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Final Environmental Impact Statement for the Land Management Plan

Nez Perce-Clearwater National Forests

Final Environmental Impact Statement for 2023 Land Management Plan for the Nez Perce-Clearwater National Forests

Lead Agency:

United States Department of Agriculture (USDA)- Forest Service

Cooperating Agencies:

Idaho County, Idaho

Clearwater County, Idaho

State of Idaho

Government to Government Consulting Agency

Nez Perce Tribe

Responsible Official:

Cheryl Probert
Forest Supervisor
USDA Forest Service
Nez Perce-Clearwater National Forests
1008 Highway 64, Kamiah, Idaho 83536

For More Information Contact:

Zach Peterson
Public and Government Relations Staff Officer
1008 Highway 64 Kamiah, ID 83536
208-935-4239 or zachary.peterson@usda.gov

Sara Daugherty
Forest Planner
1008 Highway 64, Kamiah, Idaho 83536
208-963-4206 or sara.daugherty@usda.gov

Abstract: This Final Environmental Impact Statement documents the analysis of the Preferred Alternative and four additional action alternatives developed for programmatic management of the four million acres of National Forest system lands administered by the Nez Perce-Clearwater National Forests. The purpose is to provide land management direction for the Nez Perce-Clearwater National Forests, combining the 1987 Nez Perce National Forests Land Management Plan and the 1987 Clearwater National Forest Land Management Plan into one plan for the Nez Perce-Clearwater National Forests, now managed as one administrative unit.

Commonly used acronyms

ARSC	Aquatic and Riparian Conservation Strategy
BA	Basal Area (square feet per acre)
CCF	Hundred Cubic Feet
CFR	Code of Federal Regulations
cfs	Cubic feet per second
CWN	Conservation Watershed Network
DBH	Diameter at Breast Height
DC	Desired Conditions
ESA	Endangered Species Act
FSH	Forest Service Handbook
FSM	Forest Service Manual
GA	Geographic Area
HUC	Hydrologic Unit Code
IRR	Idaho Roadless Rule
LCAS	Lynx Conservation and Assessment Strategy 2013
MA	Management Area
MBF	Thousand Board Feet
MMBF	Million Board Feet
MMCF	Million Cubic Feet
NEPA	National Environmental Policy Act 1970
NPCLW	Nez Perce-Clearwater National Forests
NRLMD	Northern Rockies Lynx Management Direction 2007
NRV	Natural Range of Variation
NWGC	National Wildfire Coordinating Group
PTSQ	Projected Timber Sale Quantity
PVT	Potential Vegetation Type
RMZ	Riparian Management Zone
RNA	Research Natural Area
ROS	Recreation Opportunity Spectrum
SIO	Scenic Integrity Objective
VCC	Vegetation Condition Class
WSR	Wild and Scenic River

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Chapter 1. Purpose of and Need for Action

1.1 Introduction

The National Forest Management Act of 1976 (U.S. Department of Agriculture 1976a) requires the preparation of an integrated land management plan by an interdisciplinary team for each unit of the National Forest System. In May of 2012, the Forest Service began using new planning regulations (National Advisory Committee for Implementation of the National Forest System Land Management Planning 2018) to guide collaborative and science-based revision of land management plans that promote the ecological integrity of national forests while contributing to social and economic sustainability. Public involvement must be provided in preparing and revising land management plans (previously called 'forest plans').[1] Land management plans must provide for multiple use and sustained yield of products and services and include coordination of outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness. The Land Management Plan does not authorize site-specific projects or activities; rather, it establishes broad direction to guide future project and activity decision making.

The Nez Perce and Clearwater National Forests were consolidated in 2013. The official name of the administratively combined forests is the Nez Perce-Clearwater National Forests. For the purposes of this document, the forests will be referred to as the Nez Perce-Clearwater. Prior to the official combination, each forest had its own Land Management Plan. Part of implementing the consolidation included a combined Land Management Plan effort, which includes the preparation of this Final Environmental Impact Statement.

The plan revision process began with preparation of an assessment that summarized the status and management of various resources on the Nez Perce-Clearwater. The assessment of the Nez Perce-Clearwater was published in June 2014. This assessment evaluated existing information about relevant ecological, economic, and social conditions, trends, and sustainability, and their relationship to the Land Management Plan within the context of the broader landscape. This information was used to identify any need for change in forest resources or in the management of those resources and as a basis for preparing the final Land Management Plan.

This Final Environmental Impact Statement documents a programmatic National Environmental Policy Act (NEPA) review. It discloses the broad environmental impacts and benefits of the proposed alternatives in contrast to analyses conducted for site-specific projects. This document describes, in general terms, the expected effects of management during the plan period but does not predict the site-specific effects of future speculative actions each time the standards and guidelines are implemented at the project level. Those site-specific effects would be disclosed in subsequent NEPA reviews during the implementation of individual projects.

1.2 Planning Area: The Nez Perce-Clearwater National Forests

The Nez Perce-Clearwater is in the heart of north-central Idaho in a seven-county region, comprising Idaho, Clearwater, Latah, Shoshone, Benewah, Lewis, and Nez Perce counties (figure 1).

[1] The terms "forest plan" and "land management plan" are used synonymously in this document.

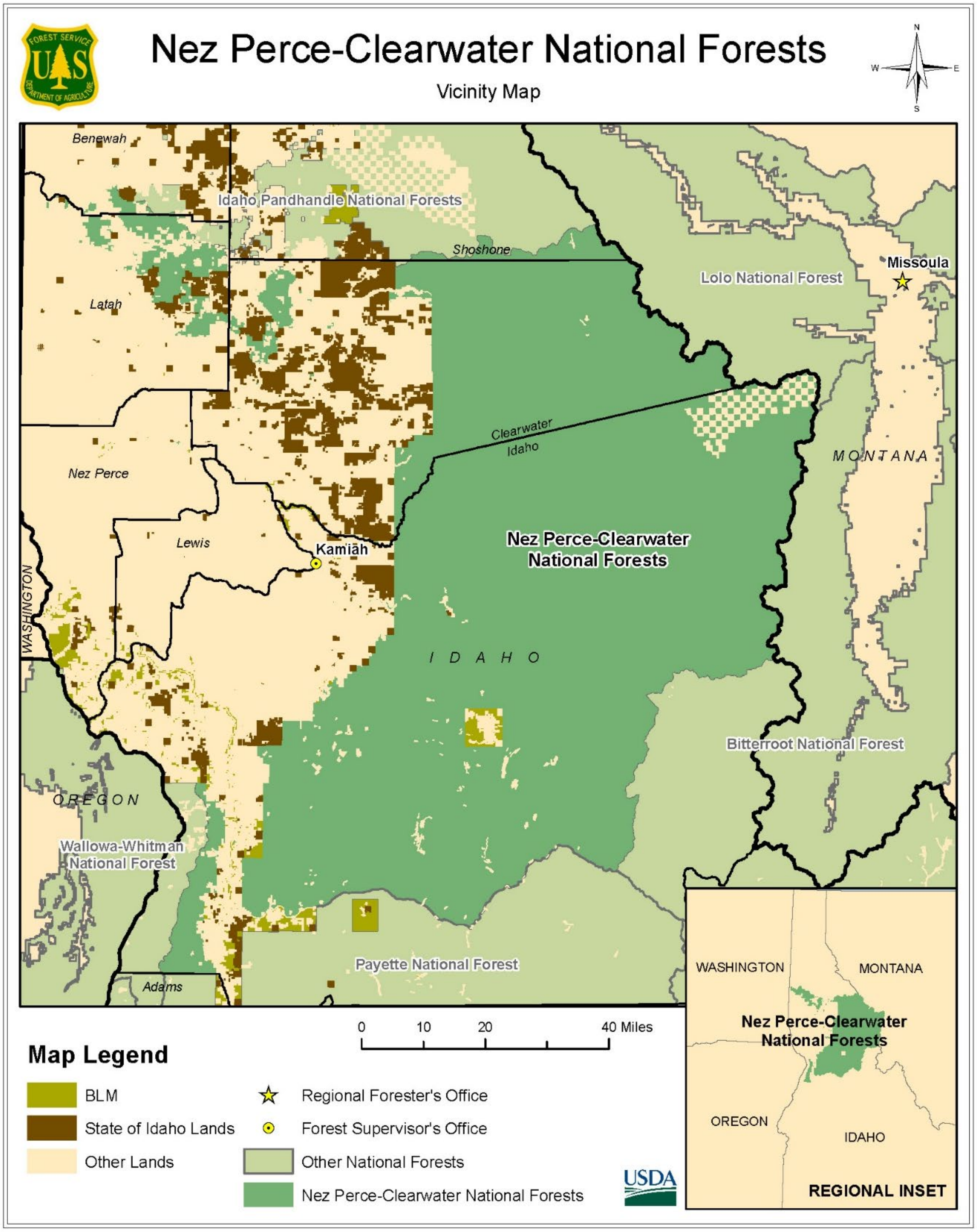

Figure 1. Map of the Nez Perce-Clearwater National Forests

The plan area encompasses six ranger districts: Palouse, North Fork, Lochsa and Powell, Moose Creek, Salmon River, and Red River. The Nez Perce-Clearwater is responsible for managing approximately four million acres across this landscape. The Clearwater River drains most of these acres within both forests and rugged mountain ranges, pristine rivers and streams, and extensive forested landscapes combine to create diverse ecosystems that provide spectacular recreational opportunities; substantial fish and wildlife habitat; and numerous forests, mineral, and range products.

The landscape of the Nez Perce-Clearwater is characterized by deep, rugged river canyons surrounded by either rolling hills or steep jagged mountains. Mixed conifer forests interspersed with small but distinctive open meadows, grasslands, and pockets of deciduous trees and shrubs comprise most of the vegetative cover. Rivers, lakes, and streams are often framed by lush riparian vegetation. Western redcedar, Western larch, western hemlock, Douglas-fir, grand fir, lodgepole pine, and Ponderosa pine are the dominant conifer species, which drape the canyon walls and stretch to the uplands. Historically, Western white pine and whitebark pine were found throughout the area. Disturbance in the form of wildland fire, landslides, and insect and disease are continually cycling through the landscape. These natural processes create a patchwork of openings with vegetation at all age classes found across the Nez Perce-Clearwater.

The rich heritage of the area is still visible. American Indian use of the area dates back for millennia and the Nez Perce-Clearwater has been the home of the Nez Perce Tribe for centuries. Early travelers used routes through the Bitterroot Mountains to explore the far reaches of the country. These events have been remembered through the designation of the Lolo Trail Historic Landmark corridor and other historic routes that bisect the Nez Perce-Clearwater. Historic mining towns, log cabins, Forest Service facilities, wagon roads, and fire lookouts dot the landscape, adding to the unique scenic character of the area.

1.2.1 Distinctive Roles and Contributions

The unique qualities of the Nez Perce-Clearwater and its ability to provide ecosystem services characterize the roles and contributions of the area. These roles and contributions provide the basis for management direction and the foundation for realistic and achievable desired conditions.

In addition to the role of providing common National Forest ecosystem services, such as clean air, clean water, nutrient cycling, and carbon sequestration, the Nez Perce-Clearwater plays a distinctive role in the local area, the region, and the nation by uniquely contributing diverse outdoor recreation opportunities; social and economic sustainability; cultural and heritage values, and ecological diversity.

Forest Service Planning

Forest Service planning takes place at different organizational levels and geographic scales. Planning occurs at three levels—national strategic planning, National Forest System unit planning, and project or activity planning. The Chief of the Forest Service is responsible for national planning, such as preparation of the Forest Service strategic plan that establishes goals, objectives, performance measures, and strategies for managing the national forests. National forest unit planning results in the development, amendment, or revision of a Land Management Plan, such as the Nez Perce-Clearwater Land Management Plan. The supervisor of the national forest is the responsible official for developing and approving a plan, plan amendment, or plan revision for lands under the responsibility of the supervisor. The forest supervisor or district ranger is the responsible official for project and activity planning (36 CFR 219.2).

National Strategic Planning

The U.S. Department of Agriculture (USDA) Forest Service Strategic Plan: Fiscal Years 2015–2020 contains four outcome-oriented goals for the Forest Service, each with strategic objectives. The strategic plan can be accessed online (www.fs.fed.us/strategicplan). The first two goals and related objectives are directly related to the current planning effort:

- Sustain our Nation's forests and grasslands
- Foster resilient, adaptive ecosystems to mitigate climate change
- Mitigate wildfire risk
- Conserve open space
- Deliver benefits to the public
- Provide abundant clean water
- Strengthen communities
- Connect people to the outdoors.

The Forest Service continues to use the results of the 2010 Resources Planning Act Assessment, a report on the status and projected future trends of the Nation's renewable resources on all forests and rangelands, as required by the 1974 Forest and Rangeland Renewable Resources Planning Act. The assessment includes analyses of forests, rangelands, wildlife and fish, biodiversity, water, outdoor recreation, wilderness, urban forests, and the effects of climate change on these resources. The assessment provides a snapshot of current United States forest and rangeland conditions (all ownerships), identifies drivers of change for natural resource conditions, and projects the effects of those drivers on resource conditions 50 years into the future. This assessment uses a set of future scenarios that influence the resource projections, allowing the exploration of a range of possible futures for renewable natural resources. Alternative future scenarios were used to analyze the effects of human and environmental influences on forests and rangelands, including population growth, domestic and global economic growth, land use change, and climate change.

In addition, the USDA strategic plan for fiscal years 2018 through 2022 has specific goals that also align with the 2012 Planning Rule, including (1) facilitate rural prosperity and economic development, and (2) ensure productive and sustainable use of National Forest System lands. The USDA strategic plan can be accessed on the USDA's website (www.usda.gov).

National Forest System Unit Planning

The National Forest Management Act of 1976 (Pub. L. 94-588) amended the Forest and Rangeland Renewable Resources Planning Act of 1974. The National Forest Management Act requires the preparation of an integrated Land Management Plan by an interdisciplinary team for each unit of the National Forest System (national forests and grasslands). The public must be involved in preparing and revising Land Management Plans, also called forest plans. Forest plans must provide for multiple use and sustained yield of products and services and include coordination of outdoor recreation, range, timber, watershed, fish, wildlife, and designated areas such as wilderness. The forest plan does not authorize site-specific prohibitions or activities; rather, it establishes overarching direction to guide future project and activity decision making.

The 2012 Planning Rule for Land Management Planning for the National Forest System sets forth process and content requirements to guide the development, amendment, and revision of Land Management Plans to maintain and restore National Forest System land and water ecosystems while providing for ecosystem services (the benefits people obtain from the National Forest System planning area) and multiple uses. The final planning directives, effective January 30, 2015, are the key agency guidance documents that direct implementation of the 2012 Planning Rule.

Outdoor Recreation

The diverse landscapes and stunning scenery of the Nez Perce-Clearwater provides extraordinary settings for recreational activities, such as camping, whitewater rafting, jet boating, trails for both motorized and non-motorized users, and fishing on the world-renown Selway, Salmon, Clearwater, and Lochsa Rivers.

Recreation opportunities also include wildlife-oriented recreation, such as hunting, wildlife watching, photography, and sport fishing. The Nez Perce-Clearwater provides crucial habitat for salmon, steelhead, and freshwater fish, which include nationally renowned blue-ribbon fishery streams, including Kelly Creek, the North Fork Clearwater River, and the Lochsa River.

The Nez Perce-Clearwater serves a unique national role providing vast, contiguous wildland areas, including the Selway-Bitterroot, Gospel-Hump, and Frank Church-River of No Return wilderness areas, with regional linkages to the Hells Canyon Wilderness and Idaho Roadless Rule areas, such as the Great Burn (Hoodoo) and Mallard-Larkins. Together these areas comprise the largest complex of unroaded lands in the lower 48 states.

Travel routes and corridors, such as the Northwest Passage Scenic Byway, also known as U.S. Highway 12; the Lolo Trail corridor, a National Historic Landmark; the Magruder Corridor; and the Elk City Wagon Road, trace the paths of the Nez Perce Tribe, Lewis and Clark, and early traders, providing recreation access and unique historical and cultural recreation experiences. The Nez Perce-Clearwater's road and trail systems provide a community backyard connection from the river valleys to the remote alpine elevations that are highly valued by residents and visitors. In addition, seven backcountry airstrips provide a distinct opportunity for access to the remote areas of the Nez Perce-Clearwater.

A network of trails and roads provide summer and winter access. Trail opportunities for both non-motorized and motorized users are plentiful in both the summer and the winter.

Social and Economic Sustainability

As the largest land jurisdiction in Idaho and Clearwater counties, the Nez Perce-Clearwater serves as a backdrop for the local area and plays a key role in supporting the social and economic sustainability of local communities, the State of Idaho, the Nez Perce Tribe, and the broader region. The productive forest lands continue to support traditional lifestyles and generational ties to the land; provide commodities, such as timber, grazing, and minerals, for regional industry; and sustain an outfitter and hunting guide recreation economy. The sport fisheries for spring and fall Chinook salmon, westslope cutthroat trout, steelhead trout, and kokanee and big game hunting opportunities for elk, black bear, moose, and big horn sheep are important components supporting the area's social and economic vitality.

The Nez Perce Tribe has reserved treaty rights, which entitle them to hunt, fish, gather, and graze livestock on the Nez Perce-Clearwater. Subsistence hunting, fishing, and gathering are both socially and economically critical to the Nez Perce people and are not viewed by them as recreation activities. The Nez Perce Tribe is involved in consultation regarding the management of the Nez Perce-Clearwater and staff from both organizations strive for a productive working relationship, particularly in efforts to support the recovery of anadromous fisheries. In addition to being culturally and socially important to the tribe, healthy salmon runs are an important economic component for both the tribe and local communities.

Cultural and Heritage Values

For millennia, the Nez Perce-Clearwater has been uniquely situated at the crossroads of several American Indian cultural areas, each possessing their own characteristic lifeways, languages, customs, and traditions. The river systems that bisect this topographically and culturally diverse region have helped create a unique archaeological and historical record on National Forest System land. The Salmon River is exceptional as the longest undammed river system in the contiguous United States. Through the centuries, the river was home to countless American Indians, Euro-American homesteaders, and miners, as well as Chinese sojourners. While thousands of archaeological sites now lie inundated under dams on the Columbia Plateau, the Salmon River flows free, and the archaeological record remains relatively intact.

The Nez Perce-Clearwater's rugged landscape required the development of ancient trail networks. The two most important were the Southern Nez Perce Trail and the Nez Perce National Historic Trail, which connected the Nez Perce homeland with buffalo country in Montana and the Northwestern plains and facilitated the dramatic 1877 flight of the Nez Perce from the U.S. Army. These mountain routes were also important to other Great Basin and Plateau American Indian groups, including the Coeur d'Alene, Shoshone, and Pend 'd Oreille and Flathead Salish tribes, who traveled and used the area for subsistence and trade and to maintain kinship ties and tribal alliances. Today, these American Indian groups and descendant communities, including the Nez Perce, retain an on-going and vibrant culture with unbroken ties to this region.

The history of the Nez Perce-Clearwater, especially that related to timber and mining, continues to influence local communities today. Mining began in the early 1860s around today's Elk City, Florence, and Pierce, Idaho. Together, these localities provided the political and financial impetus that culminated in Idaho statehood in 1890. Today, the ghost town of Florence is the oldest town site in Idaho on National Forest System land. The diverse landscape of the Nez Perce-Clearwater contains an abundance of agriculture, industrial, and domestic ruins and standing structures that document and enhance local history and are important to the identity of many rural communities within and near the Nez Perce-Clearwater boundaries.

Ecological Diversity

The Nez Perce-Clearwater is located directly in the path of ash dispersal from three major Pacific Rim volcanic eruptions – Glacier Peak, Mount Mazama, and Mount Saint Helens – depositing an ash cap as deep as 36 inches in some depressions. The resulting soil nutrient and water-holding capacity supports the Nez Perce-Clearwater's highly productive ecosystems.

The Nez Perce-Clearwater possesses a tremendous range and unusual diversity of habitats, from boreal and coastal elements in the north to extensive grasslands and pine forests in the south. The maritime influence of the Pacific Ocean also contributes to a unique coastal disjunct ecosystem with associated species uncommon to the Northern Rockies, such as the Coeur d'Alene and Idaho giant salamanders, deerfern, and Pacific dogwood. The local climatic transition caused by extreme terrain differences result in high floral diversity, including endemic species like the evergreen kittentail, Dasynotus, Idaho barren strawberry, spacious monkeyflower, the federally listed Spalding's catchfly, and four species of pine. The three major river systems, comprised of the Salmon, Clearwater, and Snake Rivers, and their accompanying tributaries, provide important aquatic and riparian habitat for many species, including bull trout, steelhead trout, westslope cutthroat trout, and Chinook salmon.

Additionally, many endemic gastropods are found in the major river systems, particularly in the Salmon River. The sheer number of endemic aquatic species within the planning area is notable and exemplary within the western United States. The Nez Perce-Clearwater's substantial spawning and rearing habitat for steelhead trout and Chinook salmon provides a large portion of the total returns of adult anadromous salmonids in the Snake and Columbia River basins.

In addition, the diverse vegetative communities on the Nez Perce-Clearwater provide terrestrial habitats that host several regionally unique native wildlife populations. This includes native lineages of fisher and bighorn sheep, as well as mountain quail, the white-headed woodpecker, and the harlequin duck. The extensive acreage of undeveloped lands, both on the Nez Perce-Clearwater and interconnected neighboring public lands, provide important habitat security and linkage for wide-ranging species, such as lynx, wolverine, and other carnivores. Historic large herds of elk are significant to the people of the area. Many economies within the planning area benefit greatly from the elk herds.

Plant and Animal Species

Bighorn Sheep

Rocky Mountain bighorn sheep historically occurred in northeastern Oregon, central Idaho, Montana, Wyoming, and northeastern Nevada. After a severe population decline in the early 1900s, bighorn remained in only a few isolated areas of their former habitat (Wisdom et al. 2000c, a). The current range represents an increase in occupied habitat since that time because of a combination of reintroductions and protection of remnant populations. Much of the historical range, however, is still unoccupied in the Salmon and Clearwater River basins and Idaho (Wisdom et al. 2000c, Idaho Department of Fish and Game 2005, Wisdom et al. 2000a).

Bighorn sheep prefer open habitats with short vegetation, both for high-quality forage (Wisdom et al. 2000c, a) and to maintain high visibility for predator avoidance. Additionally, cliffs, talus, and seasonal springs and seeps are important drivers of bighorn habitat. The location of cliffs and talus ultimately defines the distribution of bighorn sheep because such features are essential for escape cover and the secure rearing of young (Wisdom et al. 2000c, Bate and Wisdom 2004).

The primary reason the bighorn declined is due to their susceptibility to pneumonia after exposure to bacteria (*Pasteurella* spp.), viruses (Parainfluenza type-3), lungworm, and stress agents. Sources of these diseases are generally domestic sheep and goats. Major reductions or total extirpation of bighorn herds due to pneumonia outbreaks are well documented.

Bighorn sheep in the planning area have survived when other regional populations have been reduced or extirpated. This, coupled with the fact that domestic sheep grazing on the Nez Perce-Clearwater has been ongoing for centuries, make these populations of bighorn particularly interesting. In fact, individuals of this population have served as the source for other bighorn re-introductions around the west (Mack et al. 2017).

Bighorn sheep are a species of great cultural value to the Nez Perce Tribe. Additionally, they are an important game species historically and presently in Idaho.

Fisher

The Nez Perce-Clearwater National Forests and southern Idaho Panhandle National Forests are the primary areas that support fisher in the U.S. Forest Service Northern Region (Raley et al. 2012) (personal communication Sauder 2013, personal communication Schwartz 2013). The fisher is a forest-dependent species that evolved in the Northern Rocky Mountains in a complex landscape mosaic shaped by regularly occurring environmental influences on its preferred habitat, such as fire, tree disease, and wind-throw. Fishers are associated with areas of high cover and structural complexity in large tracts of mature and old-growth forests (Powell and Zielinski 1994, Sauder and Rachlow 2014, Schwartz et al. 2013). Other important site characteristics include the presence of nearby water, slope, elevation, and snow characteristics (U.S. Department of the Interior 2011a, Olson et al. 2014).

Anadromous Fish

The Nez Perce-Clearwater supports five fish species federally listed as threatened under the Endangered Species Act and one listed as endangered. Spring and summer Chinook salmon on the Nez Perce-Clearwater constitute nationally renowned fisheries of considerable local socioeconomic importance. Their cultural importance to the indigenous people of the area, particularly the Nez Perce Tribe, cannot be overstated. Snake River steelhead on and originating from the Nez Perce-Clearwater form a nationally renowned fishery of considerable socioeconomic importance, attracting anglers from all over the western United States and places beyond. Spawning and rearing habitat provided by rivers and streams on the Nez Perce-Clearwater are vital for both species within the context of the Snake River basin and for all stocks of Chinook salmon within the Columbia River basin. Bull trout exist within all subbasins throughout the Nez Perce-Clearwater, including the North Fork Clearwater subbasin. Fall Chinook salmon occur within the Salmon River, and sockeye salmon use the Salmon River as a migration corridor to headwater reaches of the Salmon basin.

Endemic gastropods

The plan area supports high gastropod diversity, including slugs and snails. In fact, approximately 68 species of gastropods are known to occur in the plan area, which is the result of the Northern Rocky Mountain refugium (Stagliano et al. 2007) (Brunsfeld et al. 2001). This area occurs along the Idaho and Montana border and was neither covered by northern ice sheets during glaciation periods nor paved with lava from the south and west (Stagliano et al. 2007). Many species of gastropods in the plan area are regional endemic species limited to northern Idaho, western Montana, southern British Columbia, and eastern Washington. Others are Idaho endemics limited in many cases to Idaho while some are local endemics with distributions limited to parts of the Nez Perce-Clearwater and some lands just outside the plan area. The Selway forestsnail (*Allogona lombardii*), the Mission Creek Oregonian (*Cryptomastix magnidentata*), and the Nimapuna disc (*Anguispira nimapuna*) are some examples of local endemic gastropods.

Similarly, the lower Salmon River canyon has exceptional landsnail diversity, which has been recognized by scientists since the 1860s (Frest and Johannes 1995) (Frest and Johannes 1997). Several species and sub-species of landsnail species are local endemics limited to the lower Salmon River canyon. Some of them are only known from small or scattered areas within the lower Salmon River canyon. Most of these species occur outside of the plan area boundaries at lower elevations but some taxa have been observed on Nez Perce-Clearwater.

Elk

Historically, elk herds were scattered, and numbers were low in the planning area. Few elk were found along the Clearwater River by Lewis and Clark in the early 1800s, probably due in part to the dense, unbroken canopy of forest that covered the area. Wildfires burned over vast expanses near the beginning of the twentieth century, creating vast shrub-fields that provided abundant forage areas for elk. Elk numbers subsequently increased and then peaked around 1950. Elk herds declined into the 1970s, partially due to the maturation of the shrub-fields and ensuing decline in forage availability, and logging and road-building activity increased elk vulnerability to hunters under liberal hunting seasons and the loss of some major winter ranges due primarily due to invasive species (Wakkinen, Hickey, et al. 2017).

Elk are a high profile culturally important species, both historically and currently, and one of high economic value in the area. Much local collaboration has occurred with the primary goal of increasing elk herds. The Nez Perce-Clearwater is considered essential in providing habitat for elk.

Harlequin Duck

Harlequin ducks are medium sized ducks that prefer turbulent, highly oxygenated waters. They breed in fast moving mountain streams and prefer rivers with closed canopies for breeding. On the Nez Perce-Clearwater, populations are routinely monitored on the Lochsa River and its major tributaries, including North Fork Spruce Creek. The Lochsa River has the highest number of breeding pairs of harlequins in the State of Idaho, according to the 2017 Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b). Many observations are documented to occur on tributaries of the North Fork Clearwater and Selway Rivers (Idaho Species Diversity Database[2]).

Harlequin duck migrate and winter on rocky coastlines. Harlequin ducks face many of the same threats other migratory birds face and their populations have diminished greatly over time. The breeding habitats on the Nez Perce-Clearwater are some of the best breeding habitats in Idaho and in the continental United States.

Mountain Quail

Mountain quail populations on the Nez Perce-Clearwater are remnants of once larger populations in Idaho and Oregon. Until the 1950s, mountain quail populations were abundant in western Idaho. They were found from the southwestern deserts north to the area along the lower Snake, Salmon, and Clearwater Rivers. Now they are found in only a few places, mostly along the Salmon River. They live in steep rugged terrain and can survive along dry slopes. The reasons for their decline are unknown. Mountain quail, as their name suggests, are usually found at higher elevations, unlike the more common California or valley quail. Mountain quail are quite unique. They are Idaho's largest quail species and the only North American quail that exhibits locally migratory behavior. They move up and down along riparian zones changing elevation depending on snow conditions, food availability, and other factors.

Whitebark Pine

Whitebark pine (*Pinus albicaulis*), a federally listed tree species, is found at higher elevations on the Nez Perce-Clearwater. Whitebark pine is native to subalpine and timberline zones. In northern Idaho, whitebark pine is a seral component of subalpine fir communities and dominates the highest peaks and ridges of greater than approximately 6,000 feet. Understory cover is typically discontinuous on these high-elevation sites. Engelmann spruce, Rocky Mountain lodgepole pine, and Rocky Mountain Douglas-fir may associate with whitebark pine, especially on mid-elevation sites. Whitebark pine is a fire adapted species, reseeding quickly following fire with assistance from the Clark's nutcracker. Due to white pine blister rust, a fungus that causes about 96 percent mortality once infected, mountain pine beetle, fire suppression and climate change, whitebark pine is in decline across its native range.

[2] Idaho Fish and Wildlife Information System, Species Diversity Database: https://idfg.idaho.gov/species/ [Accessed April 2017]

Project and Activity Planning Consistency and Transition to the Revised Plan

As required by National Forest Management Act and the Planning Rule, subject to valid existing or statutory rights, all projects and activities authorized by the Forest Service after approval of this plan must be consistent with the applicable plan components (16 U.S.C. 1604(i)) as described at 36 CFR 219.15. Projects and activities approved before the revised plan's approval are not required to meet the direction of the revised plan and will remain consistent with the direction in the 1986 and 1987 forest plans, as amended.

All project or activity approval documents, made after the effective date of the plan, will describe how the project or activity is consistent with the applicable components of the forest plan. When a proposed project or activity would not be consistent with the applicable plan components, the responsible official shall take one of the following steps, subject to valid existing rights:

1. Modify the proposed project or activity to make it consistent with the applicable plan components;
2. Reject the proposal or terminate the project or activity;
3. Amend the plan so that the project or activity will be consistent with the plan as amended;
4. Amend the plan contemporaneously with the approval of the project or activity so that the project or activity will be consistent with the plan as amended. This amendment may be limited to apply only to the project or activity.

Resource plans (for example, travel management plans) developed by the national forest that apply to the resources or land areas within the planning area must be consistent with the plan components. Resource plans developed before this plan decision will be evaluated for consistency with the plan and updated, if necessary, through site-specific National Environmental Policy Act decision making.

Authorizations for occupancy and use made before this plan approval may proceed unchanged until time of reauthorization. At time of reauthorization, all permits, contracts, and other authorizing instruments must be made consistent with the Land Management Plan, subject to valid existing or statutory rights, as provided at 36 CFR 219.15(d).

1.3 Background to Forest Land Management Planning

1.3.1 Forest Plan Revision: Land Management Planning

The National Forest Management Act requires all national forests to develop plans that direct resource management activities. These plans must be revised when conditions have changed significantly or around a ten- to fifteen-year cycle.

The existing Forest Plans for the Nez Perce and Clearwater National Forests were completed in 1987 and have been amended many times. The two Forests were administratively combined in 2013, and the Idaho Roadless Rule made management decisions that affected approximately 1.5 million acres of the Nez Perce-Clearwater. Revised Forest Service policies, congressional direction, court decisions, new or updated conservation agreements and recovery plans, and new scientific findings have all highlighted that the current plans are outdated and need to be revised.

To respond to these challenges the Nez Perce-Clearwater is currently in the process of revising the forest plans. The new, combined Land Management Plan will incorporate changes in the natural environment, will include new scientific understandings and social trends, and will satisfy regulatory requirements.

Eight primary decisions are made in Land Management Plans:

1. Forestwide components to provide for integrated social, economic, and ecological sustainability and ecosystem integrity and diversity while providing for ecosystem services and multiple uses. Components must be within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.7 and CFR 219.8–219.10).
2. Recommendations to Congress (if any) for lands suitable for inclusion in the National Wilderness Preservation System and/or rivers eligible for inclusion in the National Wild and Scenic Rivers System (36 CFR 219.7(2)(v) and (vi)).
3. Identification or recommendation (if any) of other designated areas (36 CFR 219.7 (c)(2)(vii).
4. Identification of suitability of areas for the appropriate integration of resource management and uses, including lands suited and not suited for timber production (36 CFR 219.7(c)(2)(vii) and 219.11).
5. Identification of the maximum quantity of timber that may be removed from the plan area (36 CFR 219.7 and 219.11 (d)(6)).
6. Identification of geographic or management area specific components (36 CFR 219.7 (c)(3)(d).
7. Identification of watersheds that are a priority for maintenance or restoration (36 CFR 219.7 (c)(3)(e)(3)(f).
8. Plan monitoring program (36 CFR 219.7 (c)(2)(x) and 219.12).

Many other laws and regulations apply to the management of the national forests, including, but not limited to, the National Trails Act, the Clean Air Act, the Clean Water Act, and the Endangered Species Act. These laws are generally not repeated or referenced in the language of the Land Management Plan unless there is an issue that merits a reference to the direction of the law.

Additional direction for managing National Forest System lands comes from a variety of sources, including Executive Orders, the Code of Federal Regulations, and the Forest Service directive system, which consists of the Forest Service Manual and the Forest Service Handbook. This direction does not need to be restated in the Land Management Plan and will not be found in the following sections.

1.3.2 Nature of the Decisions Made in a Land Management Plan

Land Management Plans (previously and synonymously called "Forest Plans") are strategic in nature, making general decisions that are often referred to as programmatic decisions. They provide the framework for integrated resource management and guidance for subsequent project and activity decision making on the Nez Perce-Clearwater.

The revised plan will describe desired ecological, social, and economic conditions of the Nez Perce-Clearwater and provide plan component direction that will focus management activities towards maintaining or achieving those conditions over time. The proposed plan components are designed to provide for the maintenance and restoration, where needed, of the ecological integrity of terrestrial and aquatic ecosystems and watersheds; to guide the Nez Perce-Clearwater's contribution to social and economic sustainability; and to meet the Forest Service's responsibility to American Indian tribes in relation to trust responsibilities and treaty resources.

Historically, many forest communities developed strong natural-resource-based economies in the mining, logging, agricultural, and grazing industries. Over time, other values have become increasingly important, such as protecting water quality and quantity, providing recreational settings that support tourism, and providing for functioning and intact ecosystems. Forest planning today seeks to balance these public values and expectations. When making decisions for the revised plan, the potential ecological and biological impacts will be examined, as well as the economic and social impacts to the Nez Perce Tribe, local counties, the broader regional level, and the nation.

1.3.3 Life of the Plan

The National Forest Management Act of 1976, Section 6 Part 5, modified the Forest and Rangeland Renewable Resources Planning Act of 1974 to require Land Management Plans and states that plans shall "be revised from time to time when the secretary finds conditions in a unit have significantly changed, but at least every fifteen years." Based on experience nationwide, however, plans remain in effect until such time they are revised by a new plan, which may be longer than fifteen years between revisions. The first forest plans on the Nez Perce and Clearwater National Forests have been in effect since 1987 and will continue to be in effect until a Record of Decision is signed on a revised plan, estimated to be 34 years since the forest plans originated. As such, the life of the plan throughout this environmental impact statement will be used to mean the time from the signing of a Record of Decision on this plan through signing a Record of Decision on future Land Management Plans. The timeframe is assumed to be 20 to 30 years, despite the regulatory definition of not to exceed fifteen years. When "the life of the plan" is used in plan components or analysis, it is assumed that the component or analysis will be based on implementation over 20 to 30 years.

1.4 Purpose and Need for Change

In developing a proposed plan revision, the responsible official "shall review relevant information from the assessment and monitoring to identify a preliminary need to change the existing plan and to inform the development of plan components and other plan content" (36 CFR 219.7 (c)(2)(i)).

The need to change a plan should be predicated on the status of key ecosystem characteristics, the needs and opportunities for restoration or maintenance of these characteristics, and the potential for plan components to promote ecological integrity within the terrestrial, riparian, and aquatic ecosystems relevant to the plan area. The assessment of ecosystem integrity and status of at-risk species in the plan area should be reviewed to identify and evaluate opportunities for the plan area to maintain ecological sustainability and the diversity of plant and animal communities.

Similarly, the responsible official's identification of the need to change the plan should identify opportunities for the plan area to contribute to the social and economic sustainability of the plan area and affected communities.

The purpose is to revise the 1987 Land Management Plans for the Clearwater and Nez Perce Forests into a single revised Land Management Plan under the 2012 Planning Rule.

1.4.1 Administrative Consolidation and Age of Current Plans

In February 2013, a five-year effort to consolidate leadership and programs across the Nez Perce and Clearwater National Forests culminated in a decision to combine the forests into a single administrative unit called the Nez Perce-Clearwater National Forests. Forest Service planners analyzed both the Nez Perce and Clearwater National Forests existing plans in their entirety and identified areas where adjustments are necessary. The two individual 1987 Forest Plans provide different management strategies for some resources, such as recommended wilderness areas or elk habitat. Implementation monitoring of the existing plans have identified management concerns. Additionally, the 2014 Nez Perce-Clearwater National Forests' Assessment[3] and input from collaborative public outreach has identified new information that contributes to the need for change.

The National Forest Management Act includes a provision to "revise forest plans from time to time when the Secretary finds conditions in a unit have significantly changed, but at least every fifteen years" (16 U.S.C. 1604(f)(5)(A)). The 1987 Forest Plans were developed under planning regulations completed in 1979 and amended in 1982 Planning Rule. Since that time, much has changed regarding our understanding of land management planning, including improved understanding of science and sustainability, as well as a better understanding of the values and benefits public lands provide citizens. The current plans limit the pace and scale of restoration and are slow to respond to the challenges of changing conditions, such as climate change or recreation demand. In May of 2012, the Forest Service began implementation of new planning regulations, titled the 2012 Planning Rule (36 CFR 219), to guide collaborative and science-based revision of Land Management Plans that promote the ecological integrity of national forests while considering social and economic sustainability.

Need for Change

There is a need to revise the two 1987 Forest Plans under the provisions of the 2012 planning regulations to provide the combined forests consistent, adaptable management guidance in consideration of best available scientific information while continuing to provide a range of social, economic, and ecological benefits for the present and into the future.

1.4.2 Integrated Restoration

Current forest plan monitoring, the 2014 Assessment, the 2014 Climate Change Vulnerability Assessment, and the 2011 Watershed Condition Assessment identify integrated restoration needs across the Nez Perce-Clearwater to address forest health, including resiliency to stressors, such as insects and disease, drought, and climate change; wildfire risk; aquatic and terrestrial wildlife habitat; invasive species; soil productivity and function; and road management. In February 2012, then Secretary Tom Vilsack released the Increasing the Pace of Restoration and Job Creation on Our National Forests report. It describes the need to increase the pace and scale of restoration of the nation's forests to improve both the ecological health of our forest ecosystems and the economic health of forest-dependent communities. The report outlines management actions that land managers can utilize to step up the pace and scale of restoration activities on the ground.

Need for Change

There is a need to revise the 1987 Forest Plans to emphasize integrated restoration of terrestrial and aquatic resources to restore vegetation composition, structure, and landscape patterns; reduce fuel loading; and improve watershed conditions to support wildlife and other resource values while contributing to the social and economic sustainability of local and regional communities.

[3] https://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=stelprdb5396919

1.4.3 Ecological, Social and Economic Sustainability

The 2012 Planning Rule directs the Forest Service to manage National Forests for ecological, social, and economic sustainability. In addition, the rule considers the three as having equal importance in revising Land Management Plans.

Need for Change

There is a need to revise the 1987 Forest Plans to provide for ecological, social, and economic sustainability in an integrated manner. Additionally, the plans need to be revised to better consider multiple uses and ecosystem services desired by local, regional, and national publics.

1.4.4 Updates Related to Other Law, Regulation, or Policy

In addition to updated planning regulations since development of the 1987 Plans, laws and other regulations have changed and additional species have been listed as threatened or endangered under the Endangered Species Act.

Need for Change

There is a need to revise the 1987 Forest Plans based on best available scientific information to update direction from the Inland Native Fish Strategy (INFISH) and Pacific Anadromous Fish Strategy (PACFISH) with forest-specific aquatic conservation strategies. There is a need to update lynx habitat boundaries from the 2007 Northern Rockies Lynx Management Direction. In addition, there is a need to incorporate direction established in the Idaho Roadless Rule.

1.4.5 State and Local Land Management Plans

There is a need coordinate land management planning with the planning efforts of federally recognized Indian Tribes, other Federal agencies, and State and local governments (2012 Planning Rule 36 CFR §219.4(b)). Development of the proposed Land Management Plan considered local and state plans. Chapter 3 provides a summary of how local plans were incorporated into the planning process and any items that could not be incorporated into an alternative.

Plans considered include:

Nez Perce Tribe

- Nez Perce Tribe Department of Fisheries Resources Management Plan (https://nezperce.org/wp-content/uploads/2020/09/DFRM-Management-Plan-2013-2028.pdf)

County Natural Resource Plans

- Idaho County: http://idahocounty.org/idaho-county-natural-resources-plan/
- Clearwater County: Available in the Project Record
- Benewah County: Available in the Project Record
- County Wildfire or All Hazard Mitigation Plans
- Idaho County: https://idahocounty.org/planb/wp-content/uploads/2022/09/DRAFT_IdahoCounty_MHMP_2022.pdf
- Clearwater County: Clearwater County Wildfire Plan May 2023.pdf

- Lewis County: Lewis-Co-Multi-Jurisdictional-Hazard-Mitigation-Plan-July-2020-with-Fire-Plan.pdf (lewiscountyid.us)
- Nez Perce County: http://www.co.nezperce.id.us/Portals/0/EmergencyManagement/ALL_Hazard_Mitigation_Plan_2022.pdf
- Latah County: https://api.latah.id.us/web/DownloadFile?filename=DisasterServices\Plans\Latah%20County%20Hazard%20Mitigation%20Plan-2020.pdf
- Shoshone County: https://shoshonecounty.id.gov/wp-content/uploads/2018/08/2018-Shoshone-County-Final-AHMP-Adopted_Approvedhttps://shoshonecounty.id.gov/wp-content/uploads/2018/08/2018-Shoshone-County-Final-AHMP-Adopted_Approved.pdf.

State of Idaho Plans

- State Wildlife Action Plan (SWAP) (https://idfg.idaho.gov/swap)
- State Forest Action Plan (https://www.idl.idaho.gov/noboundariesforestry/forest-action-plan/)
- Idaho Water Resource Board Comprehensive State Water Plan (https://idwr.idaho.gov/iwrb/water-planning/state-water-plan/)
- Department of Environmental Quality Total Maximum Daily Load Implementation Plans (https://www.deq.idaho.gov/water-quality/surface-water/total-maximum-daily-loads/)
- Idaho Department of Parks and Recreation Strategic Plan (https://parksandrecreation.idaho.gov/about-parks-recreation/)

1.4.6 Best Available Scientific Information

There is a need to incorporate new information and science into plan guidance. Inventory information about forest land and water resources is more comprehensive than what was available in 1987, because of continued updates and new data management tools. The Forest Service now has geographic information system (GIS) technology, which greatly enhances assessment, analysis, and monitoring. Research and monitoring have increased our knowledge of the physical, biological, and social processes occurring on the Nez Perce-Clearwater during the last quarter of a century. Using science in planning provides the responsible official with the knowledge, methods, and resource expertise needed to make an informed decision. In addition, the Nez Perce Tribe holds unique traditional ecological and cultural knowledge of the area. To ensure that the revised plan helps contribute to sustainable stewardship of the nation's forests, the Nez Perce-Clearwater has used the best available scientific information to inform the 2014 Assessment and the development of the proposed plan components.

Specialists used multiple resources that included peer-reviewed and technical literature; databases and data management systems; modeling tools and approaches; information obtained via participation and attendance at scientific conferences; local information, workshops, and collaborations; and information received during public participation periods for related planning activities. Resource specialists considered what is most accurate, reliable, and relevant in their use of the best available scientific information. The citations in Chapter 3 (and corresponding Literature Cited), as well as additional data stored in the project record, serve as the Nez Perce-Clearwater's initial list of best available scientific information. A final determination of best available scientific information will be made with the Record of Decision.

1.5 Scoping

The Nez Perce-Clearwater is proposing to revise the current Land Management Plans. Scoping was done with the release of the July 2014 proposed action and Notice of Intent in the Federal Register (79 Federal Register 41252 document number 2014-16534). The proposed action document included preliminary identification of forestwide and management area desired conditions, objectives, standards, guidelines, and the suitability of lands for specific multiple uses, including those lands suitable for timber production. The proposed action included preliminary identification of the long-term sustained yield and planned sale quantity. It included a description of the plan area's distinctive roles and contributions within the broader landscape; the preliminary identification of priority restoration watersheds; and proposed and possible actions that may occur on the plan area over the life of the plan. The 2014 proposed action yielded 13,800 comments. From those comments, issues were identified (see Section 1.7).

Modifications of the 2014 proposed action led to the release of the 2017 Framework for Alternative Development. This document explicitly stated it was not an alternative, but rather a set of theoretical plan components that could be used to develop alternatives. That document was considered as an alternative but will not be analyzed in detail. Some portions of the Framework for Alternative Development moved forward into one or more action alternatives to be analyzed based on robust collaboration during alternative development while other portions did not move forward at all.

1.6 Decision Framework

Given the need for change, the deciding official reviews the action alternatives, the No Action Alternative, the Preferred Alternative, and the environmental consequences to make the following decisions:

- Forestwide components to provide for integrated social, economic, and ecological sustainability and ecosystem integrity and diversity while providing for ecosystem services and multiple uses. Components must be within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.7 and CFR 219.8–219.10).
- Identification of geographic or management area specific components (36 CFR 219.7(d)).
- The plan's distinctive roles and contributions within the broader landscape.
- Identification of suitability of areas for the appropriate integration of resource management and uses, including lands suited and not suited for timber production (36 CFR 219.7(c)(2)(vii) and 219.11).
- Identification of the maximum quantity of timber that may be removed from the plan area (36 CFR 219.7(c)(2)(ix) and 219.11(d)(6)).
- Identification of watersheds that are a priority for maintenance or restoration (36 CFR 219.7(f)(i)).
- Recommendations to Congress (if any) for lands suitable for inclusion in the National Wilderness Preservation System and/or rivers eligible for inclusion in the National Wild and Scenic Rivers System (36 CFR 219.7(c)(2)(v) and (vi)).
- Identification or recommendation (if any) of other designated areas (36 CFR 219.7 (c)(2)(vii).
- Plan monitoring program (36 CFR 219.7(c)(2)(x) and 219.12).

The responsible official for the Land Management Plan is the Forest Supervisor. After reviewing the results of the analysis evaluated in the Final Environmental Impact Statement, the responsible official will issue a draft record of decision, in accordance with agency decision making procedures (40 CFR § 1505.2) that will:

- disclose the decision (identifying the selected alternative) and reasons for the decision.
- discuss how public comments and issues were considered in the decision, and
- discuss how all alternatives were considered in reaching the decision, specifying which one is the environmentally preferable alternative (defined in 36 CFR § 220.3).

The Land Management Plan provides a set of integrated plan direction for managing the Nez Perce-Clearwater for the next 10 to 15 years. However, even after approval of the plan, project level environmental analysis will still need to be completed for specific proposals to implement the direction in the Land Management Plan.

Land management plans do not make budget decisions. Should Congress emphasize specific programs by appropriation, a redistribution of priorities would follow, regardless of the alternative implemented.

1.7 Public Involvement and Collaboration

The Nez Perce-Clearwater began public participation activities in 2012 and facilitated numerous public and interagency meetings to bring together information for the Nez Perce-Clearwater to consider in preparing the assessment, developing the proposed action, and developing alternatives to the proposed action. There were 22 rounds of public meetings between 2012 and 2014 to develop the 2014 Proposed Action. The first meeting was a summit to introduce the concepts of forest plan revision to the public. The next meetings discussed the Need to Change, the Desired Conditions, and Forest Resource Management, including wilderness and timber suitability and other plan components. Public input was compiled at each meeting, as well as throughout the process. The dialogue and recommendations from this public involvement process were used to help develop the proposed action.

In addition to postal mail and email, public meeting information was announced via the forest plan revision website.[4] The website also included a means for public comment using electronic or printed comment forms or submitting comments via an electronic database and posted meeting results and other information. Updates were posted periodically.

The notice of intent for the proposed action to prepare an environmental impact statement was published in the Federal Register on July 14, 2014. The notice of intent asked for public comment on the proposal for a 60-day period, which was extended to 120 days based on public requests. The Nez Perce-Clearwater held five public meetings to provide opportunities to better understand the proposed action so that meaningful public comments could be provided by the end of the scoping period. Using the comments from the public, other agencies, tribes, and organizations, the Nez Perce-Clearwater interdisciplinary team developed a list of issues to address through changes to the proposed action, development of alternatives, or in analysis of impacts of the proposed action. A corrected notice of intent was published on September 5, 2019, to correct the anticipated dates of

[4] https://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=stelprdb5447338

availability of the Draft Environmental Impact Statement from 2015 to 2019 based on changes to the timeline.

Since the scoping period, public involvement has been ongoing. Stakeholders have been defined as any individual, organization, government, or tribe that is interested in our planning process. The forest plan revision team met with thousands of individuals from hundreds of organizations since 2012. Following the scoping period, the team continued to meet with any and every organization that invited the team to meet with them. This included attendance at well over 100 meetings between 2014 and the release of the Draft Environmental Impact Statement. The Nez Perce-Clearwater convened meetings on several occasions, including a meeting in May 2015 to update the public on what has happened since scoping, a webinar in December 2017 to prepare the public for alternative development, a meeting in January 2018 to solicit input on alternatives over three days in two locations, and another meeting in the summer of 2018 to share the alternatives being analyzed with the public over six meetings across the Nez Perce-Clearwater. Additionally, in 2018, County Commissions were briefed in public county commission meetings in the counties of Idaho, Clearwater, Latah, Lewis, Nez Perce, Benewah, and Shoshone in Idaho and the counties of Ravalli, Superior, and Missoula in Montana.

Comments have been accepted at any time during the process and that acceptance will continue throughout the process. These comments have helped the interdisciplinary team develop plan components and alternatives, conduct analysis, determine the best available scientific information, conduct wilderness evaluations, create wild and scenic suitability reports, and develop a monitoring plan. Comments have also been used by the Regional Office in development of the Species of Conservation Concern (SCC) list.

Collaboration with groups terming themselves as such has also provided the Nez Perce-Clearwater with information that is used by the Nez Perce-Clearwater the same as other comments. The Nez Perce-Clearwater attends their meetings at their invite and does not give any decision-making authority to these collaborative groups. However, groups of people with diverse thoughts and needs working to solve problems working towards consensus on issues is taken very seriously and input of this sort is highly valued by the Forest Service, whether it comes from an organized collaborative or from elsewhere. The interdisciplinary team has meet with the following collaborative groups since 2012:

- Forest Plan Collaborative 2012-2014, U.S. Forest Service convened
- Clearwater Basin Collaborative (CBC) 2014-current, at their invitation
- Efficiency in Public Collaborative (EPC) 2019-2020

The State of Idaho has been involved with forest planning since 2012. Various state agencies have been present at public meetings, met with the interdisciplinary team, provided information and data, and assisted in the development of plan components.

State agencies, offices, and commissions that have been involved include:

- Idaho State Department of Agriculture
- Idaho Department of Environmental Quality
- Idaho Department of Fish and Game
- Idaho State Historic Preservation Office

- Idaho Department of Lands
- Idaho Department of Parks and Recreation
- Idaho Department of Water Resources
- Idaho Geological Survey
- Idaho Governor's Office of Species Conservation.
- Idaho Governor's Idaho Roadless Commission
- Idaho Governor's Lewis and Clark Trail Commission

Four agencies or governments have signed a cooperating agency agreement for plan revision with the Forest Service. These cooperating agencies participate in the development of the Land Management Plan and Final Environmental Impact Statement with regards to their areas of specialized expertise. Cooperating agency participation in the forest plan revision is not an endorsement of the Land Management Plan nor does cooperating agency status limit their ability to participate during the public involvement process. Cooperating agencies include:

- Idaho County
- Clearwater County
- State of Idaho by and through the Idaho Governor's Office of Species Conservation

The Forest Service has consulted with the Nez Perce Tribe through the life of the revision of the Land Management Plan. The Tribe has been influential in the preparation of both the Draft and Final Environmental Impact Statements. Staff to staff meetings between the Tribe and the Forest Service began in 2012 are ongoing. Forest Leadership has also met with the Nez Perce Tribal Executive Committee to provide updates and incorporate important components to the Land Management Plan.

Following the release of the Draft Environmental Impact Statement, the publication of the Federal Register Notice on December 20, 2019, initiated a formal 90-day comment period. The comment period was extended for 30 days, concluding on April 20, 2020, for a total comment period duration of 120 days. Public meetings were held in Kamiah, Grangeville, Orofino, Elk City, Lowell, Coeur d'Alene, Lewiston, Moscow, Riggins, McCall, and Boise in Idaho and Superior, Missoula, and Hamilton in Montana. Comments were accepted through the Forest Plan Revision commenting site, by e-mail, and by written mailed or hand delivered comment.

During the formal comment period, 20,837 comments were received in total. 1,329 unique comment letters were received. Within these letters, 4,134 individual substantive comments were identified. The substantive comments were grouped into 133 concern categories with approximately 400 concern statements were developed from these substantive comments. See Appendix M for additional information and a response to the concern statements.

As part of the public involvement process, the agency has made available the documents listed on the Nez Perce-Clearwater webpage.[5]

[5] Nez Perce-Clearwater Forest Plan Revision webpage: https://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=stelprdb5447338

1.8 Issues

The Nez Perce-Clearwater separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Land Management Plan, or other higher-level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality National Environmental Policy Act regulations explain this delineation in Section 1501.7 as "…identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review (Sec. 1506.3) …" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the project record.

1.8.1 Significant Issues

The Nez Perce-Clearwater identified four significant issues during scoping based on the scoping document titled "Proposed Action."[6]

Recommended Wilderness and Wild and Scenic Rivers

Issue 1: The Proposed Action may not adequately apportion recommended wilderness areas across the Nez Perce-Clearwater. The proposed action may not adequately apportion suitable Wild and Scenic River segments across the Nez Perce-Clearwater.

Background: The Nez Perce- Clearwater contains some of the wildest lands in the United States. Parts of three wilderness areas are found on the Nez Perce-Clearwater. The Nez Perce-Clearwater is also home to wild rivers, including the Middle Fork Clearwater River and Salmon Rivers, which were among the first to be designated in the original Wild and Scenic Rivers Act. Yet many more acres of wild country and many more miles of wild rivers are found on the Nez Perce-Clearwater. The Planning Rule directs the Nez Perce-Clearwater to evaluate areas to determine if they should be recommended for wilderness and look at rivers to determine if they are eligible and suitable for inclusion in the Wild and Scenic Rivers system.

Recommended wilderness and wild and scenic rivers are a polarizing topic amongst the public. While nearly all acknowledge they appreciate wild lands and wild and free rivers, there is no agreement as to how best to manage those lands. During collaborative efforts and based on comments received, many expressed concerns that additional recommended wilderness areas were not warranted. Some felt the current designated wilderness areas are already the best possible wilderness areas. Others stated that by percentage, the Nez Perce-Clearwater has a very high amount of designated wilderness areas compared to other national forests, regions, states. Many were concerned with the loss of recreational opportunities, including motorized, over-the-snow, and mechanized uses, that may come with additional recommended wilderness areas. Similarly, citizens and elected officials are concerned with the negative economic impact that may be realized by counties by recommending wilderness areas. Also mentioned was the perspective that the Idaho Roadless Rule (IRR) has successfully maintained many of the wilderness characteristics of these areas. Alternatively, many commented that the Nez Perce-Clearwater has some of the largest

[6] The 2014 Proposed Action was a scoping document originally intended to be an alternative analyzed in the Draft Environmental Impact Statement. However, based on internal and external comments, that alternative will not be analyzed in detail in the Environmental Impact Statement (EIS). The issue statements from the Proposed Action helped to form all action alternatives in the EIS. References to the proposed action refer to the 2014 scoping document, not a proposed or preferred alternative in the Draft Environmental Impact Statement.

remaining roadless expanses in the United States and that those should be protected by recommending them for a wilderness area designation. Many felt that the Idaho Roadless Rule does not adequately protect the Idaho Roadless Areas due to the allowance of motorized travel within them. A few wanted all or most all Idaho Roadless Areas to be recommended as wilderness areas. Many wanted many roadless areas, but not all, to be recommended. Others wanted specific areas to be recommended for a variety of ecological and social reasons.

The public is divided as to whether the Wild and Scenic Rivers Act is the most appropriate mechanism to continue to protect our rivers. Many, including elected officials and the county commissions of both Idaho and Clearwater counties, felt that the Nez Perce-Clearwater already has the best of the best designated as Wild and Scenic Rivers. They said that no other rivers rose to the level of the Lochsa, Selway, Middle Fork Clearwater, and Salmon Rivers. Some suggested that current protections on the rivers, such as PACFISH, the Clean Water Act, and Endangered Species Act, do enough to protect the outstandingly remarkable values. Others expressed that the act originally was meant to protect against dam construction and that dam construction is not likely to be considered on any river on the National Forest. There was widespread agreement that people did not want to see a dam constructed on the North Fork or South Fork Clearwater, or other major rivers, and would support limitations on dam construction. A considerable discussion regarding unintended consequences of suitability, eligibility, or designation brought into question how rivers would be managed and if a suitable finding would curtail forest management, interstate commerce, recreation, and other activities within and outside the corridor. These limitations and their relevance to the economies of local communities was discussed by several, including the county commissions of Idaho and Clearwater counties.

Some of the public appeared to be on the fence regarding finding rivers suitable. They asked that the Nez Perce-Clearwater find the right rivers for the right reasons suitable but not to make it more expansive than it needs to be. During the eligibility process, several rivers rose to the top. These rivers have multiple outstandingly remarkable values, have been reviewed for potential dam construction, and are located outside designated wilderness areas. These rivers generally are the best within their respective subbasins. These rivers also tend to have the most support for a finding of suitable. Others felt an approach that was more holistic was in order and termed this the systems approach. Rivers should not be thought of only as individual rivers or river segments but rather as river systems. Connectivity of high-quality aquatic systems is important for fisheries, wildlife, and recreation. The Nez Perce-Clearwater has some of the best aquatic habitat and rivers in the country. An alternative should be developed that finds many, or most, of the rivers suitable, with a preference on the rivers with the greatest contribution to their subbasin.

Indicators:

- Acres of recommended wilderness areas that provide primitive recreation opportunities.
- Acres of recommended wilderness areas that provide semi-primitive non-motorized recreation opportunities.
- Acres of recommended wilderness areas currently providing semi-primitive motorized recreation opportunities.
- Idaho Roadless Areas providing High and Medium –High Capability for providing wilderness character as assessed using wilderness character attributes of untrammeled, natural, undeveloped, outstanding opportunities for solitude or a primitive and unconfined type of

recreation and Special Features such as Ecological, Geologic, Scientific, Educational, Scenic or Historical Values.

- Idaho Roadless Areas with the potential to add underrepresented ecological communities to the national wilderness system as assessed using number and percentage of underrepresented ecological communities at forest, regional and national landscape scales.
- River segments with outstandingly remarkable values.
- Eligible River segments suitable for inclusion in the Wild and Scenic River system.

Recreation and Access Management

Issue 2: The proposed action may not adequately apportion motorized and non-motorized recreation access opportunities in the front country (Management Area 3) and backcountry (Management Area 2) areas across the Nez Perce-Clearwater.

Background: The Nez Perce-Clearwater currently provides for motorized opportunities on approximately 35 percent of the Nez Perce-Clearwater based on current travel plans. During scoping and in conversations with stakeholders since, it again became apparent that there is a divide between perspectives of how motorized and non-motorized use should be managed. Motorized recreation is very important to the people in the area. Local economies are dependent, in part, on motorized recreation on the Forest. Additional opportunities for motorized recreation should be available in the future. Of particular importance is the opportunity for additional loop systems, including motorized loops of varying length and skill level. In each recreation opportunity, whether roaded modified, semi-primitive, and primitive, there is a desire to be able to access these opportunities with a motorized vehicle in both the winter and summer. Conversely, the forest plan revision team heard some areas of the National Forest should remain free of motorized use. In addition to additional recommended wilderness areas, other areas should not allow motorized use in both the summer and winter seasons. Keeping areas free of motorized use is important for solitude of visitors, to reduce visitor conflict, and to provide habitat for wildlife.

Indicators:

- Acres of Nez Perce-Clearwater currently providing semi-primitive motorized or mechanized opportunity in winter or summer areas that would be managed as recommended wilderness.
- Acres of Nez Perce-Clearwater by use season providing semi-primitive motorized recreation opportunity providing secluded recreation experiences in the backcountry management area (Management Area 2).
- Acres of Nez Perce-Clearwater by use season providing motorized recreation opportunities in the front country (Management Area 3).

Forest Vegetation

Issue 3: Desired conditions for forest vegetation should be met through natural processes or through active management. The rate of progress towards the desired conditions should occur at a faster or slower pace. Desired conditions should include higher compositions of early seral species and increased or decreased patch sizes and increased or decreased tree densities to meet ecological habitat needs of wildlife species, maintain resiliency of forest vegetation communities, and meet the social needs of forest users at a local, regional, and national scale.

Background: Forest vegetation desired conditions were assumed to be an unresolved conflict among available uses. However, as comments came in and through additional conversations with various stakeholders, it became clear that for most the issue was not the desired conditions but how fast the forest moved towards desired conditions, the extent to which active management was used to move towards desired conditions versus letting natural processes dominate, and how special habitats were treated in the plan, such as old-growth forests, snag densities, and live tree retention.

As a result, the forest vegetation desired conditions are nearly identical across alternatives but rather vary by management area and in the rate at which desired conditions are assumed to be met by alternative. Old-growth, snag, and live tree retention plan components also varied by alternative. In general, the public did not comment during scoping regarding the inadequacy of our forest vegetation desired conditions but did comment on how much management was being done, or not done, and how the Nez Perce-Clearwater intended to treat legacy habitats, such as old-growth and snags into the future.

Indicators:

- Forest composition and structure: Predicted changes to tree species composition (dominance types or species presence-abundance) and structure (tree size classes, density, old growth, and snags)
- Landscape pattern of the forests: Potential changes to the pattern of forest conditions (for example, successional stages, species composition, tree density, and fuels) on the landscape
- Resistance and resilience of the forest:
- Response of vegetation to disturbances and stressors — effects of the alternatives on the hazard of wildfire, key insects and diseases, weather disturbances, and climate change
- Carbon stocks

Timber

Issue 4: The Potential Timber Sale Quantity should be increased or decreased to better provide for a balance of ecological sustainability, economic, and social resiliency. The maximum regeneration harvest unit size should be increased or decreased.

Background: Timber harvest and the potential timber sale quantity are directly tied to Issue 3 – Forest Vegetation Desired Conditions. Timber has become a metric used to discuss the amount of activity occurring on the Nez Perce-Clearwater. In this plan, timber volume is an output from the number of acres being treated to achieve desired conditions at various rates that vary by alternative. However, as the public expects a discussion regarding timber outputs, the rule's requirement to state a potential timber sale quantity and the implications the potential timber sale quantity has on local industry and the sustainability of milling infrastructure over time is discussed here as an issue.

Based on acres treated by alternative, the timber harvest levels vary by alternative and range from a level like what is being done currently on the Nez Perce-Clearwater up to a departure from the sustained yield limit to move towards desired conditions at a faster rate. Some would like to see higher levels of potential timber sale quantity to support local communities while others would like to see the highest level that is sustainable in the long-term. Others would rather see natural processes, such as fire, insect and disease, and wind throw, work through time towards forest vegetation desired conditions and would like to see a lesser timber harvest.

Indicators:

- Potential Timber Sale Quantity
- Potential Wood Sale Quantity (includes biomass)
- Maximum regeneration harvest unit size

1.8.2 Non-Significant Issues

While significant issues represent unresolved conflict among available resources; there were numerous other items that may not have been significant in the proposed action were identified through public comment. Those items helped guide the Nez Perce-Clearwater as the forest plan revision team continued to develop plan components and include:

Lolo Trail National Historic Landmark should get special management area protection with a boundary and specific desired conditions

Levels of protections for aquatic resources should be at least as strong as in the Pacific Anadromous Fisheries Strategy (PACFISH)

1.9 Organization and Land Management Plan Components

The detailed plan components for all action alternatives are organized in several parts:

- Chapter 1. Introduction
- Chapter 2. Physical and Biological Ecosystems
- Chapter 3. Tribal Trust Responsibilities
- Chapter 4. Human Uses of the Forest
- Chapter 5. Production of Natural Resources

Land Management Plan appendices include:

- Appendix 1. Maps
- Appendix 2. Glossary
- Appendix 3. Monitoring Plan
- Appendix 4. Management Approaches and Possible Actions
- Appendix 5: Northern Rockies Lynx Management Direction, Record of Decision
- Appendix 6: Water Resources and Fisheries
- Appendix 7: Scenic Character Descriptions.

The following appendices are attached to this Environmental Impact Statement:

- Appendix A: Maps
- Appendix B: Vegetation and Timber Analysis Process
- Appendix C: Wildlife Species and Habitat Summary

- Appendix D: Carbon Assessment
- Appendix E: Recommended Wilderness Inventory, Evaluation, and Analysis
- Appendix F: Wild Scenic River Suitability
- Appendix G: Climate Change
- Appendix H: Scenery Management System Mapping Process
- Appendix I: Comparison of Direction by Alternative
- Appendix J: Lolo Trail Administrative Context and Management Recommendations
- Appendix K: Water Resources and Fisheries
- Appendix L: Air Quality
- Appendix M: Response to Comments

There is an important distinction between plan components, such as desired conditions, objectives, standards, guidelines, and suitability, and other elements of the plan. A plan amendment is required to add, modify, or remove one or more plan components or to change how or where one or more components apply to all or part of the plan area, including management areas or geographic areas (36 CFR 219.13(a)).

Other elements of the Land Management Plan that are not plan components provide information and background material integral to the successful implementation of the Land Management Plan. As conditions change, this information can be updated with administrative changes.

1.9.1 Desired Conditions

A desired condition is a description of specific social, economic, and/or ecological characteristics of the plan area or a portion of the plan area toward which management of the land and resources should be directed. Desired conditions must be described in terms that are specific enough to allow progress toward their achievement to be determined but not include completion dates (36 CFR 219.7(e)(1)(i)).

These are the social, economic, and ecological attributes that will be used to guide management of the land and resources of the plan area. They may apply to the entire plan area or to specific geographic or management areas. Desired conditions are not commitments or final decisions approving projects and activities. The desired condition for some resources may currently exist or may only be achievable over a long time for other resources. The Nez Perce-Clearwater may need to adjust the desired conditions if monitoring results indicate they are not achievable in the long-term. Desired conditions will only be found in the section of the plan labeled “Desired Conditions.”

1.9.2 Objectives

An objective is a concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets (36 CFR 219.7(e)(1)(ii)).

Objectives describe the focus of management in the plan area within the plan period. Objectives that are defined as occurring “over the life of the plan” are referring to the first 15 years of plan implementation. Objectives will only be found in the section of the plan labeled “Objectives.”

1.9.3 Standards

A standard is a mandatory constraint on project and activity decision making, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements (36 CFR 219.7(e)(1)(iii)).

Standards can be developed for forestwide application or for specific areas and may be applied to all management activities or selected activities. Standards will only be found in the section of the plan labeled "Standards."

1.9.4 Guidelines

A guideline is a constraint on project or activity decision making that allows for departure from its terms, so long as the purpose of the guideline is met. Guidelines are established to help achieve or maintain a desired condition or conditions to avoid or mitigate undesirable effects or to meet applicable legal requirements (36 CFR 219.7(e)(1)(iv)). Guidelines can be developed for forestwide application or for specific areas and may be applied to all management activities or selected activities. Guidelines will only be found in the section of the plan labeled "Guidelines."

1.9.5 Suitability

Specific lands within the Nez Perce-Clearwater boundaries will be identified as suitable for various multiple uses or activities based on the desired conditions applicable to those lands. The plan will also identify lands within the Nez Perce-Clearwater boundaries as not suitable for uses that are not compatible with desired conditions for those lands. The suitability of lands need not be identified for every use or activity (36 CFR 219.7 (e)(1)(v)).

Identifying suitability of lands for a use in the Land Management Plan indicates that the use may be appropriate but does not make a specific commitment to authorize that use. Final suitability determinations for specific authorizations occur during the project or activity level decision-making process. Generally, the lands on the Nez Perce-Clearwater are suitable for all uses and management activities appropriate for national forests, such as outdoor recreation, range, or timber, unless identified as not suitable.

1.9.6 Management and Geographic Areas

Management areas and geographic areas are spatially identified areas within the Nez Perce-Clearwater. These areas are assigned sets of plan components, such as desired conditions, suitable uses, and, in some areas, either standards or guidelines, or both.

Management Area 1: Wilderness, Wild and Scenic Rivers, and National Historic Landmark Areas

Management Area (MA) 1 is comprised of protected areas with national designations. This management area consists of three sub-categories, each with their own specific management direction. The sub-categories include designated wilderness, designated wild and scenic rivers, and National Historic Landmarks. Components specific to Management Area 1 are coded as "MA1."

Management Area 2: Backcountry

Management Area 2 includes lands within Idaho Roadless Areas, recommended wilderness areas, eligible and suitable wild and scenic rivers, parts of the Gospel-Hump Geographic Area, and proposed and designated research natural areas. This management area is made up of relatively large areas, generally without roads, and provides a variety of motorized and non-motorized recreation opportunities. Trails are the primary improvements constructed and maintained for recreation users. In some areas, lookouts, cabins, or other structures are present, as well as some evidence of management activities. Components specific to Management Area 2 are coded “MA2.”

Management Area 3: Front Country

The rest of the Nez Perce-Clearwater comprises Management Area 3. Most of this management area consists of the areas with roads, trails, and structures, as well as evidence of past and ongoing activities designed to actively manage the area. This management area includes parts of the Gospel-Hump Geographic Area and proposed and designated special interest areas. This management area provides a wide variety of recreation opportunities, both motorized and non-motorized. Components specific to Management Area 3 are coded “MA3.”

Geographic Area: Gospel-Hump

The Endangered American Wilderness Act (1978) divided the roadless area formerly known as the Gospel-Hump area into three portions. The largest portion, consisting of 206,000 acres, became wilderness; another portion, comprising 45,000 acres, became available for immediate development; and a third portion, including three areas totaling 92,000 acres referred to as the Gospel-Hump Multi-Purpose Area, was designated for multiple purpose resource development. Section Four of the Endangered American Wilderness Act directed the completion of the Gospel-Hump Multi-Purpose Plan, which was completed in 1985 and incorporated into the 1987 Nez Perce Forest Plan. The Endangered American Wilderness Act provides for periodic updates to this multi-purpose plan. This section fulfills that legislative intent and would replace the direction for the area found in the Gospel-Hump Multipurpose Resource Development Plan and the 1987 Nez Perce National Forest Land Management Plan.

Geographic Area: Lower Salmon River

The Lower Salmon River area is approximately 210,695 acres and contains a rich geological complexity, contributing to a biological community that is unique within the plan area. This geographic area contains a large portion of the driest portion of the warm dry potential vegetation group dominated by Ponderosa pine under a frequent low intensity fire regime. These habitats support species associated with Ponderosa pine dominated habitats, including several species of conservation concern.

Geographic Area: Pilot Knob

The Pilot Knob geographic area is approximately 20,975 acres is known as T’amloyiitsmexs by the Nez Perce, is a very important cultural and sacred site to the Nez Perce Tribe. T’amloyiitsmexs is a significant landmark used by the Nez Perce for “weyekin,” or spiritual quests. Pilot Knob has a significant historic meaning with respect to the Nez Perce religious values and practices that have been used from time-immemorial and remains to be respected and used by Nez Perce tribal members. Per the Nez Perce Tribal Executive Committee, these tribal religious rites can be conducted in no other place. The Nez Perce Tribe strives to maintain its cultural and traditional practices and to keep alive the knowledge of the beliefs and interpretations of such values. Because of its elevation and central location, Pilot Knob started being used as a site to locate communication equipment in 1977 with the issuance of a communication use permit to the State of Idaho Military Division Public Safety Communications Unit. By 1988, the Nez Perce Tribal Executive Committee described that most of Pilot Knob’s features had been altered, defaced, or destroyed by man-made devices. The Pilot Knob Geographic Area is also an Idaho Roadless Area with a "Special Areas of Historic or Tribal Importance" theme.

Geographic Area: Lolo National Historic Landmark Trail

The Lolo Trail, a National Historic Landmark administered in cooperation with the National Park Service, is part of the Nez Perce National Historical Park. The trail extends through the Nez Perce-Clearwater from Lolo, Montana, to Weippe, Idaho.

The Lolo Trail National Historic Landmark was designated in 1963. Its significance lies in its roots as an ancient American Indian trail. This trail comprises the route Lewis and Clark traveled from 1805 to 1806, as well as the path taken by the Nez Perce Indians during the Nez Perce Indian War of 1877. The landmark stretches about 62 miles from the Nez Perce-Clearwater boundary near Musselshell Meadows to the Nez Perce-Clearwater boundary near Lolo Pass and is approximately 55,760 acres in size.

The Lolo Trail National Historic Landmark is a geographic area and also part of Management Area 1 as a congressionally designated landmark.

1.9.7 Other Required Content

Monitoring Program

The Monitoring Program will provide Land Management Plan monitoring questions and associated indicators. The monitoring plan will offer management of resources on the Plan area, including testing relevant changes and measuring management effectiveness and progress towards achieving or maintaining the plan's desired conditions or objectives per 36 CFR 219.129(a)(2). A Monitoring Plan is included as Appendix 3 of the Land Management Plan.

Priority Watersheds

The 2012 Planning Rule requires that plans identify watersheds that are a priority for maintenance or restoration (36 CFR 219.7(f)(1)). Priority watersheds are identified through the Forest Service Watershed Condition Framework, which is one of the agency's only outcome-focused restoration tools. The Forest Service launched the Watershed Condition Framework in 2010 with the aim of providing a nationally consistent way of assessing watershed condition and prioritizing watershed restoration on national forests and grasslands. Highlighting the value of the Watershed Condition Framework, Section 8405 of the Agricultural Improvement Act of 2018 (2018 Farm Bill) provides specific legislative authorization and requirements for the process, one of those being to identify for protection and restoration up to 5 priority watersheds (Hydrologic Unit Code [HUC] 12) in each National Forest.

Current priority watersheds that have restoration activities in progress include:

- Upper Elk Creek (HUC12 #170603080701)
- Upper Clear Creek (HUC12 #170603040102)
- Upper Little Slate Creek (HUC12 #170602090301)
- Musselshell Creek (HUC12 #170603060202)
- Lower Crooked River (HUC12 #170603050302)

Future priority watersheds will be determined throughout the life of this plan. Priority watersheds are selected by a forest or area responsible official after analysis and evaluation using a multi-functional interdisciplinary approach, with the consideration of:

- Agency watershed restoration policies and priorities that have been established at other scales, including national- and regional-scale restoration strategies.
- The importance of water and watershed resources (resource value), the urgency of management action to address conditions and threats, and economic considerations.
- Alignment with other Forest Service strategic objectives and priorities.
- Alignment with the strategies and priorities of other Federal and State agencies, tribes, community and collaborative efforts, nongovernmental conservation organizations, and public desires.

The participation of partners in the priority selection process is expected and highly encouraged. The 2012 Planning Rule and the planning directives require the responsible official to reach out to local, state, tribal, and other federal agencies and interest groups when identifying priority watersheds (Forest Service Handbook 1909.12, section 22.31). Priority watersheds could occur in watersheds included in the Conservation Watershed Network that require process-based restoration strategies to support ESA listed fish species and Species of Conservation Concern.

By design, Watershed Condition Framework priority watersheds are not intended to be permanent designations - when all needed work is completed, a new Watershed Condition Framework priority watershed is to be identified. Priority areas for potential restoration activities could change quickly because of disturbance events, such as wildfire or severe flooding. Therefore, the 2012 Planning Rule includes priority watersheds as other plan content, so that an administrative change could be used to quickly respond to changes in priority.

Watershed Condition Framework priority watersheds should not be mistaken for INFISH priority watersheds that were selected through the amendment of the 1987 Forest Plans. See Appendix K for more information regarding priority watersheds.

Distinctive Roles and Contributions

The Nez Perce-Clearwater's distinctive roles and contributions are described in Section 1.2.1of the Final Environmental Impact Statement.

Proposed and Possible Actions

A list of proposed and possible actions that could be implemented under this Land Management Plan are included in Appendix 4 – Management Approaches and Possible Actions. This information is not a commitment to take any action and is not a "proposal," as defined by the Council on Environmental Quality regulations for implementing the National Environmental Policy Act (36 CFR 219.7 (e)(1)(f)(iv).

1.9.8 Optional Plan Content

Additional plan content can include information, such as partnership opportunities, coordination activities, or other information to support movement toward desired conditions.

Other content in the Land Management Plan includes:

- Northern Rockies Lynx Management Direction Record of Decision, Appendix 5
- Water Resources and Fisheries, Appendix, Appendix 6
- Scenic Character Description, Appendix 7

1.10 Consistency with Plan Components

As required by the National Forest Management Act, all projects and activities authorized by the Nez Perce- Clearwater must be consistent with the Land Management Plan (16 USC 1604 (i)), per 36 CFR 219.15. This is accomplished by a project or activity being consistent with all applicable plan components.

When a proposed project or activity would not be consistent with the applicable plan components, the responsible official shall take one of the following steps, subject to valid existing rights:

- Modify the proposed project or activity to make it consistent with the applicable plan components.
- Reject the proposal or terminate the project or activity.
- Amend the plan so that the project or activity will be consistent with the plan, as amended.
- Amend the plan contemporaneously with the approval of the project or activity so that the project or activity will be consistent with the plan as amended.

1.10.1 Desired Conditions

Because of the many types of projects and activities that can occur over the life of the Land Management Plan, it is not likely that a project or activity can maintain or contribute to the attainment of all desired conditions, nor are all desired conditions relevant to every activity. For example, recreation desired conditions may not be relevant to a fuel's treatment project. Most projects and activities are developed specifically to maintain or move conditions toward one or more of the desired conditions of the plan. It should not be expected that each project or activity will contribute to all desired conditions in a plan but usually to one or a subset.

To be consistent with desired conditions of the Land Management Plan, a project or activity must be designed to meet one or more of the following conditions:

- Maintain or make progress toward attaining one or more of the Plan's desired conditions or objectives without adversely affecting progress toward the maintenance of other desired conditions or objectives.
- Be neutral with regard to progress toward attaining the Plan's desired conditions or objectives.
- Maintain or make progress toward attaining one or more of the desired conditions or objectives over the long-term, even if the project or activity would have an adverse but short-term effect on progress toward attaining, or maintenance of, one or more desired conditions or objectives.
- Maintain or make progress toward attaining one or more of the Plan's desired conditions or objectives, even if the project or activity would have an adverse but negligible long-term effect on progress toward attaining, or maintenance of, other desired conditions or objectives.

The project documentation will include a finding that the project is consistent with the Plan's desired conditions or objectives and briefly explain the basis for that finding. When a categorical exclusion applies and there is no project decision document, the project must still be found consistent with the revised land management plan.

1.10.2 Standards

A project or activity is consistent with a standard if the project or activity is designed in exact accordance with the standard. The project documentation must confirm that the project is consistent with applicable standards. Deviation from standards requires an amendment to the plan.

1.10.3 Guidelines

A project or activity must be consistent with all guidelines applicable to the type of project or activity and its location in the Land Management Plan area. A project or activity is consistent with a guideline in either of two ways:

- The project or activity is designed in accordance with the guideline, or
- A project or activity design varies from the guideline but is as effective in meeting the intent or achieving the purpose of that guideline.

The project documentation will describe how the project is consistent with the applicable guideline(s). When the project design varies from the exact wording of a guideline, project documentation must specifically explain how the project design is as effective in meeting the purpose of the guideline. Under this circumstance, a plan amendment is not required. However, if a project or activity is not designed to comply with the intent or purpose of a guideline, an amendment to the plan is required.

1.10.4 Hierarchy of Plan Guidance

If conflicting plan guidance is discovered, the following hierarchy will be used to determine which plan components shall be applied in the following order:

1. Designated Wilderness and Designated Wild and Scenic Areas—Management Area 1
2. Lolo National Historic Trail
3. Designated Research Natural Areas
4. Proposed Research Natural Areas, Eligible and Suitable Wild and Scenic Rivers, and Recommended Wilderness
5. Idaho Roadless Rule, unless directed by the rule itself, which supersedes a Land Management Plan
6. Geographic Area Plan Components
7. Management Area Plan Components, other than those listed in 1-5 above
8. Forestwide Plan Components

1.11 Rights and Interests

The Land Management Plan will provide a strategic framework that guides future management decisions and actions. As such, the Plan will not create, authorize, or execute any ground-disturbing activity. The Land Management Plan will not subject anyone to civil or criminal liability and will create no legal rights. The Plan will not change existing permits and authorized uses.

Chapter 2. Alternatives

2.1 Introduction

This chapter describes and compares the alternatives considered by the responsible official for the Land Management Plan. It includes the following:

- a discussion of how the alternatives were developed
- issues raised
- descriptions and comparisons of the alternatives
- a map of each alternative considered

This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative, while some of the information is based upon the environmental, social, and economic effects of implementing each alternative.

2.2 Alternatives Considered in Detail

The range of alternatives developed and presented are based on a preliminary evaluation of the information gathered from public and internal comments and the purpose and need for the project. While all alternatives provide a wide range of ecosystem services and multiple uses, some give slightly greater emphasis to select resources based on the theme of the alternative and response to revision topics. The Nez Perce-Clearwater developed six alternatives, including the no action and five action alternatives, in response to issues raised by the public. The alternatives span the range of forest management practices and uses of available resources. The general theme and intent of each alternative is summarized below. A limited number of plan components vary by alternative. Table 4 shows an overview of alternatives.

Four action alternatives were developed based on input, including comments received since the release of the proposed action in July 2014, and through collaboration on alternative development during the winter of 2017-2018. All alternatives analyzed in the Final Environmental Impact Statement met a minimum bar of being ecologically, socially, and economically sustainable per the 2012 Planning Rule. Furthermore, each alternative contributes to rural prosperity and other U.S. Department of Agriculture strategic goals. Alternative themes and their relation to the significant issues are described below.

The action alternatives were developed based on the Nez Perce-Clearwater's Assessment (2014), the need for change, desired conditions, implementation and monitoring of the current forest plan, public meetings, and comments received during the public involvement period, interagency meetings, and meetings with the Nez Perce Tribe. The alternatives represent a range of possible management options from which to choose. Each alternative emphasizes specific land and resource uses and de-emphasizes other uses in response to the revision topics. Some components may vary between alternatives to address the issues identified during scoping; see the description of the alternatives for specific details. Much of the plan direction for desired conditions, standards, and guidelines remains constant for all action alternatives. Where plan direction varies by alternative, the text indicates such. A table of plan components that vary by alterative is included in Appendix H.

2.2.1 No Action Alternative

Under the No Action Alternative, the 1987 Nez Perce and the 1987 Clearwater National Forests' Land Management Plans would continue to provide direction for the combined National Forests unless amended by site specific project implementation. Analysis of a No Action Alternative is a requirement of the National Environmental Policy Act. This analysis reflects the likely outcomes of managing forest lands and resources under the direction of the separate forest plans, into the future. The No Action Alternative for programs associated with an issue statement are as follows.

Recommended Wilderness and Wild and Scenic Rivers

The 1987 Clearwater Forest Plan included the Mallard Larkins, Hoodoo, and Selway additions to Recommended Wilderness Areas, totaling 198,200 acres. These areas have been managed similarly to designated wilderness with respect to motorized and mechanized travel since 2012. Some uses that would be non-conforming in an authorized designated area include administrative use of motorized hand-tools, commercial rental of structures, and the management of fire. Prior to 2012, over the snow winter use was permitted in recommended wilderness areas. That use was ended by the Clearwater Travel Plan Record of Decision.

The Nez Perce National Forest identified no recommended wilderness. While several suitability studies have been initiated in the past, no decisions were made.

Three Wild and Scenic Rivers have been designated on the Nez Perce-Clearwater:

- Middle Fork Clearwater (including the combined flows of the Lochsa River and the Selway River)
- Main Salmon River
- Rapid River

Twenty-nine rivers were found eligible by the 1987 Forest Plans. These rivers have also been identified in the National Rivers Inventory since 1982:

- Bargamin Creek
- Bear Creek Complex – Bear, Cub, Paradis, Brushy Fork, and Wahoo
- Cayuse Creek
- Little North Fork Clearwater
- North Fork Clearwater
- South Fork Clearwater
- Fish Creek
- West Fork Gedney Creek
- Hungery Creek
- Johns Creek
- Kelly Creek
- Lake Creek
- Meadow Creek (Selway)
- Moose Creek Complex – Moose, East Fork Moose, North Fork Moose, West Moose, and Rhoda

- Running Creek
- Salmon River
- Slate Creek
- Three Links Complex – Three Links and West Fork Three Links
- White Bird Creek
- White Sand Creek (renamed Colt Killed Creek)

Recreation and Access Management

The 2017 Clearwater Travel Plan Decision on the Clearwater National Forest dictated allowed and disallowed motor vehicle operation and designated routes. The Forest is open to motorized recreational use except in designated wilderness or as closed by this Travel Plan Decision. No travel plan has been completed on the Nez Perce Forest. The Nez Perce Forest is open to motorized travel except in designated wilderness or closed by a site-specific closure order. Table 1 shows percent area open and closed to motorized use for summer and winter on the Nez Perce-Clearwater based on the Clearwater Travel Plan decision and current closure orders across the Forests.

Table 1. Percent plan area of existing summer and winter open to motorized access under the No Action Alternative

Motorized Access	Summer	Winter
Motorized	55%	63%
Nonmotorized	39%	37%

The 2008 Idaho Roadless Rule[7] identifies 34 Idaho Roadless Areas on the Nez Perce-Clearwater to be managed under the Rule. While the Rule does not speak to motorized use or access, the Rule does place restrictions on timber harvest, road building, and discretionary minerals activities.

The 1993 Clearwater Forest Plan Stipulation for Dismissal mandated that the Clearwater National Forest manage some areas within the Bighorn-Weitas Roadless Area and the North Lochsa Slope Roadless Area similarly to how the National Forest was managing recommended wilderness (no timber harvest and no road construction). For the purposes of the No Action Alternative, these areas are part of the larger Idaho Roadless Area that falls within and where road construction and timber harvest are precluded. For the purposes of the No Action Alternative, they are not considered recommended wilderness areas although management of these areas is similar to that of recommended wilderness.

Recreation opportunity spectrum classes were not used to determine suitability for motorized uses in the 1987 plans. Instead, the 1987 plans used direction from elk habitat effectiveness objectives to identify the appropriate density of motorized roads and trails on the Nez Perce-Clearwater. Direction in the 1987 forest plans required lands to provide for elk by maintaining areas with specified amounts of elk habitat potential. The elk habitat potential standards were associated with land allocations in the 1987 plans and elk habitat effectiveness was the metric used to calculate elk habitat potential.

[7] https://www.fs.usda.gov/main/roadless/idahoroadlessrule

Forest Vegetation

Forest vegetation is treated to increase the dominance of early seral species, including Ponderosa pine, Western larch, and Western white pine. All silviculture systems are used as appropriate, though regeneration harvest is a primary tool for changing dominance types. Reforestation success is generally high in managed stands. Even-aged regeneration harvest unit size above 40 acres requires Regional Forester approval; however, most projects requested are granted this exception to the National Forest Management Act 40-acre limitation based on the silvics of forest stands in north central Idaho.

Old growth is managed per the 1987 Forest Plans, including the 1993 Clearwater Forest Plan Stipulation for Dismissal agreement. Snag and live tree retention are managed consistent with Bollenbacher et al.'s (Bollenbacher et al. 2009a) recommendations, and downed woody debris retention is managed consistent with recommendations by Graham et al. (Graham et al. 1994).

Timber

Timber outputs in the No Action Alternative are assumed to be 50 to 60 million board feet annually, corresponding to a treatment area of 3,000 to 3,500 acres across the Nez Perce-Clearwater. While the Nez Perce-Clearwater is not bound to these volumes, they are a representation of what the current management situation on the Nez Perce-Clearwater is able to produce under the 1987 Forest Plans and amendments.

A slope break of 35 percent is generally used to guide timber harvest by ground-based system versus cable-based systems.

Aquatics

The aquatic ecosystems, fisheries, and water resources programs are based on PACFISH, the associated Forest Plan Amendment, and biological opinion. PACFISH includes a delineation of riparian habitat conservation areas. In practice, activities within Riparian Habitat Conservation Areas have not been conducted on a large scale despite being permitted in some cases within PACFISH. The No Action Alternative assumes that most projects will continue to not propose treatments within Riparian Habitat Conservation Areas.

The Nez Perce Forest Plan includes language to improve aquatic and riparian conditions in watersheds not meeting quality objectives as defined in Appendix A of that plan. In practice, this constraint has been implemented on the Nez Perce-Clearwater by including watershed restoration projects as part of larger vegetation management projects to demonstrate that watershed has an upward trend.

The Clearwater Forest Plan similarly describes watersheds not meeting objectives in Appendix K. The 1993 Stipulation for Dismissal on the Clearwater Forest Plan litigation mandates that any activity in these watersheds yield no net increase of sediment during the project.

The Nez Perce-Clearwater has a very active watershed restoration program, working in partnership with the Nez Perce Tribe, nearby county governmental agencies, and others. The No Action Alternative assumes that these activities continue. Restoration activities are guided by the Watershed Condition framework, the Nez Perce Tribe's Atlas[8], and vegetation management projects approving watershed restoration work as part of larger integrated projects.

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[8] The Atlas Framework is a tool that prioritizes projects that provide the best value for Columbia River Basin fish. The Nez Perce Tribe uses a Lochsa basin Atlas to help determine priorities for aquatic restoration in that subbasin. For more information visit: https://www.salmonrecovery.gov/doc/default-source/default-document-library/atlas-fact-sheet---aug2015---final.pdf?sfvrsn=2.

Soils

Management of the soil resource in the No Action Alternative is based upon limitations on activities that detrimentally disturb soils and protecting the ash cap. A regional fifteen percent detrimentally disturbed soils cap constrains the amount of ground disturbance that can occur on the Nez Perce-Clearwater. Additionally, on the Nez Perce National Forest, the 1987 Forest Plan includes a twenty percent detrimentally disturbed soils standard. Activities on landslide prone areas, as defined by land types, are restricted. In practice, lands over 55 to 60 percent slope are unlikely to be managed through timber harvest.

Wildlife

The Nez Perce and Clearwater Forests manage habitat to provide for viable populations of species. The Forests' mandate is to manage habitat for species. State wildlife agencies, specifically the Idaho Department of Fish and Game, have the responsibility to manage wildlife population numbers. The Forest Service also has the responsibility for managing tribal treaty trust resources, of which fish and game are critically important to the Nez Perce Tribe. Additionally, the Forests are obligated under the Endangered Species Act (ESA) to aid in recovery of listed species.

The federally listed species in the planning area include Canada lynx (threatened) and wolverine (proposed threatened). Grizzly bear was not included on the U.S. Fish and Wildlife Service list of species that are known to occur on the Nez Perce-Clearwater.

The Nez Perce-Clearwater manages 11 species on the Nez Perce Forest and 15 species on the Clearwater Forest as management indicator species. There are 11 species on the Regional Forester's Sensitive Species List for both the Nez Perce and Clearwater National Forests.

Current management on the Nez Perce-Clearwater emphasizes management of elk and other big game species while providing habitat for other threatened, endangered, sensitive, and management indicator species.

Fire Management

The 1987 plans did not acknowledge that fire was the dominant change agent in the forested ecosystem and should be allowed to play its role across the landscape. Except for wilderness areas and some backcountry roadless areas, aggressive suppression was the primary strategy to manage fire.

The vegetation management strategy for the Nez Perce-Clearwater is to manage the landscape to maintain or trend towards vegetative desired conditions. The tools the Nez Perce-Clearwater has used to move towards desired conditions include hazardous fuel reduction by mechanical treatments, such as timber harvest and hand thinning, prescribed burning, and managing natural wildfire ignitions, for resource objectives. Timber harvest has averaged 4,345 acres per year for the past ten years across the Nez Perce-Clearwater and is expected to increase in pace and scale in the future. Mechanical treatments, such as hand thinning, have accounted for approximately 2,510 acres per year over the past 10 years. Wildland fire, including management ignited prescribed burning and wildfires managed for resource objectives, have accounted for most fuels treatment over the last ten years, accounting for an annual average of 4,346 acres and 35,700 acres respectively.

The 1987 Nez Perce National Forest Plan, as amended, will provide for resource protection and fire use necessary to protect, maintain, and enhance resource values and attain land management goals and objectives. The plan allows for the forestwide use of all management response options for wildfire (control, contain, confine). Exceptions for unplanned ignitions include Management Areas 7, 10, 12 through 15, 17, and 19 through 23. Planned prescribed fire is allowed forestwide. Mechanical treatments are not allowed in wilderness.

The 1987 Clearwater National Forest Plan includes the following forestwide standard: Fire strategies allow for the management of planned or unplanned ignitions to achieve a variety of resource objectives in many of the management areas. Wildfire strategies consist of confine, contain, and control objectives with max acres allowed to burn within each management area. Prescribed fire acres for natural and activity fuels were assigned for each management area. Recreation and research natural areas were not allowed to have unplanned ignitions and were only assigned contain wildfire strategies. Mechanical treatments are not allowed in wilderness.

Livestock Grazing

Livestock owned by local ranchers, referred to as permittees, are permitted to graze within the Nez Perce-Clearwater National Forests under the authority of the Granger-Thye Act of 1950, the Multiple-Use Sustained- Yield Act of 1960, and other federal laws and policies. Thirty-four permittees graze a total of 4,590 head of cattle within 36 active allotted areas, referred to as grazing allotments. There is one permitted sheep allotment with the Nez Perce-Clearwater National Forests, but it is currently inactive due to incompatibility between domestic sheep and native big horn sheep.

Livestock grazing allotments comprise less than 15 percent of the Nez Perce-Clearwater National Forests administered lands. Much of forage capacity for livestock grazing within the Forests is considered transitory in nature, which is forage produced following reduction in conifer overstory associated with fire and timber harvest. Grazing allotments are managed to maintain sustained production of forage, while also meeting the needs of other forest resources, including riparian habitat, threatened and endangered species, native fisheries, wildlife, and recreation. Guidance to grazing permittees regarding management of an allotment is described in a formal Allotment Management Plan and Annual Operating Instructions.

Allotment Management Plans are developed in conjunction with an interdisciplinary review and National Environmental Policy Act analysis of resource issues. Measures to mitigate any identified issues are specified in the Allotment Management Plan and Annual Operating Instructions. Following the listing of steelhead trout and Chinook salmon as threatened species, allotment management has emphasized protection and enhancement of riparian areas, with a focus on streams used by steelhead and salmon. Forest Service administrators routinely inspect grazing allotments for compliance with the objectives and standards specified in the Allotment Management Plan and Annual Operating Instructions.

Energy and Minerals

Mineral resource activities are administered under the appropriate laws and regulations to ensure protection of surface resources while not unduly interfering with mining operations. The national forest provides for reasonable access for mineral prospecting, exploration, development, and production consistent with applicable Land Management Plan direction. Exploration and development of mineral resources is facilitated by providing timely responses to Notices of Intent and Operating Plans. Current emphasis is on working actively with operators to develop adequate mitigations for site-specific resource concerns and to obtain sufficient bonds to cover estimated reclamation needs. The frequency of inspections of ongoing operations is commensurate with their size and complexity, ensure adequacy of operating plans, and identify unforeseen environmental impacts. Reclamation of disturbed areas to a productive condition is required in all cases.

There are approximately 3500 active unpatented mining claims on the Nez Perce-Clearwater. Filing and staking of additional claims tends to fluctuate with the value of certain mineral commodities; however, the trend is generally associated with the value of precious metals. The geology of the Nez Perce-Clearwater generally possesses a low- to high-grade mineralization in many areas. Mineralization could include precious metals, strategic rare earth element deposits, or base metal deposits. Due to a lack of infrastructure, wilderness areas, wild and scenic river corridors, and a low potential of occurrence, the exploration and development of both nonrenewable and renewable energy resources is not expected.

Annually, the Nez Perce-Clearwater administrates Plans of Operation for 40 to 50 suction dredging operations, 3 to 5 placer or lode operations, and 20 to 30 Notices of Intent for mineral exploration.

Small-scale placer and dredging operations continue to be the dominate type of mining on the Nez Perce-Clearwater and are evident because there are no active large or medium sized exploration or mining operations. Table 2 lists waterbodies, timing constraints, and the maximum number of suction dredging operations authorized.

Table 2. Waterbodies, timing constraints, and maximum number of authorized suction dredging operations

Waterbody	Authorized Dates	Maximum Operations
Lolo Creek	July 15 through August 15	18
Moose Creek	July 01 through August 15	38
Orogrande and French Creeks	June 30 through September 15	20
South Fork of the Clearwater River	July 15 through August 15	15

Priorities under the No Action Alternative include:

- Complete an inventory of abandoned mining sites and prioritize sites that pose a risk to human health for permanent closure and reclamation consistent with the management of other surface resources.
- Meet the demand for mineral materials consistent with the management of other surface resources.
- Study existing mineral withdrawals to determine whether to maintain them in that status.
- Request mineral examinations to determine if claims are valid if suspected use is not authorized under mining law or if there is a conflict with other federal uses or regulation.

2.2.2 Alternative W

Resources and land allocation on the Nez Perce-Clearwater are not mutually exclusive. It may be possible to have high levels of timber harvest, sustain rural economies, recover listed fish and wildlife species, provide clean air and clean water, and provide habitat for viable populations of wildlife species all at the same time. For instance, areas evaluated for recommended wilderness are independent from most areas that provide for timber harvest due to the Idaho Roadless Rule. As such, it is possible to recommend all or nearly all Idaho Roadless Rule Areas for recommended wilderness and have a very high level of timber outputs. This thought process led to the idea of a “have it most” alternative. This alternative has higher levels of recommended wilderness coupled with a higher timber output and a faster rate of movement towards forest vegetation desired conditions. Forest vegetation desired conditions would be minimally met within thirty years. Areas not selected as recommended wilderness allow for motorized use, including in the roadless areas. Wild and Scenic Rivers stem from a collaborative approach that looks at rivers outside the wilderness. The intent is to couple items that may otherwise be viewed as being mutually exclusive.

Recommended Wilderness

Alternative W recommends the most areas and the most acreage with ten areas recommended as wilderness, totaling 856,932 acres. These areas would be managed without motorized access in the summer and winter and would not allow mechanized travel.

Suitable Wild and Scenic Rivers

Alternative W includes twelve rivers as suitable wild and scenic rivers.

Access

Alternative W provides for motorized access in all Idaho Roadless Areas with a backcountry restoration theme not recommended as wilderness. Non-motorized access is also greater in this alternative due to the high amount of recommended wilderness that is managed as non-motorized.

Forested Vegetation

Objectives are designed to meet forest vegetation desired conditions for size class distribution and species composition within thirty years.

Timber Harvest

To meet forest vegetation desired conditions, a potential timber sale quantity up to the sustained yield limit of 241 million board feet is expected for the life of the plan.

2.2.3 Alternative X

Alternative X responds to several state and local plans which call for fewer or no areas of recommended wilderness,[9] fewer or no suitable wild and scenic rivers, and higher timber outputs. In this alternative, zero areas are recommended as wilderness. The Idaho State Rivers Program is used as a surrogate to continue to protect key tributaries to the North and South Fork Clearwater Rivers while not pursuing Wild and Scenic River Suitable status on any river. Forest vegetation would be within the lower bound of the desired conditions within twenty years.

Recommended Wilderness

Alternative X allocates zero acres of recommended wilderness.

Suitable Wild and Scenic Rivers

Alternative X allocates zero suitable wild and scenic rivers. Rivers that are referred to in the State of Idaho Department of Water Resources River Plan are managed consistently with that plan, which includes provisions to protect water quality and maintain free flow.

Access

Alternative X allocates the most land as suitable for motorized access both summer and winter.

[9] The Idaho County Natural Resource Plan calls for zero recommended wilderness on the Nez Perce-Clearwater National Forest. The Clearwater County Natural Resource Plan acknowledges that some limited areas of recommended wilderness may be an acceptable tradeoff if other items benefiting rural economies are increased, such as increased timber production

Forested Vegetation
Objectives are designed to meet forest vegetation desired conditions for size class distribution and species composition within twenty years.

Timber Harvest
A departure from the sustained yield limit of 241 million board feet for two decades allows for achievement of desired conditions within that period. This corresponds to an annual potential timber sale quantity of 261 million board feet.

2.2.4 Alternative Y
Alternative Y provides for intermediate level of recommended wilderness and moves towards forest vegetative desired conditions for size class distribution and species composition in fifty years. Historic snowmobiling areas in the Great Burn are removed from consideration as recommended wilderness resulting in a boundary change, but within the areas moving forward as recommended wilderness we do not authorize any uses that may preclude designation as wilderness in the future. This alternative also looks at the major rivers not designated in the Wild and Scenic Rivers Act, including the North Fork Clearwater and South Fork Clearwater, as suitable for inclusion in the Wild and Scenic Rivers system.

Recommended Wilderness
Alternative Y finds four Idaho Roadless Areas as recommended wilderness. This includes a boundary modification of the Hoodoo Roadless Area to allow for over-snow use in two areas that historically has this use prior to the 2012 Clearwater Travel Plan decision. In total, 309,332 acres would be recommended for wilderness. These areas would be managed to not allow over-snow use, motorized use or mechanized travel.

Suitable Wild and Scenic Rivers
Fourteen rivers are found suitable in Alternative Y, including the South Fork Clearwater and North Fork Clearwater.

Access
Access for motorized use is expanded slightly from the No Action Alternative to allow for additional loop opportunities for motorized recreation in several backcountry restoration themed Idaho Roadless Areas including the Bighorn Weitas and Pot Mountain roadless areas.

Forested Vegetation
Forest Vegetation desired conditions are met within fifty years and rely on a combination of active management and natural processes.

Timber Harvest
Timber harvest associated with meeting forest vegetation desired conditions yields a potential timber sale quantity between 130 and 150 million board feet annually.

Other variation in Alternative Y
Alternative Y includes language in the Pilot Knob Geographic Area to not renew the communication site in the future.

2.2.5 Alternative Z

Alternative Z was crafted to respond to requests to have an alternative in which natural processes dominate over anthropogenic influence. In this alternative, a proposal for recommended wilderness that was brought forward by a group of national and state wilderness advocacy groups was mostly carried forward. Additionally, rivers were viewed as part of a larger system, and major tributaries to our largest rivers will be analyzed as being suitable for inclusion in the wild and scenic rivers system. Reliance on natural process would warrant a slower movement towards forest vegetation desired conditions in an anticipated one hundred years or longer. Timber outputs would also be lower and near a lower threshold needed to provide for economic sustainability and sustain rural economies. Additional plan components related to snag guidelines, live tree retention, and elk security are included that limit uncertainty regarding how and where these features will be located on the landscape.

Recommended Wilderness

Recommended wilderness in Alternative Z includes ten Idaho Roadless Areas, totaling 569,755 acres. These areas are managed to allow many uses within them, including uses that would likely not be allowable if designated wilderness by congress in the future. This includes winter motorized over-snow use and mechanized travel.

Suitable Wild and Scenic Rivers

Alternative Z utilizes a system approach to find suitable rivers that forms connection between the headwaters and the main river basins. Thirty-seven rivers are found suitable in Alternative Z.

Access

Access in Alternative Z most closely represents the current levels of access of the No Action Alternative. No major changes are made to the existing condition, other than a geographic area for West Meadow Creek finds that area not suitable for motorized recreation.

Forested Vegetation

Forested vegetation desired conditions would be met over one-hundred-years or longer and would emphasize natural processes before active management.

Timber Harvest

Timber harvest in Alternative Z is projected to be between eight and one-hundred million board feet annually.

Other Variation in Alternative Z

Alternative Z adds additional snag and leave tree requirements when planning timber harvest for any purpose.

2.2.6 Preferred Alternative

The Preferred Alternative was developed following the comment period on the Draft Environmental Impact Statement. This alternative integrates concerns from the public and attempts to find balance and compromise with the major issues. This alternative responds to public comments and is a compilation of portions of all other alternatives analyzed in detail in the Draft Environmental Impact Statement. The Preferred Alternative integrates ecological, social, and economic sustainability while responding to both local and national interests.

Recommended Wilderness

Three recommended wilderness areas would be included in the Preferred Alternative, including parts of four Idaho Roadless Rule areas – Hoodoo, Mallard-Larkins, East Meadow Creek, and West Meadow Creek. The East Meadow Creek Recommended Wilderness Area would be a new recommended area from the No Action Alternative. In total, the Preferred Alternative includes 263,357 acres of recommended wilderness.

Suitable Wild and Scenic Rivers

In the Preferred Alternative, eleven rivers would be found suitable as wild and scenic rivers. In addition, one river with shared jurisdictions, the Little North Fork Clearwater River, would remain eligible.

Access

Opportunities for motorized access decrease in the preferred alternative, in the summer and winter when compared to taking no action and based on the 1987 Plans and closure orders. Approximately fifty-five percent of the Nez Perce-Clearwater would be suitable for motorized use in the summer and approximately sixty percent in the winter. While these opportunities are focused on providing real opportunity for motorized users in both the summer and winter, areas across the Nez Perce-Clearwater where ecological or social reasons dictate a non-motorized experience were delineated as such. These areas include habitat for species such as grizzly bear and wolverine, cross country ski areas, and wintering habitat for some ungulate species.

Forested Vegetation

Forested vegetation desired conditions are predicted to be met in thirty to thirty-five years, resulting from a combination of timber harvest, prescribed fire, and natural disturbance. It is estimated that between 53,000 and 64,500 acres of total disturbance would occur annually.

Timber Harvest

An estimated, 10,000 acres of timber harvest annually would produce between 190 and 210 million board feet annually.

2.3 Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by the National Environmental Policy Act to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received since the scoping period beginning in July of 2014 provided suggestions for alternative methods for achieving the purpose and need. Some of these alternatives may have been outside the scope of this document, duplicative of the alternatives considered in detail, or determined to not meet the purpose and need. Therefore, some alternatives were considered but dismissed from detailed consideration for reasons summarized below.

Reasons for eliminating an alternative from detailed study include, but are not limited to:

- The alternative does not meet the purpose and need.
- The alternative is outside the scope of this environmental impact statement.
- The alternative does not meet law, policy, or regulations.

- The content of the alternative is contained in other alternatives or within the range already being analyzed in detail.

Alternatives considered but eliminated from detailed study are summarized in the following sections. These alternatives include those suggested by many individuals and/or entities. Dozens of other alternatives were also considered but are not listed here. A full listing can be found in the project record.

2.3.1 2014 Proposed Action

As a result of input from scoping comments, the 2014 Proposed Action will not be brought forward or analyzed in the Final Environmental Impact Statement in detail. Many elements of the 2014 Proposed Action will be carried forward into other alternatives. All elements of the 2014 Proposed Action that were not brought forward into another action alternative represent an alternative considered.

2.3.2 2017 Framework for Alternative Development

The framework for alternative development was an interim document used to begin planning conversations on potential alternatives to be considered. While never intended to be analyzed in detail, the framework also represents a variety of plan components considered but ultimately not analyzed in detail. This includes an alternative that had fewer protections for aquatic resources than the PACFISH strategy. Alternatives that allowed for harvest within the riparian reserves, allowed for harvest on all lands prone to mass wasting, and emphasized salvage harvest of timber were also considered.

2.3.3 Timber Target Unconstrained by Budget

Timber industry and collaborative groups have taken a stance on the 2012 Planning Rule's mandate that objectives, including the potential timber sale quantity, be within the fiscal feasibility of the unit. Considering alternatives that are outside the fiscal capability of the unit are not consistent with the 2012 Planning Rule and outside the scope of a Land Management Plan. However, the Nez Perce-Clearwater has taken an all-encompassing vision on fiscal capability, particularly in Alternative X, and factors in full implementation of several initiatives designed to gain efficiency, fund sources other than appropriated dollars, and decrease unit costs when applied at scale. The maximum timber target for every alternative is the sustained yield limit, unless in a departure alternative, and harvest may occur up to that level as funds become available.

2.3.4 Maximum Recreation Alternative

The Idaho County Commissioners requested a "maximum recreation alternative." Elements of all alternatives maximize some aspects of recreation. Many elements of maximizing recreation are site-specific decisions that are outside the scope of a Land Management Plan. Depending on a particular view or desire of recreation, such as motorized versus non-motorized, developed versus dispersed, or primitive versus rural, one alternative may meet your definition of maximizing recreation more than others.

2.3.5 Ecological Processes, a.k.a. "Citizen's Alternative"

The Friends of the Clearwater provided an outline for an alternative endorsed by numerous commenters. This alternative emphasized ecological processes over anthropogenic vegetation management. Elements of this alternative within our scope that meet the purpose and need for action are included as parts of Alternatives W, Y, and Z. For example, in Alternative Z, natural processes dominate over anthropogenic influence. It includes additional plan components related to snag guidelines, live tree retention, and elk security. Timber outputs are projected to be as low as eight million board feet in Alternative Z, well below the current direction (the no action alternative) timber outputs of fifty to sixty million board feet annually.

Alternative W proposes over four times the Recommended Wilderness Area acreage as the current situation, without motorized and mechanized access, while Alternative Z proposes more Wild and Scenic Rivers than the current situation. The plan includes additional proposed Research Natural Areas that do not vary by alternative.

Further, the desired conditions were developed with an emphasis on the natural processes that influence the vegetation on the Nez Perce-Clearwater, as well as appropriate consideration of the impacts of climate change. The plan components also recognize and support the important natural roles of wildfire, insects, and diseases on the landscape, and strives to conserve key ecosystem components such as old growth, snags, and downed woody material as well as connectivity for wildlife species. The plan protects soils and aquatic resources, and the values of suitable wild and scenic rivers.

Certain elements of the citizen's alternative are not addressed to the degree suggested by the commenters, such as managing all roadless areas as recommended wilderness or as non-motorized. This is further discussed in the following alternatives considered but eliminated from detailed study.

Other concepts presented in this alternative do not meet the purpose and need, are not within the scope, or are not within the legal authority of the agency for example, plan direction regarding privatizing the management of public resources or giving the National Forests to the State of Idaho to own or manage. Some proposed plan components are not appropriate, such as standards prescribing National Environmental Policy Act analysis processes.

In summary, this alternative was not analyzed in additional detail because most elements are addressed as appropriate, although not necessarily with the same specific methods (such as standards) as suggested by the commenters.

2.3.6 Additional Areas for Over-Snow Motorized Use

Many snow machine user groups advocated for additional areas for snowmobiling and other winter motorized activities. Alternative X maximizes the amount of over-snow motorized use to the extent allowable by law. Allowing additional areas beyond what Alternative X offers for over-snow motorized use would not meet laws, regulations, and policies that guide this use as well as other multiple uses.

2.3.7 All Idaho Roadless Areas as Recommended Wilderness

Wilderness advocacy groups asked for an alternative in which all Idaho Roadless Areas were added as recommended wilderness. Thirty-three out of the 34 Idaho Roadless Areas went through a wilderness evaluation. Appendix E documents the wilderness evaluation worksheet and narrative for each area. Through this process it was determined that some Idaho Roadless Areas did not fully satisfy one or more wilderness characteristic to warrant consideration or recommendation as wilderness. Detailed analysis is documented in Appendix E of this document. Alternative W provides for the greatest number of acres of recommended wilderness, including about half of the area in Idaho Roadless. Alternatives were also considered that looked at including lands not within Idaho Roadless as recommended wilderness. However, the inventory of areas was determined to be the Idaho Roadless Rule designated areas.

2.3.8 Additional Areas as Recommended Wilderness

Several areas were brought forward by the public in scoping comments that were not included in the Idaho Roadless Rule evaluation and, therefore, were not included in this recommended wilderness inventory or analysis. Those areas included Goddard Creek, Kelly Mountain, North Siwash, Middle Fork

Face, Rudd Moore Lakes, and Wendover. The comments included the recognition that these areas likely would not warrant consideration as recommended wilderness for various reasons.

A review identified that Goddard Creek and Kelly Mountain were considered in the Roadless Area Review and Evaluation (RARE II), (U.S. Department of Agriculture 1979) and dropped as inventoried roadless areas during the Idaho Roadless Rule process. Given that these areas had been inventoried and dropped from further consideration, there was no reason to consider them further. Middle Fork Face, Rudd Moore Lakes, and Wendover areas are all less than 5,000 acres, are not contiguous to any wilderness or recommended wilderness area and were not considered in RARE II. North Siwash was reviewed and found to have had logging operations each decade since the 1960s and, therefore, had cumulatively degraded wilderness character. Following direction in Forest Service Handbook 1909.12, Chapter 70, 71.1, the Nez Perce-Clearwater reviewed these areas and determined they did not meet the criteria in the Forest Service Handbook 1909.12, Section 71.2.

Public comments also brought forward areas referred to as the Gospel-Hump additions. These included areas commonly known as Indian Creek, Johns Creek, Tenmile Creek, and Boulder Creek. These areas were also considered in RARE II (U.S. Department of Agriculture 1979) and dropped as inventoried roadless areas during the Idaho Roadless Rule process. Given that these areas had been inventoried and dropped from further consideration, there was no reason to consider them further. In addition, in 1978, the Endangered American Wilderness Act (Public Law 95-237) established the Gospel Hump Wilderness. The Act designated approximately 92,000 acres adjacent to the Wilderness "as generally depicted on said map" as management areas to be managed in accordance with a multipurpose resource management plan for multiple uses. The development of this plan was also required by the Act. Indian Creek, Johns Creek, and Tenmile Creek comprise these management areas. Given that management of these areas had been established through legislation, they were not included in the roadless inventory.

The Act also identified about 45,000 acres "generally depicted on said map" as development areas to be immediately available for resource utilization under the existing applicable Forest Service Land Management Plans. The Committee on Energy and Natural Resources submitted a report to accompany H.R. 3454. Maps of the areas were included in that report. That report includes the statement: "the committee expects the Forest Service to cease all further study it might contemplate undertaking with regard to the suitability and desirability of congressional designation of the lands within the 'development' and 'management' areas as components of the National Wilderness Preservation System." These development areas included areas adjacent to the east, north, and west boundary of the Gospel Hump Wilderness and include the area of Boulder Creek. Given the Congressional intent as stated in the Committee on Energy and Natural Resources report, those areas were not included in the roadless inventory.

Furthermore, Forest Service Manual 1920 –Land Management Planning, 1920.3 – policy states that plan revisions that were initiated prior to the issuance of the amended directive in 2015 are not required to revise past steps or phases of the process. For example, a completed assessment, including the wilderness inventory, does not need to be revised to comply with the amended directives. The assessment and evaluation of wilderness inventory was conducted in 2013, prior to the finalization of the planning regulation implementation directives at Forest Service Handbook 1909.12 in 2015, and, therefore, did not require revision.

2.3.9 Additional Eligible Wild and Scenic Rivers and Fewer Eligible Wild and Scenic Rivers

Many stakeholders, including river advocacy groups, suggested the list of wild and scenic eligible rivers in the scoping documentation was not complete. Many outstandingly remarkable values were suggested, and groups suggested the list was not long enough or comprehensive enough. Other stakeholders, including Clearwater County and Idaho County, suggested that the list was too long and that the list contained more than the "best of the best." Since 2015, the interdisciplinary team looked at all named rivers on the Forests and made new eligibility determinations. These determinations do not vary by alternative per the directives as a river either has outstandingly remarkable values or not. Eighty-eight rivers on the Nez Perce-Clearwater were found to be free flowing AND have outstandingly remarkable values. The results of the eligibility process have been documented and available to the public: https://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=fseprd552493.

2.3.10 No Wild and Scenic Rivers Suitability Study

As the Wild and Scenic Rivers eligibility process does not vary by alternative, the Nez Perce-Clearwater was asked to complete a suitability study to determine which rivers would be suitable for inclusion in the Wild and Scenic Rivers System. A few groups suggested that approach may not be legal or appropriate and suggested the Nez Perce-Clearwater not pursue a suitability study and manage eligible rivers under interim protection. The 2012 Planning Rule requires that National Forests include the evaluation of rivers for potential inclusion as a Wild and Scenic River under the Wild and Scenic River Act of 1968. Eligible rivers determined suitable for inclusion in the National Wild and Scenic River system should be included in the development or revision of Land Management Plans (Forest Service Handbook 1909.12, Chapter 80). The interim management of eligible or suitable rivers must then have interim protect measures until a decision is made on future use of the river though an Act of Congress. The Nez Perce-Clearwater proceeded with a suitability study along with the revision of the Land Management Plan.

2.3.11 Manage Eligible Rivers Under Interim Guidance

Once a wild and scenic rivers suitability study is complete, eligible rivers found not suitable need not be managed under interim protection measures (Forest Service Handbook 1909.12) therefore this alternative was considered but not analyzed in detail. Rather, these eligible rivers are managed under the guidance of the Land Management Plan with whatever guidance would otherwise apply. Some asked that the Nez Perce-Clearwater consider management of eligible rivers under interim direction regardless of the results of a suitability study.

2.3.12 Include All 88 Eligible River Segments as Suitable

All eligible river segments were evaluated to determine if they could be suitable in one or more alternatives. Fifty-two river segments were not found suitable following completion of the handbook process for determining suitability.

While these rivers possess values that were considered outstandingly remarkable, other resource opportunities and concerns within and/or adjacent to these river corridors were determined to warrant management actions that would be inconsistent with management direction under wild and scenic classification. Considering these opportunities and concerns, as well as the ability to protect these river values through other regulatory and administrative means, contributed to the finding that those rivers are not suitable when applying the suitability criteria (Forest Service Handbook 1909.12, Chapter 80). They were therefore not considered further in the evaluation process. Appendix F provides the details for the Wild and Scenic River suitability analysis.

2.3.13 All Idaho Roadless Areas as Non-Motorized

Groups requested that an alternative be considered that assigns non-motorized classifications to all Idaho Roadless Rule Areas or all Recommended Wilderness Areas. Alternatives W and Y and the Preferred Alternative do manage all recommended wilderness as non-motorized. However, managing all the Idaho Roadless Areas as non-motorized would preclude valid and existing multiple uses from occurring on the Forest and would be inconsistent with laws, regulations, and policies. Idaho Roadless Areas (that have not been identified as Recommended Wilderness Areas under the Preferred Alternative) will continue to be managed consistently with the Idaho Roadless Rule. Motorized and nonmotorized equipment as well as mechanized travel by the public would not be suitable in recommended wilderness areas. While the Rule does not speak to motorized use or access, the rule does place restrictions on timber harvest, road building, and discretionary minerals activities within Idaho Roadless Areas.

2.3.14 Specified Motorized Road and Trail Densities

Requests from groups, as well as from Idaho County and Clearwater County, asked that the draft Land Management Plan include desired conditions, standards, or guidelines for routes (roads and trails) open to motorized use. Some desire thresholds set by management area, watershed, or game management unit. Some see these densities as a minimum density to guarantee a minimum and predictable level of motorized access. Others look at densities as a cap on motorized routes to reduce impacts to fish and wildlife. While the alternatives do provide for differing levels of motorized use through the recreation opportunity spectrum and suitability plan components, currently no threshold for minimum or maximum densities of routes is prescribed. The suggested approach was considered and discussed at length. Designated routes and areas for motorized use are addressed in travel planning. While the Land Management Plan sets the stage for travel planning, the plan is not travel planning and becoming too specific may limit the range of possible solutions during travel planning. The action alternatives use suitability to describe motorized access. Alternatives are analyzed that increase areas suitable for motorized access in both summer and winter to respond, in part, to the concerns of the counties. Action alternatives also focus on desired conditions for access—desiring roads in the correct places to provide for a valid multiple use and providing motorized access while preventing harm to ecological resources, including fish and wildlife, remaining silent on the site-specific route density needed to accomplish this desired condition.

2.3.15 Add Plan Components for Trail Maintenance in Recommended Wilderness Areas

Some commenters suggested an alternative that adds plan components to address trail and vegetation maintenance in recommended wilderness areas to outline appropriate methods that would not affect wilderness character or future designation. These commentors suggested that administrative use of mechanized or motorized equipment should not be suitable in Recommended Wilderness Areas.

In all alternatives, except Alternative Z, recreational motorized and mechanized trail use would not be suitable in Idaho Roadless Areas recommended for wilderness. However, many of these trails are expected to stay in place and suitable for non-motorized and non-mechanized recreational use. Generally, all system trails on the Nez Perce-Clearwater are expected to receive routine maintenance approximately every three years on a rotating basis. With the exception of designated wilderness areas, these maintenance activities have included, and are expected to continue the use of motorized and mechanized equipment. The scale of these activities is small, their duration is short, they are proven to protect and improve trail and resource conditions and would be similar under all alternatives.

Forest Service Handbook 1909.12 Chapter 70 states that the responsible official has discretion to implement a range of management options, including options that enhance the ecological and social characteristics that provide the basis for wilderness designation and options that continue existing uses. It was determined that the use of chainsaws and other motorized or mechanized equipment would be suitable when such use would accomplish restoration activities that protect or enhance the wilderness characteristics of the area, maintains infrastructure and trails, or facilitates access, resource protection, or user safety. It was recognized that these activities could potentially have short-term impacts to user solitude and opportunity for primitive or unconfined recreation if back-country visitors were in proximity of these activities where they could be seen or heard. It was also recognized that such activities could have short-term disturbance to nearby wildlife for the duration of the activity. However, it was also determined that these short-term impacts would have no lasting effects on wilderness character or potential for future designation. It was determined that the objectives of such motorized or mechanized use could have long-term effects that preserve or enhance wilderness character that far exceed the duration of the short-term impacts.

Given the potential for long-term benefits to wilderness character of motorized and mechanized administrative use and considering that potential for short-term impacts would not have long-lasting effect on wilderness character or future designation, it was determined that further detailed analysis of this use versus non-use was not warranted. Therefore, the effects from these activities were not analyzed in further detail.

2.4 Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

2.4.1 Management Areas by Alternative

Management area acres are presented in table 3 by alternative.

Table 3. Management area acres by designated area and alternative (Alt)

Management Area	No Action[1]	Alt W	Alt X	Alt Y	Alt Z	Preferred
1(a)-Designated Wilderness	1,139,059	1,139,059	1,139,059	1,139,059	1,139,059	1,139,059
1(b)-Designated Wild and Scenic Rivers	57,891	57,891	57,891	57,891	57,891	57,891
1(c) National Historic Landmark	55,760	55,760	55,760	55,760	55,760	55,760
MA1 subtotal	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638
2(a) Idaho Roadless Areas	1,481,636	1,481,636	1,481,636	1,481,636	1,481,636	1,481,636
2(b) Recommended Wilderness	197,695	856,932	0	309,332	569,755	263,357
2(c) Eligible and Suitable Wild and Scenic Rivers	155,477	74,646	0	110,252	166,176	76,032
2(d) Gospel-Hump-MA2	30,164	28,498	28,498	30,164	28,498	28,498
2(e) Designated RNA	29,499	29,499	29,499	29,499	29,499	29,499
2(f) Proposed RNA	2,946	2,946	2,946	2,946	2,946	2,946
MA2 subtotal	1,489,736	1,468,505	1,463,081	1,487,434	1,472,364	1,467,078
MA3 subtotal	1,217,683	1,238,913	1,244,337	1,219,984	1,235,055	1,240,340
Forest Acreage[2]	4,074,832	4,074,832	4,074,832	4,074,832	4,074,832	4,074,832

[1]No Action Alternative numbers are estimates to compare against alternatives. The 1987 Forest Plans had dozens of management areas.

[2]Forest Acreage numbers represent the administrative Nez Perce-Clearwater boundary.

2.4.2 Overview of Alternatives

An overview of alternatives considered in detail is included in Table 4, including the No Action Alternative (“No Action”), Alternative W (“Alt W”), Alternative X (“Alt X”), Alternative Y (“Alt Y”), Alternative Z (“Alt Z”), and the Preferred Alternative (“Preferred”).

Table 4. Overview of alternatives (Alt)

Resource Topic	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Recommended Wilderness	Hoodoo, Mallard-Larkins, Portions of : North Fork Spruce-White Sands and Sneakfoot Meadows	Bighorn-Weitas, Hoodoo, North Lochsa Slope, Mallard-Larkins, East Meadow Creek, Moose Mountain, Rapid River, North Fork Spruce-White Sands, Sneakfoot Meadows, Meadow Creek-Upper North Fork	None	East Meadow Creek; Hoodoo with Boundary change to create GA for snowmobiling; Mallard Larkins; Rapid River	East Meadow Creek, West Meadow Creek, Hoodoo, Mallard-Larkins, Meadow Creek-Upper North Fork; North Fork Spruce-White Sands, Rapid River, Rawhide, Sneakfoot Meadows, Pot Mountain	Mallard Larkins (82,286 acres); Hoodoo (108,276 acres) and East Meadow Creek (72,795 acres)
Mechanized or Motorized Recreation Uses in Recommended Wilderness	No over-snow motorized travel. No summer motorized or non-motorized mechanized travel. Motorized and non-motorized mechanized equipment suitable for administrative use.	No over-snow motorized travel. No summer motorized or non-motorized mechanized travel. Motorized and non-motorized mechanized equipment suitable for administrative use	n/a	No over-snow motorized travel. No summer motorized or non-motorized mechanized travel. Motorized and non-motorized mechanized equipment suitable for administrative use	Winter over-snow motorized travel allowed. Summer mechanized travel allowed. No motorized summer travel. Motorized and non-motorized mechanized equipment suitable for administrative use.	No winter motorized travel, no summer motorized or non-motorized mechanized travel. Motorized and non-motorized mechanized equipment suitable for administrative use.
Wild and Scenic Eligible and Suitable Rivers	0 Suitable, 29 Eligible: Bargamin Creek; Bear Creek Complex (Bear, Brushy Fork, Cub, Paradis, Wahoo); Cayuse Creek; Fish Creek; Hungery Creek; Johns Creek; Kelly Creek; Lake Creek; Little North Fork Clearwater River; Meadow Creek (Selway); Moose Creek Complex (East Fork Moose, Moose, North Fork Moose, West Fork Moose Creek, Rhoda); North Fork Clearwater River; Running Creek; Salmon River; Slate Creek; South Fork Clearwater River; Three Links Creek Complex (Three Links, West Fork Three Links); West Fork Gedney Creek; White Bird Creek; White Sand Creek (renamed Colt Killed Creek)	12 Suitable: Cayuse Creek, Fish Creek, Hungery Creek, Johns Creek, Kelly Creek, Little North Fork Clearwater River, Meadow Creek (Selway), Middle Fork Kelly, North Fork Kelly, Salmon River, South Fork Kelly, Weitas Creek	0 Suitable: manage 21 rivers consistent with the Idaho Department of Water Resources "State Protected Rivers" direction. North Fork Clearwater River Subbasin: North Fork Clearwater River, Weitas Creek, Elk Creek, Isabella Creek, Beaver Creek, Elmer Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Cayuse Creek, Little North Fork Clearwater River South Fork Clearwater Subbasin: American River, Johns Creek, Gospel Creek, West Fork Gospel Creek, Meadow Creek, Red River, Silver Creek, South Fork Clearwater River, West Fork Crooked River	14 Suitable: Cayuse Creek, Fish Creek, Hungery Creek, Johns Creek, Kelly Creek, Little North Fork Clearwater River, Meadow Creek (Selway), Middle Fork Kelly Creek, North Fork Clearwater River, North Fork Kelly Creek, Salmon River, South Fork Clearwater River, South Fork Kelly Creek, Weitas Creek	37 Suitable: Systems Approach: Bargamin Creek, Bear Creek, Big Sand Creek, Bostonian Creek, Boundary Creek, Brushy Fork Creek, Buck Lake Creek, Caledonia Creek, Colt Killed Creek, Crooked Fork Creek, Cub Creek, East Fork Meadow Creek (Selway), East Fork Moose Creek, Fish Creek, Graves Creek, Hungery Creek, Johns Creek, Kelly Creek, Little North Fork Clearwater River, Meadow Creek (South Fork Clearwaeter River), Middle Fork Kelly Creek, Moose Creek, North Fork Kelly Creek, North Fork Moose Creek, North Fork Storm Creek, Rhoda Creek, Running Creek, Sabe Creek, Salmon River, Silver Creek, South Fork Kelly Creek, South Fork Storm Creek, Storm Creek, Upper Lochsa River, Weitas Creek, West Moose Creek, Wounded Doe Creek	11 Suitable: Cayuse Creek, Fish Creek, Hungery Creek, Weitas Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Colt Killed Creek, Meadow Creek (Selway) and the Salmon River. 1 Eligible: Little North Fork Clearwater River
Access	Clearwater travel plan; site specific closure orders in some areas on the Nez Perce Forest (no travel plan in place)	All Backcountry Restoration IRA's motorized ROS in summer; most areas open in winter	More summer motorized access, Motorized loop opportunities expanded in MA2	Motorized loop opportunities expanded in MA2	Similar to existing condition in summer, increased winter motorized	More summer and winter motorized access. Important areas for non-motorized access in the future delineated.
Percentage of Forest in Motorized ROS Category	Summer: 61%	Summer: 47%	Summer: 58%	Summer: 44%	Summer: 43%	Summer: 55%
Percentage of Forest in Motorized ROS Category	Winter: 63%	Winter: 48%	Winter: 70%	Winter: 62%	Winter: 70%	Winter: 60%
Percentage of Forest in Non-Motorized ROS Category	Summer: 39%	Summer: 53%	Summer: 42%	Summer: 56%	Summer: 57%	Summer: 45%
Percentage of Forest in Non-Motorized ROS Category	Winter: 37%	Winter: 52%	Winter: 30%	Winter: 38%	Winter: 30%	Winter: 40%
Acres of Disturbance or Restoration Annually to be within Natural Range of Variability[1]	40,000	53,000-64,500	53,000-64,500	53,000-64,500	53,000-64,500	53,000-64,500
Timber Harvest Acres annually	4,300	12,600	14,000	7,500	3,700	8,825-10,000
Timber Output Restoration potential timber sale quantity	50-60 MMBF	221-241 MMBF	241-261 MMBF (Departure)	120-140 MMBF	60-80 MMBF	190-210 MMBF
Max Regen Unit Size	40 acres	207 acres	207 acres	207 acres	207 acres	207 acres

[1] Disturbance acres include wildfire, prescribed fire, timber harvest and other fuels treatments designed to meet desired conditions and be consistent with NRV.

2.4.3 Activities Suitable in Recommended Wilderness

A summary of proposed activities suitable in recommended wilderness is presented in Table 5 by alternative.

Table 5. Summary of proposed activities suitable in recommended wilderness by alternative (Alt)

Proposed Activity	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Motorized Travel	No	No	n/a	No	Yes- Winter Motorized	No
Mechanized Travel	No	No	n/a	No	Yes	No
Motorized and mechanized tools for public use	No	Hand-Held Motorized allowed (for example, Chainsaws)	n/a	No	Yes	No
Motorized and mechanized tools for administrative use	Yes	Hand-Held Motorized allowed (for example, Chainsaws)	n/a	No	Yes	Yes
Aircraft landing for recreational use	No	No	n/a	No	Yes	No
Aircraft landing for administrative use	Yes	Yes	n/a	Yes	Yes	Yes

Chapter 3. Affected Environment and Environmental Consequences

3.1 Introduction

This chapter presents the existing environment of the Nez Perce-Clearwater National Forest, hereinafter referred to as the "Nez Perce-Clearwater," plan revision project area and the potential consequences to that environment that may be caused by implementing the alternatives described in Chapter 2. Within each resource section, the boundaries of the area used for the resource analysis are disclosed. The discussion of resources and potential effects take advantage of existing information included in the 2014 Assessment, other planning documents, resource reports and related information, and other sources, as indicated. Where applicable, such information is briefly summarized and referenced to minimize duplication. The discussions here refer to the potential for the effect to occur and are in many cases only estimates. The effects analyses are useful when comparing and evaluating alternatives on a forest-wide basis but is not intended to be applied directly to specific locations on the national forest.

This final environmental impact statement is a programmatic document. It discloses the environmental consequences on a large scale at the planning level. This contrasts with analyses for site-specific projects. The final environmental impact statement presents a programmatic action at a forest level of analysis but does not predict what will happen each time the standards and guidelines are implemented. Environmental consequences for individual, site-specific projects on the Nez Perce-Clearwater are not described. The environmental effects of individual projects will depend on the implementation of each project, the environmental conditions at each project location, the application of standards and guidelines in each case, addressed with the appropriate level of NEPA documentation.

The affected environment and environmental consequences discussions in this chapter allow a reasonable predication of consequences on the Nez Perce-Clearwater. However, this document does not describe every environmental process or condition.

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications or longer-term environmental consequences of managing the Nez Perce-Clearwater under this programmatic framework.

3.1.1 Budget Levels

The Nez Perce-Clearwater's budget directly affects the level of activities and outputs that may occur through Land Management Plan implementation. Funding appropriated by congress is expected to remain flat or decrease in the future. Budgets include appropriated funds, as well as other sources of funding, such as retained receipts from timber sales, money available to accomplish work in stewardship contracts, partnership dollars, and other trust fund accounts. Overall, the amount of funding available to accomplish work on the Nez Perce-Clearwater is expected to increase as the amount of timber harvest increases. In alternatives in which timber harvest does not increase, available funding is expected to remain constant. Objectives assume that current appropriated funding levels would be maintained; however, as activity increases additional funding would be available to perform other restoration work on the Nez Perce-Clearwater. Alternatives that include additional timber harvest assume additional non-appropriated funds are available to support an increase in other non-timber related restoration objectives. Objectives in some alternatives also assume efficiencies in planning and implementation are realized, reducing planning and implementation costs and the time required. To analyze effects without consideration of expected budgets would be a misrepresentation of expected outcomes. The exception is the vegetation, timber, and fire management resource sections. To display movement towards vegetation desired conditions and to develop the sustained yield limit, an unconstrained budget level was analyzed along with constrained, current budget level.

3.1.2 Relevant Laws Common to All Resource Areas

The following laws, regulations, and policy are relevant to all, or nearly all, resource areas. Each section may also include additional relevant laws, regulations, and policies specific to that resource area.

The Multiple-Use Sustained-Yield Act of 1960 set the stage for the management of national forests by specifying that they would be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes. Renewable surface resources should be administered for multiple use and sustained yield to best meet the needs of the American people without impairment of the productivity of the land.

The Forest and Rangelands Renewable Resources Planning Act of 1974 provides for maintenance of land productivity and the need to protect and improve the soil and water resources.

Under the National Forest Management Act (1976a), "It is the policy of the Congress that all forested lands in the National Forest System shall be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yields. Plans developed shall provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area to meet the overall multiple-use objectives, and within the multiple-use objective." This act also provided specific direction, including, but not limited to, the development of land management plans and silvicultural requirements, such as maximum even aged harvest openings and reforestation requirements.

3.1.3 Chapter 3 Organization

Chapter 3 of this document is organized into the following sections:

- 3.1 Introduction
- 3.2 Physical and Biological Ecosystems
- 3.2.1 Forestlands
- 3.2.2 At Risk Plant Species
- 3.2.3 Climate Change and Forest Carbon
- 3.2.4 Fire Management
- 3.2.5 Invasive Species
- 3.2.6 Soil Resources
- 3.2.7 Water Resources
- 3.2.8 Aquatic Ecosystems and Fisheries
- 3.2.9 Wildlife
- 3.2.10 Air Quality

- 3.2.11 Ecology
- 3.3 Tribal Trust Responsibilities
- 3.4 Human Uses
- 3.4.1 Cultural Resources
- 3.4.2 Sustainable Recreation
- 3.4.3 Scenery
- 3.4.4 Infrastructure
- 3.4.5 Land Ownership and Land Uses
- 3.5 Production of Natural Resources
- 3.5.1 Timber
- 3.5.2 Energy and Minerals
- 3.5.3 Livestock Grazing
- 3.6 Designated and Recommended Areas
- 3.6.1 Designated Areas
- 3.6.2 Recommended Areas
- 3.6.3 Research Natural Areas
- 3.6.4 Special Areas
- 3.7 Risk Management & Safety
- 3.8 Economic and Social Environment
- 3.8.1 Economic Sustainability
- 3.8.2 Social Sustainability
- 3.9 Concluding Information and Disclosures

3.2 Physical and Biological Systems

3.2.1 Forestlands

This report discusses the coarse filter characteristics of terrestrial ecosystems on the Nez Perce-Clearwater, including both forested and non-forested plant communities. The coarse-filter approach discusses conditions at the ecosystem or plant community level in terms of providing for ecosystem integrity and diversity.

Key ecosystem characteristics are defined in the 2012 Planning Rule as "the dominant ecological components that describe ecosystems and are relevant to ecosystem condition and integrity as well as land management concerns." Vegetation ecosystem integrity is assessed through the characteristics listed in table 6. These characteristics were identified in the Nez Perce-Clearwater Forest Plan Assessment as measurable components of ecosystem integrity or were identified through public scoping. They are measurable and described quantitatively or qualitatively. The desired condition for each characteristic and its relationship to current and potential future conditions form the basis for this analysis.

Table 6. Terrestrial vegetation key ecosystem characteristics

Characteristic	Indicator	Measure
Vegetation composition	Dominance types (forested and non-forested)	Percent of area
Size class distribution	Classes based on basal area weighted diameter	Percent of area
Forest density	Classes based on canopy cover density	Percent of area
Landscape resilience	Resilience indicators	Insect and disease hazard ratings; Projected wildfire; Landscape pattern and patch size
Rare or Unique habitat element	Aspen prevalence	Percent of area
Old Growth	Resilient old growth	Percent of area

Vegetation management includes timber harvest, fuel reduction, restoration, and salvage. Public scoping identified a need for more active or less active vegetation management. The alternatives were formulated with this in mind, and this analysis focuses on effects to indicators from varying management intensities and practices. Separate sections deal with additional vegetation characteristics and issues, including fire and fuels, carbon storage, timber outputs, and at-risk plant species.

Changes Between Draft and Final Environmental Impact Statement

Multiple changes were made for this document; however, all changes are within the scope of the Draft Environmental Impact Statement analysis and discuss issues that the public has had an opportunity to comment on. This section details the key changes between the draft and final analysis for terrestrial vegetation. See the timber section also, as the modeling changes between these resources are interconnected.

Analysis was added for the Preferred Alternative. With respect to vegetation, this alternative is like all action alternatives, with one distinction being in the objective functions used in the timber scheduling model (PRISM), as described in the timber section and Appendix B. A minimum value for long term sustained yield was incorporated into the PRISM runs for the Preferred Alternative.

Updated specific measures for landscape resiliency to replace vegetation condition class with projected wildfire. Projected wildfire is used as a measure of desired condition attainment related to the natural range of variation for wildfire frequency and severity without reference to specific vegetation types as with vegetation condition class.

Updated acreage calculations for each management area by alternative. This was in response to the GIS analysis of boundaries associated with recommended wilderness for each alternative. These updated acreage estimates are very small and do not affect desired conditions for terrestrial vegetation.

Updated tables and narrative surrounding discussions of the distribution and frequency of broad potential vegetation type by forestwide and management area scales. This update is in response to incorporating data from the updated R1 Hybrid 2015 data set which included remeasured Forest Inventory and Analysis (FIA) plots which provided an updated estimate of numerous vegetation characteristics including dominance types, size class, and density metrics at various scales.

Incorporated a large-tree structure analysis into the size class discussions to illustrate how each alternative affects large tree recruitment. The large-tree structure analysis is also used to illustrate the relationship between large tree distributions and old growth forest structure on the forest.

Updated insect and disease hazard ratings based on updated R1 Hybrid 2015 FIA data set.

Included additional discussions relating the current distribution of old growth types to natural disturbance regimes including wildfire. The old growth discussion has been expanded to include a discussion relating old growth types to old growth forest cover types and the relationship to dominance types and habitat type groups and included tables to illustrate both the metrics used to define old growth, old growth forest cover types, and the disturbance processes which give both rise and decline of old growth on the forest.

Updated the forest density section and incorporated updated **Sim**ulating vegetation **P**atterns and **P**rocesses at **L**andscape Sca**LE**s (SIMPPLLE) output data to collaborate the effects of natural disturbance processes and vegetation treatments on forest density.

Updated existing condition estimates for dominance types, size class, and canopy cover classes based on updated R1 Hybrid 2015 FIA data set.

Updated desired condition ranges for dominance type and size class based on updated natural range of variation (NRV) analysis which incorporated an updated climate model with improved predictive performance of regional climate scenarios.

Updated average opening patch size and area weighted mean opening patch size based on updated NRV analysis. Included a Jenks Natural Breaks algorithm analysis to better describe the variance of opening size distributions.

Incorporated the preferred alternative into vegetation analysis, ecosystem consequences, and conclusion sections including the projected modeling outcomes for changes in dominance types, size class, and density.

On April 20, 2023, the USDA issued a technical report in fulfillment of Biden Executive Order 14072, Section 2(b) (U. S. Department of Agriculture and U.S. Department of the Interior 2023 (14072 2023)). This report provides definitions for mature and old-growth forests and an initial inventory of these conditions on lands managed by the Forest Service and Bureau of Land Management. This report presents the finding that the Forest Service and Bureau of Land Management lands combined contain 32.7 +/- 0.4 million acres of old-growth and 80.1 +/- 0.5 million acres of mature forest, representing 18 percent and 45 percent of all forested land managed by the two agencies, respectively. This initial national inventory was conducted by applying the old-growth and mature working definitions to Forest Inventory and Analysis field plot data. To provide the initial inventory, the department provided narratives and working quantitative definitions for old-growth and mature forest for each Forest Service region.[10]

To quantify and estimate old growth, the authors of the technical report utilized Old Growth Forest Types of the Northern Region (Green et al. 2011) which has been used to define old growth in the Northern Region for decades. Prior to the mature and old growth report produced in response to President Biden's Executive Order (14072 2023), there was not a consistent definition of "mature forest." The quantitative definition presented in the technical report is considered a "working" definition appropriate for application for the national-scale inventory. As mentioned in the "Mature and Old-Growth Forests: Definition, Identification, and Initial Inventory on Lands Managed by the Forest Service and Bureau of Land Management," the working definitions developed for the national inventory may need "further refinement… to apply working definitions at local scales due to diverse ecology, forest types, site characteristics, and varied management contexts" (14072 2023). At this time, the working definition has not been refined to the local scale; therefore, we do not currently have a quantitative estimate of mature forest on the Nez Perce-Clearwater National Forests.

[10] https://www.fs.usda.gov/sites/default/files/mature-and-old-growth-forests-tech.pdf

Relevant Laws, Regulations, and Policy

Federal Laws

Multiple-Use Sustained-Yield Act of 1960: This act set the stage for the management of National Forests by specifying that they would be administered for outdoor recreation, range, timber, watershed, wildlife, and fish purposes. Renewable surface resources shall be administered for multiple use and sustained yield to best meet the needs of the American people without impairment of the productivity of the land.

Forest and Rangelands Renewable Resources Planning Act of 1974: This act provides for maintenance of land productivity and the need to protect and improve soil and water resources.

National Forest Management Act of 1976: The act specifies "it is the policy of the Congress that all forested lands in the National Forest System shall be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stand designed to secure the maximum benefits of multiple use sustained yields. Plans developed shall provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet the overall multiple-use objectives, and within the multiple-use objective." This act also provides specific direction in areas such as the development of land management plans and silviculture requirements, including maximum even aged harvest openings and reforestation requirements.

Executive Orders

Executive Order 12898 of February 11, 1994, Environmental Justice

Executive Order 14072 of April 22, 2023, Strengthening the Nation's Forests, Communities, and Local Economies

Agency Regulations

36 CFR 219.9. National Forest System Land Management Planning (The Planning Rule)

36 CFR 223 Special Forest Products

36 CFR 241 Fish & Wildlife

36 CFR 251 Land Uses

36 CFR 254 Land Ownership Adjustments

36 CFR 293 Wilderness

36 CFR Part 294 Roadless Area Conservation, Applicability to the National Forests in Idaho; Final Rule

State and Local Laws

Idaho Department of Water Resources requirements

Idaho Department of Environmental Quality

State and Local Plans

Clearwater County Natural Resources Plan

Clearwater County Community Wildfire Protection Plan

Idaho County Natural Resources Plan

Idaho County Wildland-Urban Interface Wildfire Mitigation Plan

Benewah County Natural Resources Plan

Latah County Community Wildfire Protection Plan

Shoshone County Fire Mitigation Plan

Methodology

Spatial Scale

The Nez Perce-Clearwater plan components focus on the need to conserve dynamic, multi-scale ecological components, structures, and processes that sustain a full complement of native species and their supporting ecosystems. This report documents the coarse filter analysis of the terrestrial ecosystems. Other reports focus on species-specific conditions, resources, and management strategies under a fine filter approach.

The affected area for terrestrial vegetation is the lands administered by the Nez Perce-Clearwater as illustrated in Appendix A. This area represents the National Forest System lands where changes may occur to vegetation because of management activities or natural events. Information is summarized at three scales:

Forestwide to provide information on the broad scale context. This scale is appropriate as it is an ecological boundary that includes the broad scale vegetation and ecological trends in a contiguous land area as recommended by the Council of Environmental Quality's publication Considering Cumulative Effects under the National Environmental Policy Act[11].

Broad potential vegetation group because indicators, such as species dominance and density, vary by site capability.

Management area because the unique disturbance history and human uses of each area has and will continue to influence vegetation.

Effects to forest vegetation under each alternative are analyzed by potential vegetation type group within each management area. The management area split was done in response to a request from the public. The Nez Perce-Clearwater was divided by potential vegetation type group due to the varying ecological capacities and differing natural conditions for each potential vegetation type group. The rationale behind splitting the landscape by management area was that each management area has different tools available for management and different objectives for management. Because of this, the landscape was partitioned for analysis, monitoring, and development of desired conditions to reflect those differences. This was done to balance the types of disturbances used to meet objectives. For instance, if all management areas were grouped together, setting a desired condition for up to 40 percent of the warm moist potential vegetation type group to be in an early successional stage possibly could result in much of that 40 percent being in Management Area 3, where timber harvest is the primary tool to achieve desired conditions. As a result, much more than 40 percent of the front country may be harvested to reach the desired conditions

[11] National Environmental Policy Act, NEPA.gov. Available online: https://ceq.doe.gov/publications/cumulative_effects.html#:~:text=Considering%20Cumulative%20Effects%20Under%20the,additional%20information%20and%20background%20data

while fire suppression kept a large portion of the roadless areas in a mid-to-late successional stage. Conversely, using the same example, if fire swept through Management Area 1 and Management Area 2, causing 40 percent of the warm moist potential vegetation type group to be in the early successional stage, timber harvest would no longer be useable as a tool in Management Area 3 to create more of the early successional stage. The idea was to create balance in how different tools were used to achieve desired conditions.

The affected area for cumulative effects also includes lands of other ownership within and immediately adjacent to the forest boundaries. The cumulative effects analysis will discuss how the vegetative landscape may be affected by each alternative in the analysis area when considering other past, present, and foreseeable future actions.

Temporal Scale

The temporal scale of this comparative analysis is 150 years. Quantitative effects were derived from the SIMPPLLE and PRISM models, which use whole decades as the modeling time steps. Action alternatives are designed to achieve desired conditions at different time steps in the 150-year modeling scenario. For this reason, a comparative time step approach is used to compare achievement of desired conditions between alternatives. All alternatives are analyzed at both 20 years and 50 years to provide a short-term and long-term comparative time step. The model is programmed to maximize objective functions specific to each alternative. Alternative W is designed to achieve desired conditions within 30 years, Alternative X within 20 years, Alternative Y within 50 years, Alternative Z within 100 years, and the Preferred Alternative between 35 and 40 years. Each alternative is expected to achieve different results relative to forest cover type, size class, and density distributions. All alternatives, including the No Action Alternative, are expected to have different impacts and effects related to other resources, such as acres of prescribed fire needed to accomplish objectives, acres of lynx and fisher habitat affected by wildland fire, mean opening patch size, and distribution of patches. Ultimately, each alternative is assessed relative to attainment of Land Management Plan desired conditions and objectives.

PRISM analysis models were run for 150 years to assess the stability of vegetation communities following proposed silviculture treatments and natural disturbance regimes. SIMPPLLE model runs of 1,000 years were used to capture forest succession and development under the natural range of variation influenced by climate cycles and various disturbance agents. An analysis of the natural range of variation was a primary element that informed desired conditions. The natural range of variation provides a frame of reference for ecological integrity and resilience. It reflects the conditions that have sustained the current complement of wildlife and plant species and provides context for understanding the natural diversity of vegetation and the processes that sustain it. Since the mid-1800s, human presence and activities have increased dramatically in the plan area. Natural range of variation estimates provide a reference to conditions that might have occurred prior to these impacts. The intent of using the natural range of variation to inform desired conditions is not to return precisely to conditions that occurred at a single point in time but to understand the full range of conditions that were supported prior to substantial human influence. Desired conditions are framed within the variability associated with the natural range of variation to provide context for management objectives.

Desired condition development and methodologies

This section discusses the factors and rationale applied in the development of desired conditions for vegetation in the Nez Perce-Clearwater Land Management Plan. Since the Draft Environmental Impact Statement, changes have been made to desired conditions based on internal and public comment as well as an updated natural range of variation (NRV) analysis (Appendix B of this final EIS). The desired conditions are included as plan components and form the basis of the timber and vegetation future modeling to compare alternatives. Please see the Land Management Plan for detailed definitions of each desired condition.

The NRV shows the mean percentage for the dominance type and size class attributes, with ranges around the 5 and 95 percentiles, rounded to the nearest percentage. Existing condition estimates are shown as the mean with ranges depicting the 90 percent confidence interval. The desired condition ranges are based on the NRV ranges; however, rounding occurs to not place undue confidence on model precision. Generally, the ranges span at least 5 percent for uncommon elements and 10 percent for more common elements. For example, if the NRV predicted a range of 6–8 percent, the desired condition range may be 5–10 percent. In addition, either the lower bound, upper bound, or both modeled NRV ranges are adjusted in specific cases to account for best available science information (BASI) regarding the historic condition or potential future condition of the attribute. When such adjustments are made, in most cases, the desired condition ranges overlap either the high or low end of the NRV range. Specific literature used to support adjusted desired conditions is cited in each attribute section.

Some attributes cannot be modeled with SIMPPLLE (that is, snags, old growth, coarse woody debris, etc.). For these elements, other resources are used to inform plan components.

Natural Range of Variation as a basis for desired conditions

An analysis of the NRV was a primary element that informed desired conditions. The NRV provides a frame of reference for ecological integrity and resilience. It reflects the conditions that have sustained the current complement of wildlife and plant species and provides context for understanding the natural diversity of vegetation and the processes that sustain it. Since the mid-1800s human presence and activities have increased dramatically in the plan area. The NRV estimates provide a reference to conditions that might have occurred prior to these impacts. The intent of using the NRV to inform desired conditions is not to return to conditions that occurred at a single point in time, but rather to encompass the full range of conditions that were supported prior to substantial human influence (Wiens et al. 2012).

The future will not be the same as the past. The NRV does not provide insight into conditions that may vary in the future or other considerations relative to social demands placed on the ecosystem. Further, the analysis includes inherent uncertainty, and it is appropriate to utilize additional resources, including literature, to ensure the “envelope” of vegetation conditions described by desired conditions will meet future ecological and social needs. Therefore, the desired conditions are not always equal to the NRV because additional factors were considered as noted in the detailed sections below.

Forest Service Handbook (FSH) 1909.12 Land Management Planning Handbook recognizes there may be other factors (social, economic, or ecological) that lead the responsible official to determine that the NRV may not be an appropriate desired condition for certain characteristics. These considerations include maintaining conditions that contribute to long-term resilience given uncertainties in future climate and disturbances, sustaining stand structures or species compositions that provide habitat for at-risk wildlife or plant species, conserving rare structures or components, existing or anticipated human use patterns, the effects changing climate may have, and ecosystem services expected from forest lands (such as reduction of fire hazard). The following factors are considered in the development of vegetation desired conditions: manage vegetation to generally be within the NRV, maintain conditions that would contribute to long-term ecosystem resilience and adaptation to uncertainties of future climate and disturbances, sustain important wildlife habitat conditions, and consider social and economic factors.

Research indicates there is potential for ecological transformations to occur in temperate ecosystems, based on the potential for interrelated drivers such as chronic and acute drought, wildfire, and insect outbreaks to push ecosystems beyond their thresholds for resilience (Millar and Stephenson 2015, Golladay et al. 2016). In some cases, management intervention might be able to ease the transition to new forest states and minimize losses of ecosystem services (Millar and Stephenson 2015). We do not have the capability to predict such possible shifts at the local scale. By basing the desired conditions around the NRV, with a focus on maintaining the full suite of ecosystem diversity and components that enhance resilience to disturbance, the Land Management Plan would guide management toward maintaining functioning ecosystems in the face of uncertainty.

Recent studies and analyses have been conducted regarding the appropriateness of using the NRV to frame desired conditions (Hansen et al. 2018, Timberlake et al. 2018). In both cases, the authors found that using the NRV provided a solid and defensible base to inform future desired conditions.

Halofsky et al. (2018) documents the results of a literature review and analysis of data by a variety of subject matter experts examining the ecosystems of the Northern Rocky Mountain forests and specifically the region encompassing the Nez Perce-Clearwater. This document determined that “managing toward the NRV is a reasonable approach given the available data, current state of the forest ecosystem and projected future change.” The authors examined the vulnerability of ecosystems on the Nez Perce-Clearwater to climate change and delineated potential adaptation and restoration strategies, which are consistent with the recent work of the Northern Rockies Adaptation Partnership, which is the BASI for climate change in Region 1.

Haugo and Welch (2014) developed an assessment of ecosystems, vulnerabilities, and restoration needs in cooperation with The Nature Conservancy and the Clearwater Basin Collaborative. The authors allow that NRV may help inform the desired future condition, but also promote that current departure from NRV is reflective of departure from historic fire regimes. The report discusses ecosystem integrity in the face of climate change by evaluating dominant ecosystem characteristics and functions.

The issue of using a historical range of variability in the context of climate change is discussed in Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains (Halofsky, Peterson, et al. 2018a), as shown in Box 1. The Nez Perce-Clearwater is consistent with the concepts presented, by considering the full range of NRV conditions to establish desired condition ranges (not precise targets) that are adjusted where need to reflect other BASI.

Box 1: From (Halofsky, Andrews-Key, et al. 2018). Box 6.1 – Using Historic Range and Variability to Assess and Adapt to Climate Change

- “To effectively implement ecosystem-based management, land managers often find it necessary to obtain a reference or benchmark to represent the conditions that describe fully functional ecosystems (Cissell et al. 1994; Laughlin et al. 2004). Contemporary conditions can be evaluated against this reference to determine status, trend, and magnitude of change, and to sustainable condition (Hessburg et al. 1999; Swetnam et al. 1999). Reference conditions are assumed to represent the dynamic characteristics of ecosystems and landscapes, varying across time and space (Swanson et al. 1994; Watt 1947).
- The concept of historical range and variability (HRV) was introduced in the 1990s to describe past spatial and temporal variability of ecosystems (Landres et al. 1999), providing a spatial and temporal foundation for planning and management. HRV has sometimes been equated with “target” conditions (Harrod et al. 1999), although targets can be subjective and somewhat arbitrary, they may represent only one possible situation from a range of potential conditions (Keane et al. 2009). HRV encompasses a full range of conditions that have occurred across multiple spatiotemporal scales.

- HRV represents a broad historical envelope of possible ecosystem conditions—burned area, vegetation cover type area, patch size distribution—that can provide a time series of reference conditions. This assumes that (1) ecosystems are dynamic, not static, and their responses to changing processes are represented by a past variability; (2) ecosystems are complex and have a range of conditions within which they are self-sustaining, and beyond this range they make a transition to disequilibrium (Egan and Howell 2001); (3) historical conditions can serve as a proxy for ecosystem health; (4) the time and space domains that define HRV are sufficient to quantify observed variation; and (5) the ecological characteristics being assessed for the ecosystem or landscape match the management objective (Keane et al. 2009).
- The use of HRV has been challenged because a warmer climate may permanently alter the environment of ecosystems beyond what was observed under historical conditions (Millar et al. 2007a). In particular, disturbance processes, plant species distribution, and hydrologic dynamics may be permanently changed (Notaro et al. 2007). However, a critical evaluation of possible alternatives suggests that the HRV might still be the most viable approach in the near term because it has relatively low uncertainty.
- An alternative to HRV is forecasting future variations of landscapes under changing climates by using complex empirical and mechanistic models. However, the range of projections for future climate from the commonly used global climate models may be greater than the variability of climate over the past three centuries (Stainforth et al. 2005). This uncertainty increases when we factor in projected responses to climate change through technological advances, behavioral adaptations, and population growth (Schneider et al. 2007). Moreover, the variability of climate extremes, not the gradual change of average climate, will drive most ecosystem response to climate mediated disturbance and plant dynamics (Smith 2011) that are difficult to project. Uncertainty will also increase as climate projections are extrapolated to the finer scales and longer time periods needed to quantify future range and variability (FVR) for landscapes (Araujo et al. 2005; Keane et al. 2009)."

There is literature that indicates a high likelihood of future scenarios wherein the suite of ecosystems present today and in the NRV are no longer resilient to change and transform into novel ecosystems. In other words, conditions may shift outside of the NRV, and ecosystem integrity may no longer be measured by that yardstick, therefore, desired conditions built around NRV may not be achievable. The risks for species shift and loss of forest cover due to drought and disturbance are acknowledged; however, these scenarios are generally predicted to occur in the longer term (beyond the 15-year planning cycle) and are difficult if not impossible to quantify at the scale of a National Forest. The specific configuration of potentially new ecosystem conditions is not quantifiable due to the level of uncertainty associated with future climates, and any attempt to craft desired conditions to capture the suite of conditions that may be sustainable in 50 years or more would be based on substantial guesswork and downscaling of larger modeling efforts.

The NRV for wildfire and insect activity places the analysis into context with historic regimes (see Appendix B). Wildfire is, was, and will remain the dominant ecosystem driver. Given the importance of fire as a key ecosystem process, maintaining vegetation and forest diversity, sustaining fire adapted species and structures, and creating vegetation conditions that support and sustain native wildlife species in the short and long term are critical components of the Plan. Management Area 3 is still demonstrating the lack of fire that has occurred throughout the era of fire exclusion and remains well below the NRV for acres burned; Management Areas 1 and 2 are reflecting the trend of increasing fire activity with warming climates. It is likely that insect and disease occurrence may increase with continued warm and dry climates during the life of the plan. However, recent mountain pine beetle and defoliating insect outbreaks may preclude many areas from infestation for several decades.

Past, Present, and Future Activities used in the Analysis

Effects analysis presented for each alternative includes estimates of acres burned because of wildfire which are managed for resource benefit. Not every natural ignition will be suppressed. Wildfires originating within Management Areas 1 and 2 will likely be allowed to burn to achieve landscape level objectives. Wildfire originating in Management Area 3 will likely be suppressed to protect human life and private property, particularly within the wildland urban interface and forest management investments such as plantations. Application of the national cohesive strategy for wildland fire management will have impacts to forest density objectives within the wildland urban interface and other special emphasis areas.

Significant acreage within the administrative boundary of the Nez Perce-Clearwater has been designated as roadless under the Idaho Roadless Rule. These lands are subject to management limitations, which will have an impact on the extent to which forestwide management objectives can be met.

Designation of sub-management areas, such as 1A2C-Suitable Wild and Scenic River, within designated wilderness are not likely to have any effect on vegetation management proposals given that these areas are currently within designated wilderness. There are approximately 42 sub-management areas defined within the Land Management Plan. Of these, recommended wilderness areas are likely to have the greatest effect on forest management objectives over time.

Changes in regional climate will affect the nexus between current and future forest conditions and vegetation condition class. Potential fire effects to vegetation are likely to change because of changing climate.

The Idaho Department of Fish and Game has proposed a change in the management emphasis for elk habitat. Elk habitat management should focus on developing and maintaining high quality forage. This management focus is commensurate with the wildlife resource objectives proposed by the Nez Perce-Clearwater. As such, the Idaho Department of Fish and Game elk habitat management proposal is not likely to have an impact on the attainment of vegetation objectives.

Analysis Methods and Assumptions

Management Area

There are three management areas defined for the purpose of analyzing alternatives under this Land Management Plan. Management Area 1 (MA1) contains areas designated by Congress and includes designated wilderness, designated wild and scenic rivers, and national historic landmarks and trails. Management Area 1 is managed to be consistent with the legislation for each area designation. Generally, these areas are part of the National Preservation System and are managed for preservation emphasis in which natural processes are the primary means of disturbance.

Management Area 2 (MA2) is referred to as the back-country area and contains areas designated by the executive branch, generally by the Secretary of Agriculture or the United States Forest Service. Designated areas within Management Area 2 include Idaho Roadless Rule areas, recommended wilderness, suitable wild and scenic rivers, the Gospel Hump multi-purpose area, designated Research Natural Areas, and proposed Research Natural Areas. These areas are managed consistent with the rule or plan direction in which it was designated for. Some areas have specific direction spelled out, such as the Idaho Roadless Rule. Others are managed for a specific purpose solely based on Land Management Plan direction. Generally, these lands are managed to preserve the characteristics or value for which they were designated, such as roadless character, outstandingly remarkable values, and areas for scientific research. Management often is a combination of letting natural processes dominate and promoting active management. The degree to which nature is allowed or how human influences affect change through management is variable within each sub-management area. The sub-management area categories of this management area may vary by alternative if they are designated in one alternative but not another. Timber harvest is permitted in some portions of this management area, while prescribed fire is generally permissible across the management area. Some portions of Management Area 2 are suitable for timber harvest while others are unsuitable. No areas in Management Area 2 are suitable for timber production.

Management Area 3 (MA3) is referred to as the front-country and contains areas without special designation. Management Area 3 is managed for multiple uses within the constraints of forest practices, regulations, laws, and special management restrictions. Active management is the dominant disturbance agent in this management area. Within this management area, ecological, social, and economic factors are given equal weight. The land is managed under a conservation ethos and is managed consistent with the Forest Service mission statement. Timber harvest may be used to meet desired conditions of many resources. All areas suitable for timber production are within Management Area 3.

Table 7 and Table 8 lists the acres by land status and management areas across all alternatives. To provide meaningful context for comparison across all alternatives, the management area designations are superimposed onto the administered lands of both the Nez Perce and Clearwater National Forests which represents the No Action Alternative.

Table 7. Land status acres by alternative.

	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Administrative Forest Boundary	4,074,832	4,074,832	4,074,832	4,074,832	4,074,832	4,074,832
Non-Forest Service Lands	135,775	135,775	135,775	135,775	135,775	135,775
Forest Service Lands	3,939,056	3,939,056	3,939,056	3,939,056	3,939,056	3,939,056

Data Source: VMap.

Table 8. Management area (MA) classification acres and percent by alternative.

	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA1 acres	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638
% MA1 lands	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%
MA2 acres	1,497,517	1,468,512	1,463,088	1,487,441	1,472,371	1,467,078
% MA2 lands	38.0%	37.3%	37.1%	37.8%	37.4%	37.2%
MA3 acres	1,209,901	1,238,906	1,244,330	1,219,977	1,235,048	1,240,340
% MA3 lands	30.7%	31.5%	31.6%	31.0%	31.4%	31.5%

Data Source: VMap.

Broad potential vegetation groups

Terrestrial vegetation characteristics are stratified by broad potential vegetation group, which identify sites of similar environmental conditions. These groups provide information on the inherent capability of the land to support vegetation and the nature of change in vegetative communities over time. Broad potential vegetation groups are groupings of potential vegetation types and potential vegetation types are groupings of habitat types. These hierarchical classifications are summarized as follows.

Habitat type is a fine-scale site classification based on physical and environmental similarities, which result in similar potential plant communities and ecological processes. The designation of habitat types is based on the potential climax plant community (Pfister et al. 1977). Climax conditions represent the culmination of the plant community that would occur through natural succession in the absence of stand replacing disturbances. Though the general characteristics of the climax plant community may be the same on sites of the same habitat type, existing plant communities could be very different at any one point in time due to factors unique to each site, such as the history, pattern, and frequency of disturbance.

Potential vegetation types combine habitat types into areas of similar climate, slope, soils, and other biophysical characteristics. A map layer was developed in 2004 (Jones 2004) to depict potential vegetation groups, which is currently the only available layer that provides a consistently derived and contiguous map of potential vegetation types across the Forest Service Northern Region.

Broad potential vegetation type groups provide more coarse groupings of habitat types for purposes of broad level analysis and monitoring. Region 1 produced a detailed description of these groups and how potential vegetation types and habitat types are nested (Milburn et al. 2015). These groups serve as the basis for description and analysis of ecological conditions at the forestwide and landscape scales. Areas within each of the groups would have similarities in patterns of potential natural plant communities, potential productivity, natural biodiversity, and ecological processes.

Table 9 illustrates the distribution of broad potential vegetation types within each management area. Differences in relative distributions of broad potential vegetation types between management areas gives rise to differences in species compositions and relative species abundance.

Table 9. Distribution of broad potential vegetation types (PVT) within each management area (MA).

	Percent of MA 1	Percent of MA 2	Percent of MA 3
Cold PVT	26%	10%	4%
Cool Moist PVT	34%	30%	13%
Warm Dry PVT	31%	26%	32%
Warm Moist PVT	8%	34%	49%
Non-forested	2%	1%	2%

Source: R1 Summary Database FIA Hybrid 2015 dataset.

Table 10 displays the proportion of each forestwide broad potential vegetation group associated with dominance types prevalent within the plan area. Four forested broad potential vegetation types – warm dry, warm moist, cool moist, and cold – are found on the Nez Perce-Clearwater. In addition, five non-forested types – alpine, riparian or wetland, xeric shrub or woodland, mesic grassland, and xeric grassland – plus sparsely vegetated areas are located on the Nez Perce-Clearwater. Dominance types associated with each broad potential vegetation type are listed for each management area in Table 10. A map is available in Appendix A.

Table 10. Forestwide cover dominance types and associated broad potential vegetation type groups.

Dominance Type	Cold	Cool Moist	Warm Dry	Warm Moist
Ponderosa pine	0%	0%	16.4%	1.2%
Douglas fir	2.8%	19.0%	31.5%	24.1%

Dominance Type	Cold	Cool Moist	Warm Dry	Warm Moist
Grand fir	0%	2.5%	34.4%	46.2%
Western larch	0.4%	2.0%	1.2%	2.5%
Western redcedar	0%	0%	0.3%	14.7%
Western hemlock	0%	0%	0%	1.3%
Mountain hemlock	9.0%	5.7%	0%	0.5%
Western white pine	0.4%	0%	0%	1.2%
Lodgepole pine	41.2%	14.6%	12.7%	3.7%
Engelmann spruce	6.8%	22.0%	2.0%	3.1%
Subalpine fir	39.0%	27.2%	0.7%	1.0%
Whitebark pine	0.4%	0.5%	0%	0%
Pacific yew	0%	0%	0%	0.3%

Data Source: R1 Hybrid 2015 Data Set.

Table 11. Dominance types and associated broad potential vegetation type by Management Area

Management Area 1 Dominance Type	Cold	Cool Moist	Warm Dry	Warm Moist
Ponderosa pine	0%	0%	22%	0%
Douglas fir	4%	11%	39%	34%
Grand fir	0%	1%	31%	45%
Western larch	0%	0%	0%	0%
Western redcedar	0%	0%	0%	19%
Mountain hemlock	0%	0%	0%	0%
Western white pine	0%	0%	0%	0%
Lodgepole pine	37%	14%	5%	0%
Engelmann spruce	10%	36%	1%	2%
Subalpine fir	49%	37%	2%	0%
Whitebark pine	0%	1%	0%	0%
Management Area 2 Dominance Type	**Cold**	**Cool Moist**	**Warm Dry**	**Warm Moist**
Ponderosa pine	0%	0%	8%	1%
Douglas fir	0%	11%	39%	34%
Grand fir	0%	1%	31%	45%
Western larch	0%	0%	1%	1%
Western redcedar	0%	0%	0%	13%
Mountain hemlock	26%	11%	0%	1%
Western white pine	1%	0%	0%	1%
Lodgepole pine	40%	21%	16%	7%
Engelmann spruce	3%	18%	3%	3%
Subalpine fir	28%	29%	0%	1%
Whitebark pine	1%	1%	0%	0%
Pacific yew	0%	0%	0%	1%
Management Area 3 Dominance Type	**Cold**	**Cool Moist**	**Warm Dry**	**Warm Moist**
Ponderosa pine	0%	0%	20%	2%

Management Area 1 Dominance Type	Cold	Cool Moist	Warm Dry	Warm Moist
Douglas fir	3%	5%	20%	17%
Grand fir	0%	4%	39%	51%
Western larch	3%	5%	2%	4%
Western redcedar[1]	0%	0%	0%	17%
Mountain hemlock	0%	7%	0%	0%
Western white pine	0%	0%	0%	2%
Lodgepole pine	65%	13%	15%	2%
Engelmann spruce	3%	32%	2%	4%
Subalpine fir	26%	34%	0%	1%
Whitebark pine	0%	0%	0%	0%

[1]Approximately 2.5% of the western redcedar dominance type within Management Area 3 is composed of western hemlock (*Tsuga heterophylla*), which occurs only in the warm moist potential vegetation type group.

Data Source: R1 Hybrid 2015 Data Set.

Dominance Type

Dominance type is determined by the species with the greatest abundance of canopy cover, basal area, or trees per acre within a setting or map feature. The species that determine the dominance type are always of the same lifeform. Therefore, it is necessary to first identify the dominant lifeform and tree lifeform subclass before determining dominance type (Barber et al. 2011).

Dominance type is not an expression of total species composition or species presence for a map feature or forested stand. The species having a plurality of canopy cover, basal area or trees per acre determines the dominance type. Other species are generally present within a mapped feature or forested stand but occur at lower percentage amounts. For example, a forested stand may be classified as a grand fir (*Abies grandis*) dominance type based on having the largest percentage of basal area but may also contain Douglas fir (*Pseudotsuga menziesii*), Western larch (*Larix occidentalis*), and Ponderosa pine (*Pinus ponderosa*). The total species assemblage is a function of the habitat type, forest succession, and disturbance history. Refer to Appendix B for a description of species presence for each management area.

Currently, the plan area is dominated by mid and late seral species, such as grand fir, subalpine fir (*Abies lasiocarpa*), and Engelmann spruce (*Picea engelmannii*) dominance types; however, many of these areas would have historically been dominated by long-lived early seral species, such as Ponderosa pine, Western larch, Western white pine (*Pinus monticola*), and whitebark pine (*Pinus albicaulis*). The percentages of current forest cover types by management area are displayed in the tables within this section.

Historically, Western white pine was the most important forest cover type in North Idaho, occupying the region's cooler moister sites in elevations between 2,000 and 5,500 ft. (Haig 1932). Because of the shade intolerance of Western white pine, successful fire suppression efforts in the 1900s discouraged the continued reproduction of this tree species, as did the introduction of white pine blister rust. Due to the lack of stand replacing disturbances and lack of naturally occurring blister rust resistant seed sources on the landscape, Western white pine is being supplanted by more shade tolerant and more disease susceptible species, including grand fir and Douglas fir (Fins et al. 2001). Site specific observations in the project area verify these general observations made by Fins(2001). In the stands proposed for vegetation management, the most abundant species are shade tolerant species rather than long-lived early seral species, such as Western white pine, Ponderosa pine, or Western larch.

The warm dry broad potential vegetation group occupies the warmest and driest sites on the Nez Perce-Clearwater that support forests. These sites support Ponderosa pine, Douglas fir, and dry site grand fir habitat types. This group occurs at lower elevations, on warm southerly aspects, and on droughty soils. Forests are often dominated by Douglas fir and Ponderosa pine along with Western larch as a minor component. Open forest savannas may occur within this group where grasses or shrubs are dominant, and trees are widely scattered due to repeated frequent fires.

The warm moist group includes some of the most productive forest sites on the Nez Perce-Clearwater. Distribution of this group is highly influenced by aspect, slope position, and seasonal fluctuations in water tables. On drier sites, grand fir is the dominant climax species north of the North Fork Clearwater River. Western hemlock (*Tsuga heterophylla*) dominates the wetter end of this group with western redcedar (*Thuja plicata*) dominating on cooler and wetter sites south of the North Fork Clearwater River. This setting occurs on mid-to-high elevation sites across all aspects. Historically, Western white pine is the most common seral species dominant within this group, along with grand fir, Western larch, and Douglas fir.

The cool moist group comprises the most productive subalpine-fir and Engelmann spruce sites on the Nez Perce-Clearwater. Moist mountain hemlock (*Tsuga mertensiana*) and lodgepole pine (*Pinus contorta*) habitat types are in this group, along with subalpine fir and spruce habitat types. This setting occurs on mid-to-high elevation sites across all aspects. Lodgepole pine and Engelmann spruce are the most common seral species.

The cold broad potential vegetation group occupies the highest elevation areas that support forests. Some sites are cold, moderately dry subalpine fir habitat types that support moderately dense forest cover. Remaining areas are cold drier mountain hemlock and lodgepole pine. At the timberline, whitebark pine and subalpine larch types are dominant where growing conditions are harsher and tree density more open.

Non-forest broad potential vegetation groups consist of the persistent non-forested vegetation climax types. They occur on sites where establishment and growth of conifers is impeded, for example in areas of shallow or very droughty soils; very wet soils and high-water tables; or very frequent disturbance. Persistent non-forested areas include alpine meadows, dry grasslands and shrublands, mesic grasslands, and riparian areas. There are also areas on the Nez Perce-Clearwater that are non-vegetated where very sparse or no vegetation grows, such as scree or barren areas. These are excluded from the analysis.

Forest Density

Forest density is a measure of the area occupied by trees. The density of trees can influence tree growth and vigor; susceptibility to drought, insects and diseases, wildfires, and windthrow potential; and the rate of forest succession, as well as other attributes such as vertical structure. These factors, in turn, affect whether the stand is suitable habitat for certain wildlife species. For this analysis, tree canopy cover is used as the measure of density because it is the only spatially explicit measure of forest density available for analysis. Tree canopy cover data is derived from the VMap product (see Appendix B) and tracked through spatial projections in the SIMPPLLE model. Canopy cover is the percentage of ground covered by a vertical projection of the outermost perimeter of the tree crowns, considering trees of all heights. Density is reported as the percent of canopy cover associated with tree species and is analyzed across all potential vegetation type groups and management areas to evaluate effectiveness in meeting plan objectives.

Canopy cover is low when the stand is in the earliest stage of succession and dominated by seedlings. As trees grow, crowns expand to fill up growing space and canopy cover gradually increases. Growth of understory trees over time also adds to the canopy cover and vertical structure as the forest grows into the later successional stages. Disturbances and competition-based mortality can limit tree density. Site productivity also affects canopy cover, with more productive moist sites supporting higher densities and harsh sites with poor soils supporting lower densities. Frequent fire, particularly in the warm dry potential vegetation group, can maintain low canopy covers at all stages of forest succession.

Forest density influences tree species composition and vice versa. For example, Ponderosa pine and lodgepole pine are intolerant of shade and cannot survive in the lower canopy layers. Shade tolerant species, such as subalpine fir and spruce, can prosper in dense stand conditions with limited light. Unless a disturbance reduces competition from shade tolerant species, intolerant species will die out. Some cover types, such as lodgepole pine, naturally grow at high density. Others, such as Ponderosa pine, typically grow at more open densities with natural disturbance regimes.

Vertical structure is not a key indicator, nor does it have quantitative desired conditions; however, it is described in conjunction with density. Vertical structure is categorized as a single-storied, one canopy layer; a two-storied, two canopy layers; or a multistoried, three or more canopy layers. As with density, vertical structure is driven by succession, individual species traits, and disturbances. Some cover types, such as spruce and fir, naturally develop a continuous canopy made up of multiple layers of shade tolerant species. Other types, such as lodgepole pine, tend to grow in dense, single-storied stands. The four canopy cover classes and associated vertical structures are described in Table 12.

Table 12. Forest density classes and associated vertical structures.

Tree Density Class	Canopy Cover Range	Description
Non-forested	<10%	Areas with less than 10% canopy cover are non-forested. This class may include open forest savannas or persistent grass and shrub communities that occur on the warm dry broad potential vegetation group. Such sites may have multiple age classes but large fire resistant and drought tolerant trees, such as Ponderosa pine, are favored. This class also includes areas on any potential vegetation type that have been recently de-forested through disturbance and trees have not yet re-established. Finally, true non-forested communities, such as grasslands, riparian and wetlands, and alpine communities, are included.
Low to Medium	10-39.9%	Low and medium tree canopy cover classes represent relatively open forests with 10 to 39.9% canopy cover. This class is common in young forests. In addition, low densities are found in dry forest types at all stages of succession, particularly in the warm dry broad potential vegetation group where site conditions or disturbances maintain low tree density. Cool moist or cold forests may also be in this condition, particularly in areas impacted by disturbances such as mountain pine beetle infestations.
Medium-High	40-59.9%	The medium to high tree canopy cover class represents a more fully stocked forest, a condition which is common in both warm moist and cool moist potential vegetation groups. Examples of forests with this density could include mature single-storied lodgepole pine or spruce and fir multi-storied stands. Dry forests may also be in this density class, particularly where fire has been excluded and understory layers have developed.
High	60%+	The high canopy cover class includes forests with a relatively closed canopy, most often on productive sites on the cool moist broad potential vegetation group. This density class is common in stands with a spruce and fir component in a multi-storied condition. This condition also arises in single-storied lodgepole pine and sometimes Douglas fir that regenerate to extremely high densities after fire. High tree density can limit tree growth and sunlight to the understory, limiting vegetation in the understory. This condition may also occur in dry forests that have missed natural fire entries and developed layers in the understory.

Data Source: (Barber et al. 2011).

Landscape Resilience

Resistance, defined as "the ease or difficulty of changing the [ecological] system," is one of the attributes of resilience (Walker et al. 2004). Holling (2001) says that resistance can be increased by increasing diversity. Both the dominance type and size class indicators are easily measured components of diversity on the landscape, which is a measure of resilience. Density is another important measure which can be used as an indicator of resilience and diversity at the landscape scale. For example, highly dense lodgepole pine stands are more susceptible to attack by mountain pine beetles (*Dendroctonus ponderosae*) than stands having low density. The distribution and extent of highly dense lodgepole pine stands will have an impact on the occurrence of mountain pine beetle disturbance events.

Insect and disease agents are a component of forest resiliency. The methodology developed to model the effects of insect and disease uses a weighted matrix of risk rating evaluations to assign an overall insect and disease risk rating across each potential vegetation type within each management area. The two primary insects include mountain pine beetle and Douglas fir beetle (*Dendroctonus pseudotsugae*). The disease risk rating is a composite of risk rating representing the major root disease pathogens found within north Idaho forests (Lockman et al. 2016, Holden et al. 2020).

Density is a factor in both fire behavior and fire effects resulting from wildland fire. Dense forested settings typically have greater amounts of vertical fuels, as well as surface fuel loading, which contributes to severe fire effects. Disturbance resulting from severe fire effects outside of the natural range of variation are not an indicator of a resilient system. Projected wildfire is used as a component of landscape resiliency to quantify differences between alternatives. Both density and size class are components of insect and disease hazard ratings. Insect and disease hazard ratings are expected to change because of changes in dominance type transitions. The extent and rate of change in dominance type transitions will differ by alternative.

Landscape patterns are developed by disturbance events at both the spatial and temporal scales. Management actions, as well as natural disturbance events, will determine the frequency and scale of openings in the forest canopy. Taken together, both projected wildfire and insect and disease hazard ratings determined for each management area and potential vegetation type group are predictive metrics that influence landscape patterns. Changes in projected wildfire and insect and disease hazard ratings resulting from differences in management intensity associated with each alternative will influence the extent and rate of change on the landscape pattern.

The methodology for developing plan components for old growth and for anticipating effects to old growth is discussed in detail in the "Old Growth Rationale" paper that is in the project record. The rational supporting plan components for old growth should reflect that the Nez Perce-Clearwater is considerably outside of the natural range of variation for dominance types and should incorporate thinking about forested vegetation, rather than simply restricting activities within all old growth. To do this, plan components discuss underrepresented resilient dominance types while allowing harvest within overrepresented and non-resilient dominance types.

Measurement Indicators

Land Management Plan direction must provide for ecological integrity while contributing to social and economic sustainability. To achieve this, desired conditions have been developed for key vegetation components. Desired conditions describe what would restore and maintain ecosystem integrity while contributing to social and economic sustainability. Though the Land Management Plan provides direction for a relatively short period of time, desired conditions were developed with the long-term view in mind due to the long-lived nature of tree species. To deal with the uncertainty in future conditions, desired conditions incorporate strategies that would maintain or improve the resilience of the ecosystem and promote sustainability and adaptability of vegetation. The desired conditions incorporate terrestrial and watershed restoration strategies to promote landscape scale resiliency.

The future will not be the same as the past. Therefore, in addition to the natural range of variation, additional factors were considered in the development of desired conditions. These included maintaining conditions that contribute to long-term resilience given uncertainties in future climate and disturbances; sustaining stand structures or species compositions that provide habitat for at-risk wildlife or plant species; conserving rare structures or components; existing or anticipated human use patterns; the effects changing climate may have; and ecosystem services expected from forest lands, such as the fuels reduction projects, production of forest products, and recreational opportunities.

The issue statement from scoping and public collaboration relative to forest vegetation is:

Desired conditions for forest vegetation should be met through natural processes or through active management. The rate of progress towards the desired conditions should occur at a faster or slower pace. Desired conditions should include higher compositions of early seral species and increased or decreased patch sizes and increased or decreased tree densities to meet ecological habitat needs of wildlife species, maintain resiliency of forest vegetation communities, and to meet social needs of forest users at a local, regional, and national scale.

Dominance types, size class distribution, and density were chosen as indicators of the extent to which each alternative maintains, improves, or restores ecological integrity. Landscape pattern, prevalence of aspen (*Populus tremuloides*), and old growth characteristics were chosen as indicators of resilience, ecological function, and diversity.

Dominance Types

Dominance types for the desired conditions are defined using the same definitions as the DOM_MID40 attribute in the Existing Vegetation Classification (Barber et al. 2011). This method uses a 40 percent plurality determined by trees per acre for seedling and sapling size and by basal area for all other sizes to determine the dominance type of a pixel. This means that a pixel receives the classification of the tree species that is most prevalent, and species must comprise at least 40 percent of the pixel.

Dominance type was chosen as an indicator because dominance type is one of the primary ways in which the landscape is departed from the natural range of variation (See SIMPPLLE Natural Range of Variation results). To analyze dominance types, the Hybrid 2015 dataset from the Forest Inventory and Analysis (FIA) database was used to generate estimates of dominance types using the Region 1 Summary Database Estimator. The Dominance Group Mid-40 was combined with the Dominance Group 6040 attribute to track minor species components. This attribute is based on a 60 percent threshold and a 40 percent threshold where a stand is classified as a given species if it comprises 60 percent of the stand, then if no species comprises 60 percent of a stand, it is classified by the species that comprises 40 percent of the stand (Barber et al. 2011). Estimates were generated as “final” in the estimator, which is recommended for planning (Bush et al. 2018). Because the exact effects of timber harvest and fire are unknown, plots that had been affected by fire and timber harvest since the time of sampling were removed. This means that all plots that had been burned or harvested after they were sampled were not included in the estimates of preliminary current conditions. Subsequently, plots affected by wildfires between 2015 and 2017 were re-measured and this updated data was included in the final estimates of current conditions. Disturbances are critically important for the development of successional pathways and vegetation patterns.

The effect each alternative would have on dominance types was originally analyzed using Spectrum and the modeling was performed by Kendrick Greer of Mason, Bruce, and Girard. A design document was written recording the various parameters used to predict dominance types under each alternative. This document is included in the project record. Transition pathways were created for Spectrum that identify the requirements for dominance types to change and are also part of the project record. As modeling development progressed, it was recognized that the Spectrum model was not robust enough to handle all the modeling elements and parameters needed to generate this comparative analysis. The original Spectrum design document and data input records were imported into the PRISM model to assure that the model could generate a solution for each parameter across all alternatives. All PRISM documentation is included in the project record.

Size Class

Size class was identified as a forestwide indicator. As above, the rationale for this is that size class distribution on the Nez Perce-Clearwater is departed from the natural range of variation (see SIMPPLLE Natural Range of Variation results). Size class distribution refers to the amount of the Nez Perce-Clearwater within different size classes rather than the geographic location of the size classes. Size classes are defined by basal area weighted average diameter, which is in accordance with and described in greater detail in the Region 1 Existing Vegetation Classification document (Barber et al. 2011). The analysis was performed using the Size Class National Technical Guide, which indicates that the size classes coincide with the size classes used in the guide.

The desired conditions, based on natural range of variation estimates, are partitioned by management area for the same reasons as above for dominance types. Because Management Area 3 has objectives for growing timber as a commodity, the size class distribution is adjusted to accommodate the need to maintain a balance of all size classes. Since much of Management Area 3 is suitable for timber production, it should be maintained with a size class distribution that supports a commercial harvest entry schedule. A small percentage of early seral grass-shrub size class is maintained to provide for wildlife habitat desired conditions and to reflect natural vegetation patterns at the landscape scale.

Size classes, as defined in this analysis, are broken into the same classes used in the Existing Vegetation Classification (Barber et al. 2011) and are defined using the same basal area weighted diameter methodology. While not specifically measured in a quantifiable way, the size class section also contains a discussion on expected effects to old growth from the alternatives because old growth was brought forward as an indicator during public involvement. Snags were also brought forward during public involvement. Although they are not used specifically as an indicator here, this section will include a discussion on snags.

Large and very large diameter live trees are commonly identified as key components of forested ecosystems across the Northern Region. Large trees are defined as those greater than or equal to 15 inches diameter at breast height (DBH) and very large trees are greater than or equal to 20 inches diameter at breast height. These trees, particularly long-lived fire tolerant species, represent important elements of ecosystem diversity whether they occur at low or high densities. Fire tolerant species can survive low to moderate intensity fire, providing seed sources and contributing to the recovery of the forest after disturbance, promoting resilience, and providing long-term structural diversity. Where present in sufficient numbers, they contribute to late successional forest and, in some cases, old growth. They provide important wildlife habitat, both as live trees and when they die, as snags and downed wood. Additionally, they can be of high economic value for wood products.

Resource specialists and members of the public are interested in the amount and distribution of large and very large trees occurring across the landscape. This understanding is important in the context of defining the natural range of variation, desired conditions, and resilience of forested ecosystems. The Northern Region Existing Vegetation Classification System (Barber et al. 2011) includes a size class metric, which classifies plots or stands based on the basal area weighted average diameter; a single label is assigned to a plot or stand. However, scattered individuals, groups, and clumps of large and very large trees may occur in forests classified into a smaller size class. To characterize stands or plots where large and very large trees occur at certain minimum densities, an attribute has been developed for analysis and monitoring in the Northern Region: Large-tree Structure. Large-tree Structure, coupled with Size Class, provides information on the density of large trees as well as the average size of the trees on a plot or within a stand. These attributes are related but refer to distinct resource information needs.

Dominance and size class were chosen as indicators because they are two of the key elements of forest vegetation that are most readily changed by management actions and natural disturbance events (Larson and Churchill 2012). They are also two ecosystem elements for which the natural range of variation information is available. These two elements have associated quantified desired conditions, so the effects of each alternative relative to meeting desired conditions for forest vegetation are readily measured, detected, and displayed. Dominance and size class are both measured by broad potential vegetation type and management area. These delineations were used because desired conditions vary by potential vegetation type and because the tools to affect dominance and size class vary by management area.

Forest Density

Density was selected as an indicator in response to public input and because forest density is departed from the natural range of variation. As with dominance types and size class distributions, density objectives will vary between potential vegetation type group and management area objectives.

Density was chosen as an indicator because density affects tree vigor (Long 1985, Hood et al. 2016) and also affects the ability of various tree species to retain dominance as with Douglas fir encroachment in Ponderosa pine stands. Density is readily quantified and displayed and is a measure of how each alternative would affect overall forest vigor and the extent to which some early seral dominance types are retained. It is also described in this analysis because it is a critical coarse filter element for wildlife in the warm dry potential vegetation type group. For this analysis, density is described by relative canopy cover in classes defined in the Existing Vegetation Classification (Barber et al. 2011). Density classes are defined by potential vegetation type group by management area.

Landscape Resilience

Resilience is used as an indicator to deal with several concerns raised during scoping and collaboration. The following quote was brought forward from scoping as an indicator:

The response of vegetation to disturbances and stressors — effects of the alternatives on the hazard of wildfire, key insects and diseases, weather disturbances, and climate change.

Resilience is also helpful in displaying differences between alternatives because it represents a sort of composite of other indicators. Resilience shows the extent to which vegetation is or is not likely to respond to various stressors. While the various elements of vegetation, such as dominance type or size class, show how a particular aspect of forest vegetation is trending toward desired conditions, resilience as an indicator provides management implications for those trends and the combination of the trends.

Measures used for resilience will vary slightly from those identified during scoping. The key measures of resilience used in this analysis are:

- Insect and disease hazard ratings
- Projected wildfire
- Landscape pattern

Resilience to climate change and weather disturbance were not specifically used as measures because these are largely related to dominance type and size class diversity (Halofsky, Peterson, et al. 2018a, b). Insect and disease hazard describe the potential implications of varying dominance types and size classes. Projected wildfire was used in this analysis in place of hazard from wildfire, which was a previously proposed measure. Fire is an important disturbance agent on the landscape of the Nez Perce-Clearwater; projected wildfire captures the importance of fire and identifies the risks associated with departure from the natural range of variation for wildfire frequency and severity type of fire that would have occurred historically. Landscape pattern is used as a qualitative measure of resilience because of the close tie between landscape pattern and landscape function (Turner et al. 2001, Hessburg et al. 2015).

In 2000, the President directed the Secretaries of Agriculture and the Interior to recommend how best to respond to severe wildland fires, reduce the impacts of fire on rural communities, and ensure sufficient firefighting capacity in the future. As a result, Congress directed development of the National Fire Plan, which precipitated LANDFIRE[12], along with the creation of a National Cohesive Wildland Fire Management Strategy (U.S. Department of Agriculture and U.S. Department of the Interior 2014b). The National Cohesive Wildland Fire Management Strategy deals with responses to wildfire, restoring and maintaining resilient landscapes and creating fire-adapted communities all based on a scientific foundation. LANDFIRE is a shared program between the United States Department of Agriculture Forest Service and United States Department of the Interior's wildland fire management bureaus under the direction of the Wildland Fire Leadership Council (WFLC). LANDFIRE produces a comprehensive, consistent, scientifically based suite of spatial layers and databases for the entire United States and territories.

LANDFIRE is used to classify vegetation according to the degree of departure from the natural range of variability associated with a given vegetation cover type. Forested vegetation types are described by fire regime in terms of the percentage of departure from the natural range of variation ranges. The projected amount of wildfire and fire frequency differs between fire regimes. Table 13 illustrates the fire regime classifications and departure percentages from historical fire occurrence.

Table 13. Fire regime departure expressed as percent departure of extent burned from Natural Range of Variation.

Fire Regime Group	Existing Average Acres Burned per Decade	Average Desired Acres Burned per Decade	Current Fire Regime % Departure	Desired Fire Return Interval (Frequency)	Desired Fire Severity
I	45,919	195,500	77%	0-35 years	Low to mixed
II	3,141	10,000	68%	0-35 years	High
III	89,579	305,500	71%	35-200 years	Mixed/low
IV	111,496	80,500	-38%	35-200 years	High

[12] LANDFIRE (LF), Landscape Fire and Resource Management Planning Tools, is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations.

Fire Regime Group	Existing Average Acres Burned per Decade	Average Desired Acres Burned per Decade	Current Fire Regime % Departure	Desired Fire Return Interval (Frequency)	Desired Fire Severity
V	2,423	850	-185%	200+ years	High to mixed to low
Total	252,558	592,350	57%	Regime dependent	Regime dependent

Data Source: Calculation_SRF_MF.xlsx.

The dominant, historical fire regime that occurred within forested vegetation in the northern Idaho region can be characterized as a variable or mixed-severity fire regime (Zack and Morgan 1994, Brown and Smith 2000). Severity refers to the amount of overstory vegetation replacement and the effect on dominant vegetation cover types; in fire management, severity is "defined as the amount of vegetation replacement, and its effects to the dominant vegetation (Barrett et al. 2010)." This type of fire regime commonly had a moderately short fire-return interval for nonlethal or mixed severity fires with lethal crown fires occurring less often. Relative to the other two common fire regimes that are often recognized for forested vegetation—the nonlethal and stand-replacement regimes—the mixed-severity fire regimes are the most complex (Agee 2005). Individual mixed-severity fires typically leave a patchy pattern of mortality on the landscape, which creates highly diverse communities. These fires kill a large percentage of the more fire-susceptible tree species, such as hemlock, grand fir, subalpine fir, and lodgepole pine, and a smaller proportion of the fire-resistant species, including Western larch, Ponderosa pine, whitebark pine, and Western white pine (Arno et al. 2000).

Aspen is a rare and unique habitat element on the Nez Perce-Clearwater, and, as such, is important for the diversity it provides and is an important coarse scale feature for wildlife (Rogers et al. 2014). It was chosen as an indicator because one of the ways in which the alternatives vary is the extent to which aspen is increased on the landscape through disturbance processes. The amount of aspen can be quantified; therefore, the extent to which each alternative meets the desired conditions for aspen can be readily analyzed and displayed.

Old growth characteristics were identified as a resource of concern during public scoping and as a critical component of ecosystem diversity and as a habitat element for species that require large diameter trees for part of their life cycle. Plan components discuss within-stand characteristics for each broad potential vegetation group, including the need to maintain legacy trees to meet habitat needs for cavity nesting wildlife. Old growth was chosen as an indicator because the frequency and distribution of stands exhibiting old growth characteristics is expected to vary by management area and broad potential vegetation group because of proposed forest management practices and because of natural disturbances. Old growth is discussed in qualitative terms to compare how each alternative may influence the relative frequency and distribution of old growth components as compared to the No Action Alternative. In addition, large-tree structure is discussed to distinguish between those large trees, which contribute to diversity of stand structure within stands of all size classes and those trees which contribute to old growth characteristics.

Old growth is a structural condition that may exist during the late successional stage of forest development. Old growth provides wildlife habitat, biological diversity, and other ecosystem functions, such as carbon storage. It also contains seed sources that contribute to landscape resilience. The concept of old growth involves not only tree age but also characteristics, such as trees size and spacing, large dead standing and fallen trees, broken and deformed tops, bole and root rot, multiple canopy layers, canopy gaps and understory patchiness, cessation in height growth of oldest trees, near zero net productivity, and biochemistry of secondary metabolic products in old trees (Johnson et al. 1995). This condition is not static and, as old growth dies, it is replaced by younger forests as they age; therefore, the distribution of old growth across the landscape changes over time. The Nez Perce-Clearwater uses structural attributes to define old growth based on the best available scientific information (Green et al. 1992).

The Forest Inventory and Analysis (FIA) program is mandated by congress to provide a comprehensive, continuous, and statistically sound field inventory of national forest resources and National Forest System lands. FIA is administered by the Research and Development branch of the Forest Service (Bush et al. 2006). The FIA mission was first defined in The McSweeney-McNary Forest Research Act of 1928 to generate a comprehensive inventory and analysis of renewable resources of the United States. The Forest and Rangeland Renewable Resources Planning Act of 1974, P.L. 93-378, as amended, directed the Secretary of Agriculture to prepare a Renewable Resources Assessment every 10 years, which utilizes data trends derived from FIA data. Congress has further mandated through The Agricultural Research, Extension, and Education Reform Act of 1998 (P.L. 105-185) that FIA data be consistently collected and summarized across all land ownerships, including public lands managed by the National Forest System, with reports for each state produced at five-year intervals. The integrity of FIA sample locations is protected to assure that they remain representative of unsampled locations. In compliance with Public Law 106-113 (Fiscal Year 2000 Consolidated Appropriations Bill), FIA closely restricts disclosure of exact coordinates for all FIA sample locations, including those on public lands. This protects FIA sample locations from unauthorized access and unintentional impacts or improper tampering. For this reason, it is not permissible to render a spatial distribution of old growth forest locations on the forest based on FIA data. FIA currently uses a standardized configuration for its sample locations in the field. This configuration is designed to measure a diverse spectrum of forest metrics from species, size and age classes, forest density, and structure across all land types and within public and private ownerships. The National Forest System applies its definition of old growth forest using data collected according to FIA standards and maintained in the FIA database (Czaplewski 2004).

The Nez Perce-Clearwater National Forest is covered by 669 FIA sample locations (Bush and Reyes 2020). The FIA sampling grid provides an equal probability sample of each national forest. This sampling grid uniformly covers Wilderness Areas and roadless areas as well as lands managed for other purposes, regardless of their suitability for timber production. Therefore, the FIA sampling frame is appropriate to make scientifically defensible and reliable inferences regarding the condition of forests within sufficiently large areas, regardless of their management regime. These inferences include estimation of snag density and the proportion of all forested areas in a national forest that meets its definition of old growth forest (Czaplewski 2004).

To conduct analysis of forest attributes over large areas such as the 3,939,057 acres of the Nez Perce-Clearwater, it is infeasible to maintain an inventory of all vegetation on every acre. FIA provides a statistically-sound representative sample designed to provide unbiased estimates of forest attributes. This inventory design is appropriate for making estimates of a variety of attributes of forested lands across large landscapes such as National Forests, multiple fifth-code watersheds, and ecological section. The FIA sampling frame uniformly covers all forested lands, regardless of management emphasis. Therefore, wilderness areas (Management Area 1), roadless areas (Management Area 2), and actively managed lands (Management Area 3) all have the same probability of being sampled. FIA data comes from a spatially balanced statistical sample that allows estimates of means and their associated standard errors and confidence interval accuracies (Bush et al. 2006).

Carbon stocks were brought forward as an indicator during public involvement and are discussed in the Climate Change and Forest Carbon section.

Affected Environment

Existing Condition

A primary goal of the Land Management Plan action alternatives is to provide for ecological integrity and sustainability, supporting the full suite of native plant and animal species while providing for the social and economic needs of people. Resistance and resilience are important concepts applied at both the stand and landscape level. At the stand level, resistance and resilience are important factors to consider in the development of forest management implementation guidance. The landscape scale is integral in monitoring for attainment of desired conditions for ecological integrity and sustainability. Resistance at the stand level refers to the influence of structure and composition on disturbance severity while the landscape level refers to the influence of structure and composition on the spread of disturbance. Resilience at the stand level refers to the influence of disturbance on subsequent structure and composition and at the landscape level as the influence of disturbance on subsequent forest structure and composition (DeRose and Long 2014).

This section begins by describing the primary ecosystem and ecosystem processes and disturbances, then discusses vegetation composition and structure. Composition is the type and variety of the vegetation while structure is the physical form of vegetation, such as the vertical and horizontal arrangement of plants. Forest structure is complex, but this analysis is coarse, relying on classifications of forest size class and density. Separate sections discuss more specific elements of structure, including snags, downed wood, and old growth. Finally, landscape pattern is discussed. Landscape pattern can include a nearly infinite number of attributes; for this analysis, however, the focus is on early successional forests.

Abiotic Ecosystem

Climate and Ecological Provinces

The overall ecological context for the northern Rocky Mountain forests is the interaction of effective water availability and disturbance processes and the pattern of vegetation resulting from those interactions. In the western portion of the northern Rocky Mountains, which includes northern Idaho, the warmer Pacific maritime air mass dominates producing upwards of 30 to 40 inches of precipitation each year, on average. Averages for precipitation vary greatly across the forest. The northern portion of the forest, north of the North Fork River, can experience years with 60 to 80 inches of precipitation, while the southern portion of the forest along the Salmon River may average only 20 inches. This variation in precipitation patterns across the forest gives rise to differences in species composition and site productivity. Air masses can also move across this region from the southwest, crossing California and Nevada, and bringing little moisture but bringing dry thunderstorms when they hit the mountains and valleys of southern and central Idaho. One such storm can release over 80,000 lightning strikes. Also, dry cold air masses are sometimes pulled out of north-central Canada, bringing high winds, very dry air, and very cold temperatures in the winter.

This climate context, combined with soils, defines where different forest types can occur. The soils part of the equation is best understood by looking at the National Hierarchy of Ecological Units, where Provinces are at the largest scale, further subdivided into Sections at the scale of national forest size, and, ultimately, Subsections (Nesser et al. 1997). Subsections were developed by further subdividing Sections. For forest planning, Biophysical Settings were developed that are approximately equivalent to the Subsections in scale and roughly approximate the boundaries of the Subsections but were developed from aggregating land types to provide a picture of lands with very similar topography, water balances, growing seasons, and forest types.

The Nez Perce-Clearwater is almost entirely within two ecological Provinces as delineated by Bailey (1994):

M333: The Northern Rocky Mountain Forest Steppe—Coniferous Forest—Alpine Meadow Province, located north of the Middle Fork Clearwater and Lochsa Rivers

M332: The Middle Rocky Mountain Steppe—Coniferous Forest—Alpine Meadow Province, located south of the Middle Fork and Lochsa Rivers.

The Northern Rocky Mountain Forest Steppe province extends from east of the Cascade Mountains in Washington to the Continental Divide in Montana, into Canada to the north, and throughout northern Idaho. The Middle Rocky Mountain Steppe province extends over the Blue Mountains in northeastern Oregon, the Salmon Mountains in central Idaho, and into the basins and ranges of southwestern Montana. Most of these two provinces have been glaciated with landforms typical of this process.

Two ecological sections (McNab et al. 2007) within these provinces dominate the Nez Perce-Clearwater: the Idaho Batholith (M332A) and Bitterroot Mountains (M333D). Small pieces of sections 331A (Palouse) and M332G (Seven Devils area) also occur within the Nez Perce-Clearwater. However, these two sections have narrow extents and are similar enough to the adjacent sections that, for forest planning purposes, they have been combined with the adjacent Sections—Palouse with the Bitterroot Mountains and Seven Devils with the Idaho Batholith. See the 'Ecological Sustainability Summary' section for further detail.

Ecosystem Processes and Disturbances

Vegetation is not static; it is constantly changing across space and time due to drivers such as climate, succession, fire, insects, and diseases. The complex interactions between these processes over past centuries resulted in the vegetation that currently exists and will influence changes into the future. Since the late 1990s, national disturbance rates have been influenced primarily by natural disturbances rather than anthropogenic ones and increasing rates for forest decline have been concentrated in the western United States where extended droughts have coupled with increasingly high temperatures to create increasingly stressed and vulnerable forests (Cohen et al. 2016, Mildrexler et al. 2016).

Climate

Climate strongly influences vegetation and ecosystem processes. Temperature and moisture patterns dictate what plants can establish and grow on a site and influence factors such as growth rates and density. Drought can alter vegetation directly by killing plants or indirectly by increasing the frequency and severity of disturbances or rendering forests more susceptible to insect and disease. Over geologic time, changes in climate are natural; even so, because of climate change, forests may face rapid alterations in the timing, intensity, frequency, and extent of disturbances (Dale et al. 2001).

Considerable natural variation in climate has occurred historically. Future climate projections suggest that temperature increases will exceed the historical variation for average monthly maximum temperature. Specific changes in ecosystem components due to expected climate change are difficult to predict and are highly uncertain, especially in the diverse terrain of the northern Rocky Mountain region.

In the western United States, it is likely that water balance and disturbance dynamics will be more important than actual increased temperature in affecting vegetation. Longer, warmer growing seasons may increase growth rates; however, greater soil water deficits and increased evapotranspiration in the summer may offset this and increase plant stress. Growing sites on the Nez Perce-Clearwater are highly variable and are influenced by topographic position, aspect, and elevation. At any given time under variable climatic regimes, lower elevation forest cover types, such as Ponderosa pine, are drier than higher elevation cover types, such as subalpine fir. Drought conditions or effects of warm, dry climatic periods generally result in slower growth and decrease the ability of a site to support vegetation compared to cool, moist periods across all elevational gradients. Competition-based mortality increases during dry periods. Stress can also lead to higher mortality rates indirectly through susceptibility to insects or disease. Increasing soil water deficits can cause eventual shifts in species presence across the landscape as they become less able to regenerate or survive. Species located on sites at the margin of their optimal range would be most vulnerable. Species extent and distribution would be consequently impacted.

Climate changes are also expected to affect disturbances. There is a high degree of uncertainty associated with extrapolation of these effects to local sites. Persistent and recurring drought combined with high temperatures may give rise to "mega disturbances" in some areas that may cause tree mortality of a spatial extent, severity, and frequency surpassing that recorded during recent human history (Millar and Stephenson 2015). Studies of potential effects of climate change on fire and insect and disease suggest the following may occur across the western United States (Halofsky, Peterson, et al. 2018a, b):

Longer fire seasons, more days of high fire danger, increased frequency of ignitions, more frequent large fires, more episodes of extreme fire behavior, and increased average annual area burned.

Given availability and spatial distribution of host species, there may be elevated levels of native insects and disease. Predicted increases in temperature and drought will probably serve to increase pathogen populations in the future because they are able to migrate to new environments at a faster rate than trees.

Biotic Ecosystem - Vegetative succession

The Nez Perce-Clearwater has a wide diversity of terrestrial vegetation communities due to its geographic location, geology, topography, range in elevation, and climate. Vegetation ranges from dense coniferous forests in warm, moist, or dry valley bottoms to sparsely forested types on cold, steep, high-elevation sites. These vegetation communities also change over time. Simply stated, vegetative succession is the gradual replacing of one vegetation community with another. It is the basic ecological process of change in the composition, structure, and function of plant communities over time. It is based on the concept that every species has a particular set of environmental conditions under which it will reproduce and grow optimally. If these conditions remain relatively constant, the species will flourish. However, species have impacts on their own environments and on each other, and this is one factor that causes the plant community to change over time. External factors, such as weather and disturbance events to include fire and disease, also cause change in plant communities.

The successional process follows a pathway with each major step along the way referred to as a seral or successional stage. In a simplified model for a coniferous forest in the northern Rocky Mountain ecosystem, early successional stages typically follow a disturbance, such as fire, which kills all or a portion of the existing trees and other plants while leaving the physical environment intact. Trees and other plant species immediately start colonizing the site through a variety of reproductive methods, such as seeds or sprouting from underground roots and rapidly fill up all available growing space. Then follows a series of intermediate successional stages typically from about 40 to 140 years after the disturbance, collectively referred to as mid successional stages, where plant species are well established, trees grow larger, and forests grow denser. Changes in environmental conditions and competition for limited resources, mainly water and sunlight, cause some species to decline or disappear and others to expand. Forest structure may become more complex; for example, complexity can be created by greater variations in the tree height canopy layer or increased accumulation of snags and downed woody material from dying trees. Ultimately, the stand develops into a late successional stage, typically 150 or more years after the disturbance, depending on the site. As compared to mid-successional stages, the forest structure is usually more complex, tree diameters and heights are larger, and shade tolerant grass, forb, shrubs, and trees predominate. In the classical model of succession, this stage would be considered the culmination of the successional process and is called the climax forest community. The climax forest represents a state of relative stability in forest composition, structure, and function, with all existing species able to perpetuate themselves within the forest without catastrophic disturbance.

Of course, this description of successional stages and associated forest characteristics is an oversimplification of what is a far more complex and tangled web of inter-relationships between site conditions, vegetation, and the ecosystem drivers and stressors. Highly diverse forest conditions can occur within any one successional stage and age. Time spent within a stage varies and transition between stages is often gradual, except in the case of a stand-replacing disturbance that initiates the early successional stage. The abiotic conditions of a site, such as soils, aspect, and climate, and disturbance types and patterns are key to understanding the different vegetation communities that may occupy the site and their characteristics over time. Classifying and mapping of the landscape into potential groups of vegetation types is a common and useful way of describing successional pathways and the vegetation communities that may exist across the landscape both temporally and spatially. Refer to the Measurement Indicators section for a description of the potential vegetation types.

Tree species are often distinguished as playing either an early or late climax successional role. Species that have traits that enable rapid colonization and domination of a site after a major disturbance, such as fire, are called early successional. They are typically the less shade tolerant species that characteristically flourish only under conditions of full or nearly full sunlight and have rapid, early height growth. Western larch, Ponderosa pine, lodgepole pine, Western white pine, and whitebark pine are the major conifer early successional species on the Nez Perce-Clearwater. Both aspen and birch are examples of early successional hardwood species. Late successional, or climax, species are typically the most shade tolerant species capable of reproducing and growing to maturity in dense forest conditions. Grand fir, cedar, spruce, hemlock, and subalpine fir are climax species on the forest. Douglas fir functions prominently as both an early and late successional climax species, depending on site conditions. In fact, most species can play multiple successional roles and successfully occupy stands in early or later successional stages.

An important feature to note about the forests of the northern Rocky Mountain ecosystem is the influence of long-lived, fire tolerant, early successional species in the successional process and in the composition and structure of forests at all stages of development and on all sites. Species such as Western larch, Ponderosa pine, Western white pine, whitebark pine, and Douglas fir can survive for several centuries. In many areas, the fully developed “true” climax forest conditions may be relatively uncommon due to the long-term persistence of these early successional species. These species’ tolerance of low or even moderate severity fire allows some to survive through the less severe fire events. Though they may or may not be numerous, they grow to large stature and become prominent features of the overstory tree canopy, providing important structural components of late successional and old growth forests. When severe stand replacing fire occurs, they are well adapted to take advantage of the open burned forest conditions and reforest the site. In non-forested communities, early seral plants include grasses or forbs that re-sprout quickly, such as Idaho fescue. Later sections of this analysis discuss forest size and structure classes, old growth, and dead trees, which highlight this feature of Nez Perce-Clearwater ecosystems.

Successional pathways are complex, and the rate of change can be variable; simplification of the process is necessary for analysis. The evaluation of forest size classes provides the means to evaluate successional change of forests over time. The early successional stage is characterized by the seedling and sapling size class. As trees grow, they transition from smaller size classes into larger size classes. Mid-successional forests are associated primarily with the small and medium forest size classes, but forests in the large size class are also mid-successional, depending on tree ages and species, in some cases. Late successional forests are associated mainly with the large and very large forest size class.

Disturbance

Fire Regimes and Potential Vegetation Types

To better understand the fire frequency disturbance processes, the classification of natural fire regimes is usually defined in a historical sense, typically restricted to the pre-1900s, but are natural in the sense of incorporating effects of indigenous cultures. The human component of natural fire regimes cannot be separated out in most cases. A fire regime describes the frequency, predictability, and severity of fire in an ecosystem. The LANDFIRE classification found in Table 14 is a generalized system that defines the five natural fire regime groups based on the average number of years between fires known as fire frequency, combined with characteristic fire severity reflecting percent replacement of dominant overstory vegetation (U.S. Department of Agriculture 2010c).

Table 14. LANDFIRE fire regime groups frequency, severity, and severity description.

Fire Regime Groups	Frequency	Severity	Severity Description
I	0–35 years	Low to mixed	Generally low-severity fires replacing less than 25% of the dominant overstory vegetation; can include mixed-severity fires that replace up to 75% of the overstory.
II	0–35 years	Replacement	High-severity fires replacing greater than 75% of the dominant overstory vegetation
III	35–200 years	Mixed to low	Generally mixed severity; can also include low severity fires
IV	35–200 years	Replacement	High-severity fires
V	200+ years	Replacement or any severity	Generally, replacement severity; can include any severity type in this frequency range

Note: Fire Regime Groups 111, 112, 120, 121, 131, 132, and 133 are non-burnable.

Data Source: Interagency Fire Regime Condition Class (FRCC) Guidebook version 3.0, September 2010 (U.S. Department of Agriculture 2010c)

The combination of fire regime groups and potential vegetation types are used to describe the historic disturbance interaction of wildfire and vegetation. Fire Regime Groups I and III define a wildfire disturbance regime across those forested and non-forested vegetation types that adapted to frequencies of low, high, and mixed severity fire. Within the dry Ponderosa pine and Douglas fir vegetation types or warm dry potential vegetation type, frequent low and mixed severity fires kept the stands open with bunchgrass in the understory and thinned many of the smaller trees (Arno 1980). In the non-forested vegetation types, grasslands were often maintained as result of frequent fires set by both lightning and aboriginal fire (Barrett 1982).

Historically, a high percentage of the forested and non-forested vegetation types was also influenced by mixed severity fire regimes. Fire Regime Group III created a mosaic of Douglas fir, Western larch, grand fir, and western hemlock vegetation types that resulted in heterogeneous successional patterns on the Nez Perce-Clearwater. Fire Regime Group III is the most prevalent in all the forested broad potential vegetation types, as illustrated in Table 15.

Table 15. Acres of broad potential vegetation type group by primary fire regime, acres, and proportion of total acres.

Broad Potential Vegetation Type	Primary Fire Regime Group(s) Represented	Approximate Acres	Proportion
Warm Dry	I, III	873,295	22%
Warm Moist	III	1,503,725	38%
Cool Moist	III, IV	910,380	23%
Cold	IV	476,750	12%
Non-Forested	I, II, III, IV	172,690	4%

Data Source: GIS.

Landscapes with long return fire frequencies, generally over 100 years, were dominated by high severity, stand-replacement fire regimes. Fire Regime Groups IV and V represent the highest percent of the forested vegetation types with lodgepole pine as a dominant overstory species and cool moist sites where Engelmann spruce and subalpine fir are the climax species (Smith and Fischer 1997, Fischer and Bradley 1987).

Fire Regimes and Severity Acres

Fire frequency and severity contributes to changes associated with patch sizes or openings that are created when a fire burns through a given vegetation type. This also defines or shifts the structure of vegetation because of site productivity and succession. For example, large fires with small patches of regeneration are found in low severity fire regimes. Most of these patches are a result of mature large trees that survived wildfires and insects. Such patches are maintained as a fire resilient landscape through frequent low severity fires. The mixed severity fire regime created large patch sizes defined by varied stand structures. Specifically, low severity fire that had little mortality created larger tree size classes, while mixed severity fire created a multi-aged structure and those areas that burned with higher severity created more even aged structure. High severity fire regimes are driven by long fire return intervals and generally have higher severity on the vegetation, resulting in large patch sizes with late successional vegetation being burned (Agee 1998).

Fire Regime Departures and Resilience

Fire regimes are defined as characteristics of fire, such as the intensity, frequency, season, size, and extent that create fire effects for a given biophysical setting. Fire regimes can be altered by fire exclusion and land management practices. Only a small fraction of the pre-1900 annual average fire acreage is being burned today; when wildfires do occur on fire-excluded landscapes, they are likely to be more extreme in behavior, more severe, and with greater aerial extent compared to those occurring prior to the exclusion era (Finney 2003, Keane et al. 2002). Because of fire exclusion, landscapes tend to become more homogeneous with succession creating conditions that support more shade tolerant species. The distribution of patches changes over time creating less fragmentation, lower patch density and diversity, and larger patch sizes (Keane et al. 2002). For example, the alteration of fire regimes by fire exclusion has been greatest in dry forests, primarily those dominated by Ponderosa pine and Douglas fir (Graham et al. 2004). Figure 2 describes some the biophysical and human causes of fire regime change over time (Laris 2013).

Vegetation Departure

The disturbance regimes throughout the forest are dynamic and require a better understanding of change agents within each of the vegetation types to deal with the ecological departure from historical reference conditions. A standardized approach using projected wildfire compares existing vegetation composition for each biophysical setting to previously modeled reference conditions for those types. Specifically, departure from frequency and type of wildfire is a measure of departure from reference ecological conditions, whether pre-settlement or natural or historical, that typically result in alterations of native ecosystem. By using fire regimes as a proxy for reference conditions, the ecological departure from the natural fire regimes for each of the broad potential vegetation types across the Nez Perce-Clearwater is determined by projected wildfire (U.S. Department of Agriculture 2010c). For landscapes that were moderately or severely departed, those acres can provide the foundation for how many acres potentially need restoration.

The ecosystem components, such as species composition, structural stage, stand age, canopy closure, and fuel loadings, are representative of the resilience of potential vegetation types to current and future disturbance. With fire exclusion, dense understories and thickets of conifers have produced stands that are highly susceptible to a variety of insect and disease epidemics and severe wildfires. The fire regimes within the warm dry and warm moist potential vegetation type have moderate to high departures, indicating that many of these areas have missed one or more fire return intervals and have the potential for higher severity fire as a result. The cool and cool moist potential vegetation types have low to moderate departure but could move toward a higher departure without continued disturbance. Lastly, most of the shrub species are within their historical conditions. Table 16 displays the percent of projected wildfire occurring within each of the potential vegetation types across the Nez Perce-Clearwater. The warm dry and warm moist broad potential vegetation types are dominated by Fire Regime III, and the cool moist and cold broad potential vegetation types are dominated by Fire Regime IV. As discussed in previous sections, Fire Regime III is highly departed from the natural range of variation. Recent fires between 2015 and 2017 affected the cool moist and cold broad potential vegetation types, which reduced the departure of Fire Regime IV.

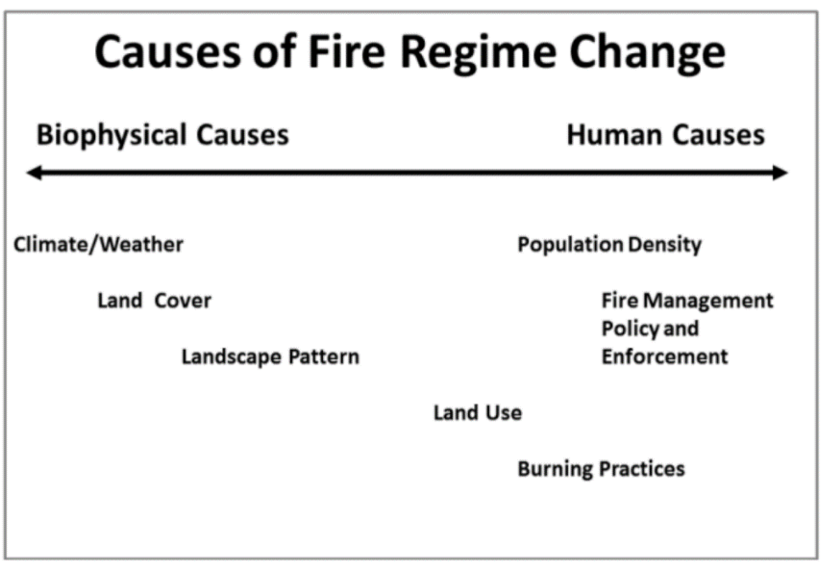

Figure 2. Biophysical and human causes of fire regime change over time.

Table 16. Acres of fire regime group (FRG) within each broad potential vegetation type.

Broad Potential Vegetation Type	Non-Burnable	FGR I	FRG II	FRG III	FRG IV	FRG V	Total Acres
Warm Dry	1.028	210,921	9,084	494,551	148,655	9,056	873,295

Broad Potential Vegetation Type	Non-Burnable	FGR I	FRG II	FRG III	FRG IV	FRG V	Total Acres
(% FRG)	(0%)	(24%)	(1%)	(57%)	(17%)	(1%)	(100%)
Warm Moist (% FRG)	1,426 (0%)	117,274 (24%)	1,271 (1%)	1,239,227 (82%)	124,524 (8%)	20,002 (1%)	1,503,725 (100%)
Cool Moist (% FRG)	712 (0%)	18,108 (2%)	183 (0%)	254,658 (28%)	635,103 (70%)	1,616 (0%)	910,380 (100%)
Cold (% FRG)	559 (0%)	9,466 (2%)	73 (0%)	109,467 (23%)	355,681 (75%)	1,504 (0%)	476,750 (100%)
Non-forested (% FRG)	6,631 (4%)	16,092 (4%)	6,969 (9%)	75,663 (44%)	66,133 (38%)	1,203 (1%)	172,690 (100%)

Data Source: Calculation_SRF_MF.xlsx.

Wildfire

Fire is a primary ecological process that has created, maintained, and renewed vegetation on the Nez Perce-Clearwater. Fire fulfills many ecological functions, including carbon and nutrient recycling, snag and tree cavity creation, and stimulating seeding and sprouting of vegetation. Natural fire regimes include low, mixed, and high severity fires. The natural range of variation analysis showed that sites in the warm dry broad potential vegetation group tended to burn with mixed or low severity. The warm moist group burned with predominately mixed severity and the cool moist group tended to burn with stand replacing severity. All fire types were well represented in the cold broad potential vegetation group. See the Fire Management section for more information.

Forest Insects and Diseases

There are many insects and diseases that affect forest vegetation. Most are native and usually exist at low population levels. Some insects can cause dramatic effects but more often changes occur gradually. Insects and diseases that currently have the most notable impacts on the Nez Perce-Clearwater are discussed in this section. Refer to the Assessment (Halofsky, Peterson, et al. 2018a, b) for additional information.

Aerial Detection Survey (ADS) data from 2013 indicates that Douglas fir beetle (*Dendroctonus pseudotsugae*), fir engraver (*Scolytus ventralis*), spruce beetle (*Dendroctonus rufipennis*), Western spruce budworm (*Choristoneura occidentalis*), balsam wooly adelgid (*Adelges piceae*), and mountain pine beetle (*Dendroctonus ponderosae*) are causing damage across the Nez Perce-Clearwater. Though damage from other insects and diseases was not specifically observed, it can be assumed that other forest insects indigenous to the Inland Northwest occur at endemic levels within the project area and that other forest diseases are also present in the area.

Bark Beetles: Three primary bark beetles native to the Nez Perce-Clearwater are the mountain pine beetle, western pine beetle, and the Douglas fir beetle. Of these, the mountain pine beetle and Douglas fir beetle are having the greatest impact across the Nez Perce-Clearwater. Warming temperatures have directly influenced bark beetle-caused mortality, and climate changes are likely to have an effect (Halofsky, Peterson, et al. 2018a, b). Beetle populations may be favored by warm temperatures due to increased survival of beetles, increased numbers of generation in a year, and increased stress of host species. Future bark beetle-caused mortality will depend not only on the spatial distribution of host trees but also the ability of beetle populations to adapt to changing conditions.

Beetle outbreaks can lead to changes in fire behavior (Jenkins et al. 2008, Hansen et al. 2015). The changes to fire behavior vary in post-outbreak stands depending upon when they occur, the net result is a substantial change in species composition, and a highly altered fuels complex. The amount of fine surface fuels increases early in epidemics, while in post-epidemic stands, large, dead, woody fuels and live surface fuels dominate. For surface fires, both the rate of spread and fireline intensity are higher in epidemic stands. Passive crown fires are more likely in post-epidemic stands, but active crown fires are less likely due to decreased aerial fuel continuity (Jenkins et al. 2008). Increasing infestation severity may cause shifts from surface fire to passive crown fire under severe weather conditions (Hansen et al. 2015). Once dead trees fall to the forest floor, they create woody debris that can burn for long durations. The potential for crown fire during this stage would be dependent upon the remnants of other species in the stand. Other studies have shown varying results, and a review of literature indicates that the effect of mountain pine beetle infestations on fire occurrence and severity in lodgepole pine forests are unclear, and outbreaks in other forest types are unknown or need more research (Simard et al. 2008).

The natural range of variation analysis compared the average acres infested per decade with recent acres infested from 2008 to 2014. Mountain pine beetle infestation was well above the natural range, while Douglas fir beetle was at the lower end. Insect events are expected to be cyclic in nature with a wide range of variability. Severe bark beetle activity was at the high end of the natural range during warm and dry periods.

Mountain pine beetle is the most aggressive and persistent native bark beetle on the Nez Perce-Clearwater. Host species include lodgepole pine, Ponderosa pine, whitebark pine, and occasionally Western white pine. Lodgepole pine is the most abundant and widespread host species and tends to grow in large often nearly pure stands of similar size trees. This contributes to epidemic populations periodically developing, killing large numbers of trees, and spreading into surrounding forests of other host species. Severe beetle outbreaks can provide regeneration opportunities for shade intolerant tree species or allow the release of understory shade-tolerant tree species. Because regeneration is more episodic in Ponderosa pine than lodgepole pine, Ponderosa pine ecosystems may be less resilient to infestations (Briggs et al. 2015). In all forest types affected by mountain pine beetle, tree mortality increases the quantity of snags and downed woody material over time (Mitchell and Preisler 1998, Hansen et al. 2015).

Mountain pine beetle hazard ratings indicate the degree of vegetation susceptibility to insect attack. Hazard represents how conducive the vegetation is to the disturbance agent (in this case, mountain pine beetle), the expected severity of damage if the insect is present and is a function of forest conditions. Elevation, age, size, proportion, and density of host pine species are factors used in the hazard rating; separate ratings are generated for lodgepole pine versus Ponderosa pine (Randall et al. 2019). Although Western white pine may also be affected, no hazard rating is available. In the following figures, the sum of proportions of each analysis area does not necessarily equal 100 percent because plots that have changed due to fire or harvest are excluded from the estimates. Figure 3 displays the existing mountain pine beetle hazard in Ponderosa pine across the Nez Perce-Clearwater by broad potential vegetation group in each management area.

The warm dry potential vegetation type group has the largest percentage (5–10 percent) of area with high beetle hazard ratings. This is indicative of the species mix associated with the warm dry potential vegetation type group. Ponderosa pine is the most affected species by mountain pine beetle within the warm dry potential vegetation type group. Similar percentages of the warm dry potential vegetation type group have medium beetle risk hazard rating. The majority of the remaining potential vegetation type groups have low to moderate beetle hazard ratings.

Lodgepole pine occurs across all potential vegetation type groups but has the greatest abundance within the cold and cool moist potential vegetation type groups. Within the cold and cool moist potential vegetation type groups, mountain pine beetle averages over 15 percent and 10 percent, respectively (Figure 4). Moderate hazard ranges from 5 percent in the warm moist potential vegetation type group in Management Area 3 to over 30 percent in the cold potential vegetation type group in Management Area 3. Low hazard ratings are primarily associated with cool moist, warm moist, and warm dry potential vegetation type groups where lodgepole pine is less prevalent.

The mountain pine beetle hazard for whitebark pine is illustrated in Figure 5. Whitebark pine forests occupy the higher elevation zones within the cold and cool moist broad potential vegetation types. Over the last two decades, the mountain pine beetle has played an increasing role in whitebark pine mortality. As white pine blister rust affects a greater proportion of the whitebark pine population, trees weakened by this disease become increasingly susceptible to the mountain pine beetle. Warmer temperatures, such as potentially driven by climate change, may also play a role in creating a more favorable environment for the beetle.

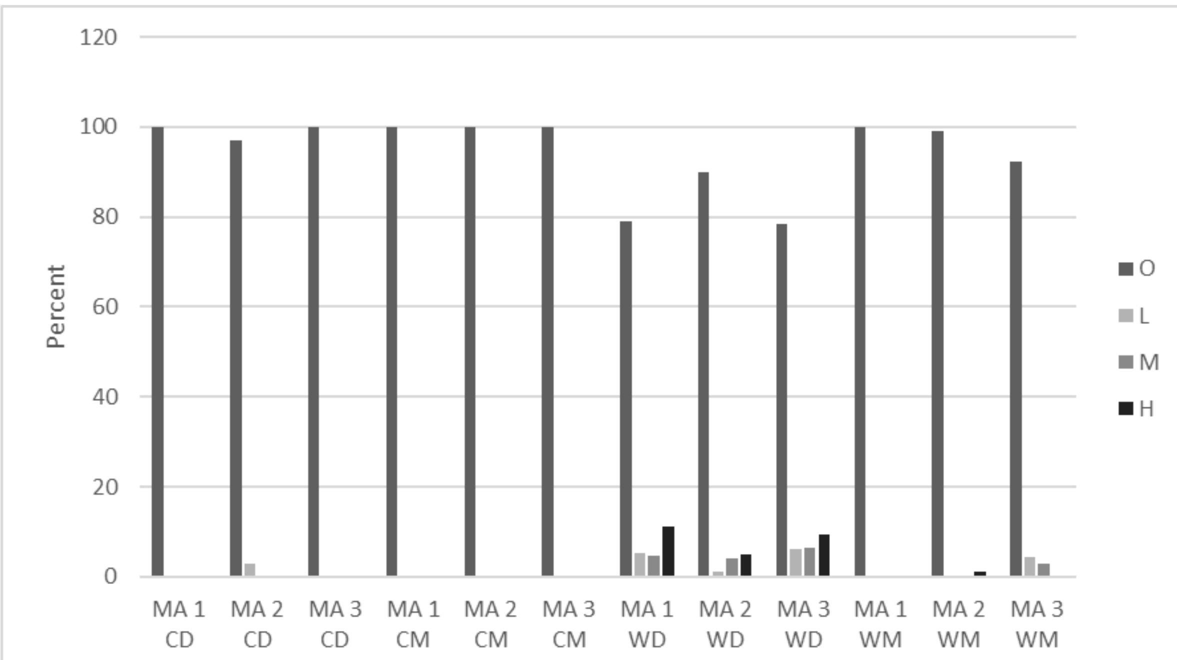

Figure 3. Percent Mountain pine beetle hazard rating for ponderosa pine by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015.

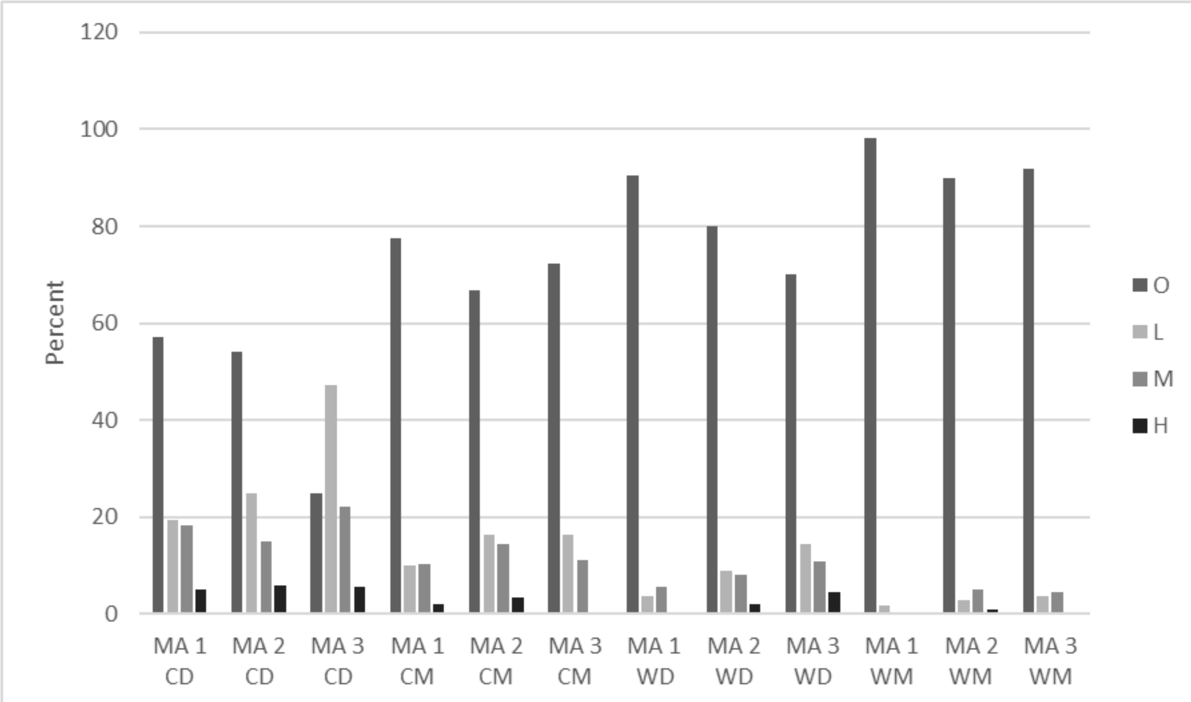

Figure 4. Percent Mountain pine beetle hazard rating for lodgepole pine by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015.

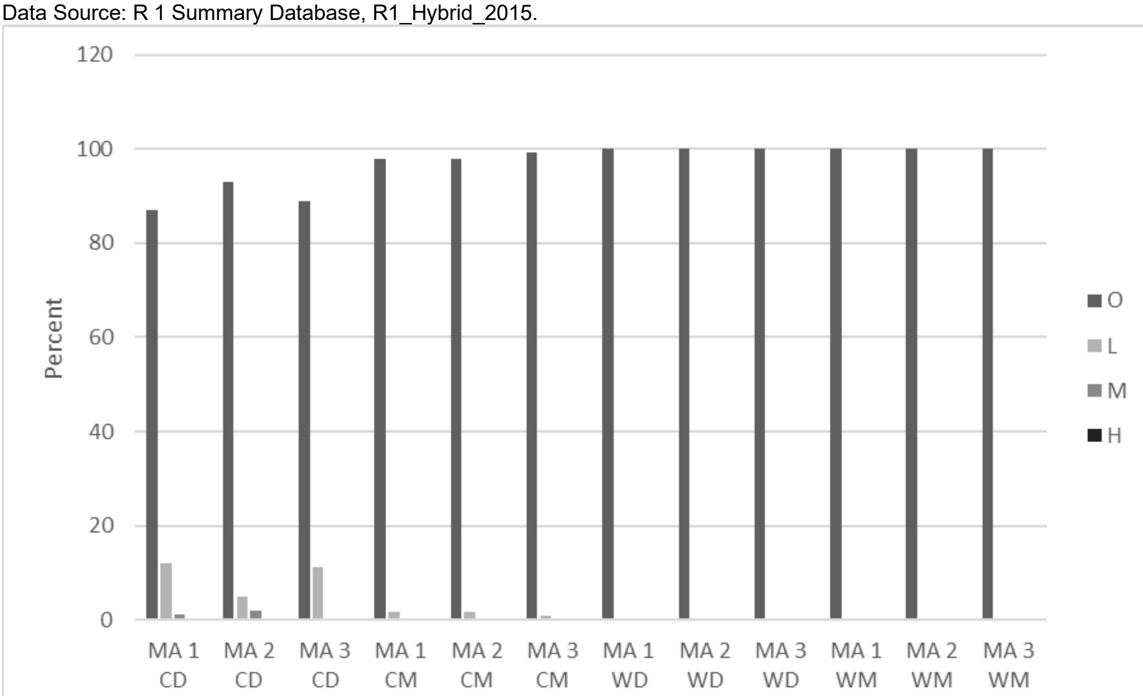

Figure 5. Percent Mountain pine beetle hazard rating for whitebark pine by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015.

Within the cold potential vegetation type groups, the mountain pine beetle averages 9 percent for low hazard rating and less than 1 percent for moderate hazard rating. Within the cool moist potential vegetation type groups, the mountain pine beetle averages 1 percent for low hazard rating. The highest percentage of area effected by the mountain pine beetle occurs in Management Area 1 in the cold potential vegetation type group. Hazard ratings are primarily associated with host species presence. It is expected that if whitebark pine populations continue to decline, as estimated by the Forest Inventory and Analysis (FIA) data then the hazard rating for whitebark pine will decline as well.

The Douglas fir beetle is a chronic mortality agent in Douglas fir forests, occurring in both the warm dry and warm moist broad potential vegetation types and killing or injuring individual and small groups of trees. Outbreaks occur periodically, typically after disturbances such as fire, drought, and windthrow, or where large areas of weakened trees exist. Large diameter trees are the most vulnerable. Typically, only the largest individuals or groups of large trees are killed, creating large snags, downed woody debris, and canopy gaps where new trees become established to create a structurally diverse stand. Douglas fir beetle has been endemic across the Nez Perce-Clearwater over the last decade, although a spike in infestation occurred following the large wildfires of 2015 and 2017 as the insect capitalized on fire-weakened trees. The natural range of variation analysis showed that the acres infested from 1999 to 2015 were at the lower end of the natural range.

The hazard or likelihood of a Douglas fir beetle infestation developing is based on the average diameter of Douglas fir trees, stand basal area, and percent composition of Douglas fir (Randall et al. 2019). Figure 6 displays estimated Douglas fir beetle hazard. Hazard is most likely to be present on warm dry and warm moist broad potential vegetation types. Where susceptible Douglas fir are available, the hazard is primarily low and moderate. This may indicate a limited potential for a large-scale outbreak; however, localized outbreaks are possible, especially where disturbances cause elevated risk and may impact high value stands such as old growth.

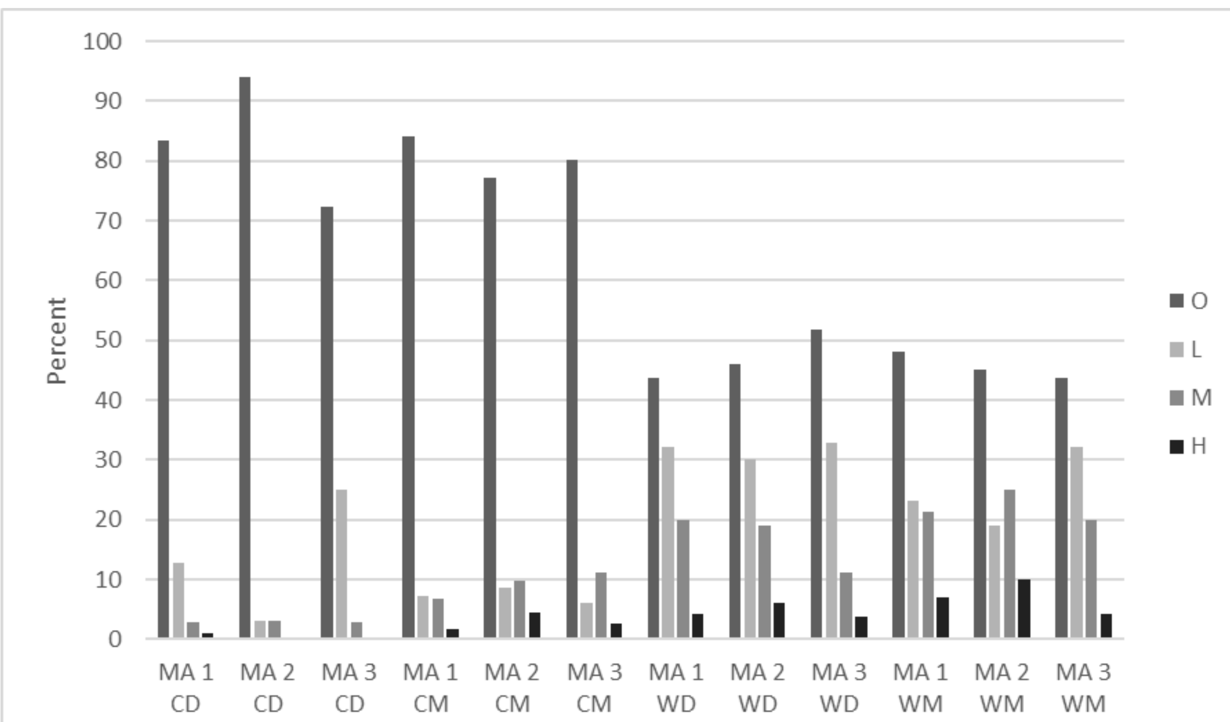

Figure 6. Percent Douglas fir beetle hazard rating for Douglas fir by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015

The warm dry and warm moist potential vegetation type groups have the highest levels of Douglas fir hazard with averages over 10 percent. This is also where Douglas fir is most common. There is moderate to low hazard associated with all potential vegetation type groups across all management areas (Figure 6).

The spruce beetle is a minor mortality agent in spruce and fir forests, killing or injuring individual and small groups of trees at endemic levels. Outbreaks occur periodically, typically after disturbances, such as fire, drought, and windthrow, or where large areas of weakened trees exist. Such outbreaks often result in complete mortality of all large diameter trees. Under endemic conditions, only the largest individuals or groups of large trees are killed, creating large snags, downed woody debris, and canopy gaps where new trees become established to create a structurally diverse stand. Spruce beetle outbreaks at all scales result in a shift in overstory species composition toward subalpine fir.

Figure 7 displays the estimated spruce beetle hazard. This hazard is most likely to be present on cold and cool moist broad potential vegetation types. Where susceptible Engelmann spruce are available, the hazard is primarily low and moderate. This may indicate a limited potential for a large-scale outbreak; however, localized outbreaks are possible, especially where disturbances cause elevated risk and may impact high value stands such as old growth.

The cool moist and cold potential vegetation type groups have the highest levels of spruce beetle hazard with averages of 10 percent. There is moderate and low hazard associated with all potential vegetation type groups across all management areas.

Fir engraver (*Scolytus ventralis*) is another beetle occurring generally at endemic levels across the Nez Perce-Clearwater. Grand fir is the primary host species for this beetle, although subalpine fir may be affected during outbreaks. Outbreaks of fir engraver generally result from drought conditions and are sustained with continuing drought. Fir engraver typically responds to stressed trees within moderate to high density stands (Randall 2012). Contributing factors to tree stress include root disease (Hertert et al. 1975) and defoliation by insects (Berryman 1973, Wright et al. 1984).

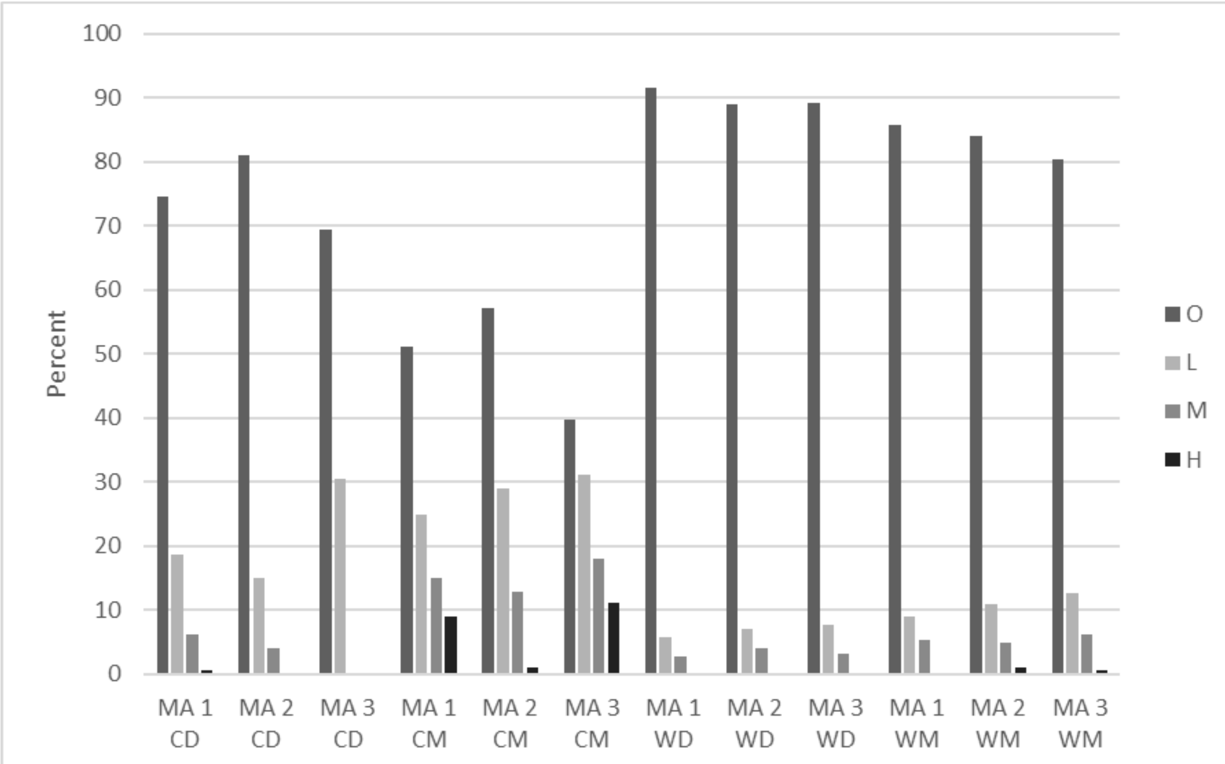

Figure 7. Percent Spruce beetle hazard rating for Engelmann spruce by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015

Dry true fir sites under natural fire regimes that were occupied by pines experience the highest levels of mortality during periods of drought. Fir engraver caused spectacular levels of mortality in true fir forests growing on very dry sites near the forest-grassland interface in southcentral Oregon during a protracted drought period in the late 1980s and early 1990s, sometimes resulting in death of entire stands (Malesky et al. 2020).

Aerial detection surveys (U.S. Department of Agriculture 2019) indicate only endemic levels of fir engraver in Management Areas 1 and 2 across all grand fir habitat types. Grand fir stands within the warm dry potential vegetation type in Management Area 3 are at a moderate hazard level.

Defoliation Insects: The balsam woolly adelgid (BWA) (*Adelges piceae*) is a non-native pest of true fir species that was detected in 1983 within the Palouse River Ranger District of north central Idaho (Livingston et al. 2000). This insect now spans the known range of subalpine fir in Idaho (Davis et al. 2020). Susceptibility of true fir species to BWA varies widely within and among species. Of the native western North American fir species, subalpine fir is the most susceptible. Within five years of infestation, up to 90 percent of stands dominated by subalpine fir died in western Oregon and Washington (Mitchell and Buffam 2001). Five years after BWA was first detected in Idaho, nearly 60 percent of the subalpine fir died, and within 18 years of infestation about 95 percent died across nine monitored sites (Lowrey and Davis 2018). Host susceptibility is probably influenced by genetic variation within species and environmental effects on the host-agent interaction (Newton and Hain 2005). Generally, larger and faster growing trees on preferred growing sites may be infested before suppressed subalpine fir (Mitchell and Wright 1967). There is a visual signature associated with BWA damage and mortality recorded during aerial detection surveys for insects and diseases. Approximately 290,000 acres have experienced some level of damage or tree mortality from this insect between 2000 and 2015. Damage from this pest is often not detectable from air until 30–50 percent of the stand is damaged (Lowrey and Davis 2018).

Management options are limited for this pest. Biological control attempted between 1957 and 1964 (Mitchell and Wright 1967) have not proven to control populations. Research by Havill et al. (Havill et al. 2020) provides a detailed adelgid phylogeny and invasion, including information that the species complex may be transitioning from sexual to asexual reproduction. Insecticides are effective at controlling BWA; however, they are generally limited to urban forests or developed areas and not a realistic option at landscape scales. Silvicultural options have not proven effective management for the balsam woolly adelgid, possibly because this insect can reproduce on true fir of all age classes and disperses passively by wind, birds, and mammals.

The western hemlock looper (*Lambdina fiscellaria lugubrosa*) has been detected on the Nez Perce-Clearwater. Western hemlock looper has become an important and cyclic disturbance agent of Nez Perce-Clearwater forests (Malesky et al. 2020). Tree mortality can occur rapidly, within two years of the start of infestation. The most severe infestations have occurred in coastal and interior wet belt regions, largely in mature hemlock and hemlock-cedar stands (Alfaro et al. 1999). During outbreaks, the western hemlock looper has been reported feeding on several other host tree species and some broad-leaved forest trees and shrubs (Alfaro et al. 1999, McCloskey 2007). Hemlock looper outbreaks may span one to five years and usually begin to collapse around year three due to natural predators, parasites, diseases, viruses, and sometimes weather. In early August 2019, western hemlock looper defoliation was mapped by aerial surveyors in Montana and Idaho. The 2019 aerial surveys were appropriately timed to capture the complete signature from hemlock looper feeding. Idaho had most of the mapped damage, and Montana had approximately 5 percent of the mapped acres of defoliation. The majority of 2019 aerially recorded defoliation occurred in Clearwater and Shoshone counties in northern Idaho and Lincoln County in Montana. The North Fork Ranger District on the Nez Perce-Clearwater experienced the highest number of National Forest System acres impacted from hemlock looper in 2019, equaling 140,076 of 297,000 total acres on the Nez Perce-Clearwater. Surveyors also mapped over 95 percent of the Idaho Panhandle National Forest's hemlock looper damage on the St. Joe Ranger District, totaling 79,000 acres.

Warmer and drier growing season conditions correlate with western hemlock looper population growth. McCloskey et al. (2007) reported periods of soil moisture deficits during the month of June were associated with the onset of western hemlock looper outbreaks, as were warmer and drier conditions during the growing season two years prior to the first year of visible defoliation. In northern Idaho, moderate and severe drought was recorded for multiple growing months in 2017, 2018, and 2019.

The larvae stage of this insect feeds on the live needles and shoots of hemlock species true firs, such as grand fir and subalpine fir, as well as Douglas fir. High levels of mortality were also observed in mature western redcedar. Field reconnaissance of the area indicated high levels of mortality among host species of all size classes. Causes for this outbreak are not yet known and monitoring continues to document the effects and scale of this disturbance. As with most host specific forest pests, the hemlock looper may have an impact on both species' composition and size class distribution of infected stands.

The Western spruce budworm (*Choristoneura occidentalis*) is a major defoliator that can cause mortality in spruce and fir forests under outbreak conditions. Recent decades have seen only endemic levels of this defoliating insect. At endemic levels, individual and small groups of host tree species are affected. Western spruce budworm feed on a wide range of hosts that most commonly include Douglas fir, true firs, spruce, and Western larch and occasionally hemlock and pine species. Outbreaks occur on a 20-to 30-year cycle possibly in association with amount of spring precipitation and may last a few years to over a decade. Such outbreaks often result in top-kill, reduced growth, loss of cone production, and mortality. Severely defoliated trees are more susceptible to attack by bark beetles.

Figure 8 displays estimated Western spruce budworm hazard. This hazard is most likely to be present on cold and cool moist broad potential vegetation types. However, spruce are often associated with riparian areas which occur within all broad potential vegetation types. Where susceptible Engelmann spruce are present, the hazard is primarily low and moderate. This may indicate lower host species density or smaller size classes.

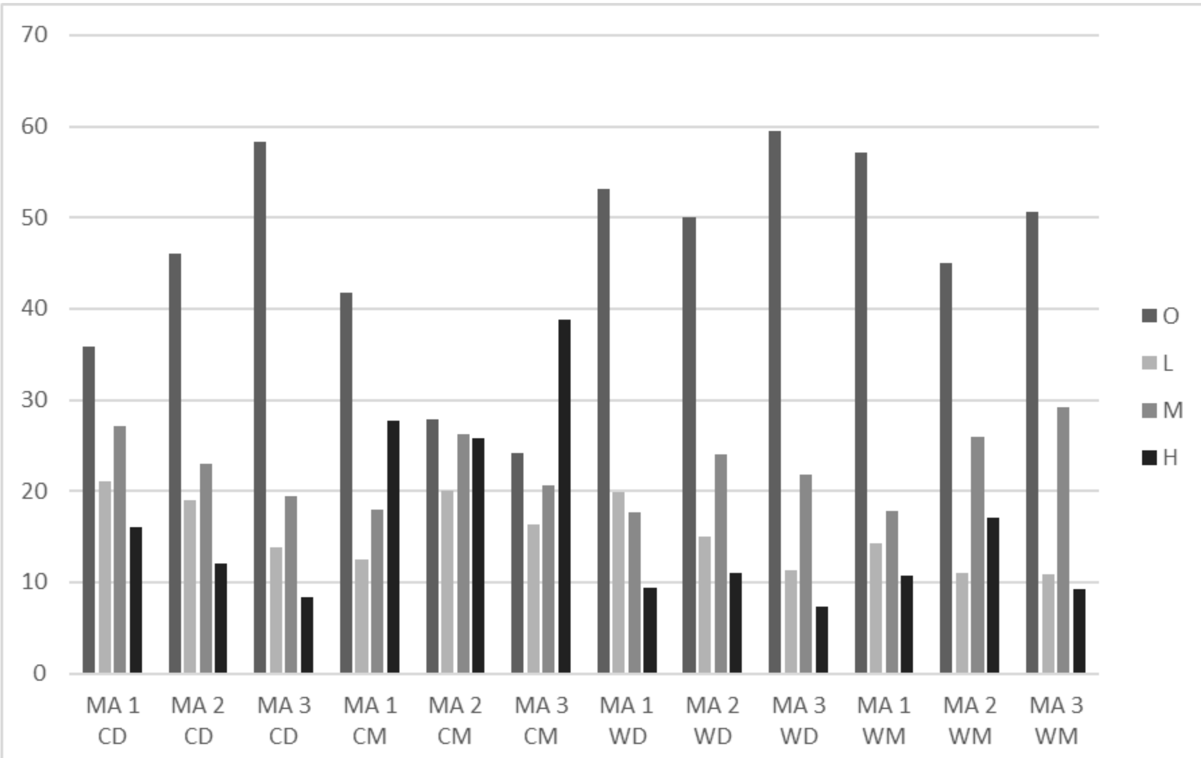

Figure 8. Percent Spruce budworm hazard rating by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating) .

Data Source: R 1 Summary Database, R1_Hybrid_2015.

The cool moist and cold potential vegetation type groups have the highest levels of Western spruce budworm hazard, with averages of 20 percent of the area having a high-risk rating (Figure 8). The highest hazard is found in Management Area 3 within the cool moist broad potential vegetation type. This is generally the result of stands being managed at higher densities. There is a moderate and low hazard associated with all potential vegetation type groups across all management areas.

Root Disease: Root diseases are the most damaging group of tree diseases (U.S. Department of Agriculture n.d.) and are caused by fungi that spread from the roots of diseased trees, dead roots, and rhizomorphs through the soil to uninfected trees and stumps. The most common root pathogens known to occur on the Nez Perce-Clearwater include armillaria (*Armillaria ostoyae*), laminated root rot (*Phellinus weirii*), annosus root disease (*Heterobasidion annosum*), and schweinitzii root and butt rot (*Phaeolus schweinitzii*). These are found throughout the plan area and are associated mostly with stands dominated by true firs, western hemlock, and Douglas fir, although Armillaria and schweinitzii were also commonly found on Douglas fir, grand fir, Ponderosa pine, and Engelmann spruce. Tomentosus root disease was also noted on Engelmann spruce. Evidence for these pathogens includes decayed roots on recent blowdown trees, mycelial fans, basal resinosus, and symptoms of thinning, fading crowns. Root diseases historically contributed to the dominance of white pine and Western larch by reducing other species early in stand development (Smith and Fischer 1997). With the loss of white pine and larch due to the fires of 1910 and 1926, selective timber harvest, and white pine blister rust, the mixed mesic forest is now dominated by the grand fir-cedar-hemlock type with its inherent high susceptibility to root diseases. The heavy incidence of root diseases in this type makes intermediate harvests an untenable option in most situations.

Root disease study plots throughout northern Idaho show that the incidence of root disease has increased over the past 40 years, as has the resulting mortality in susceptible tree species. This increase has been in both the extent of root diseases and the intensity of the diseases. In many cases, this is a result of the loss of Western white pine, which has increased the presence of susceptible species such as Douglas fir and grand fir.

Root disease is the leading cause of tree mortality on the Nez Perce National Forest (22 percent of all mortality) and the Clearwater National Forest (49 percent of all mortality). Root diseases affect more acres on these National Forests than wildland fire, bark beetles, and timber harvest combined. Because root diseases can reduce tree growth and stocking densities for many decades, their effects on forest carbon stocks and flux are more persistent than the effects of other disturbance agents. Root disease can cause mortality as well as increase susceptibility of trees to bark beetle-caused mortality. According to Lockman (2016), “root diseases exceed all other forest insects and diseases in annual volume losses in forests of Northern Idaho and western Montana.” Root disease hazard ratings are relative likelihoods that root diseases exist on a site and are causing significant impact to susceptible species, as shown in Figure 11.

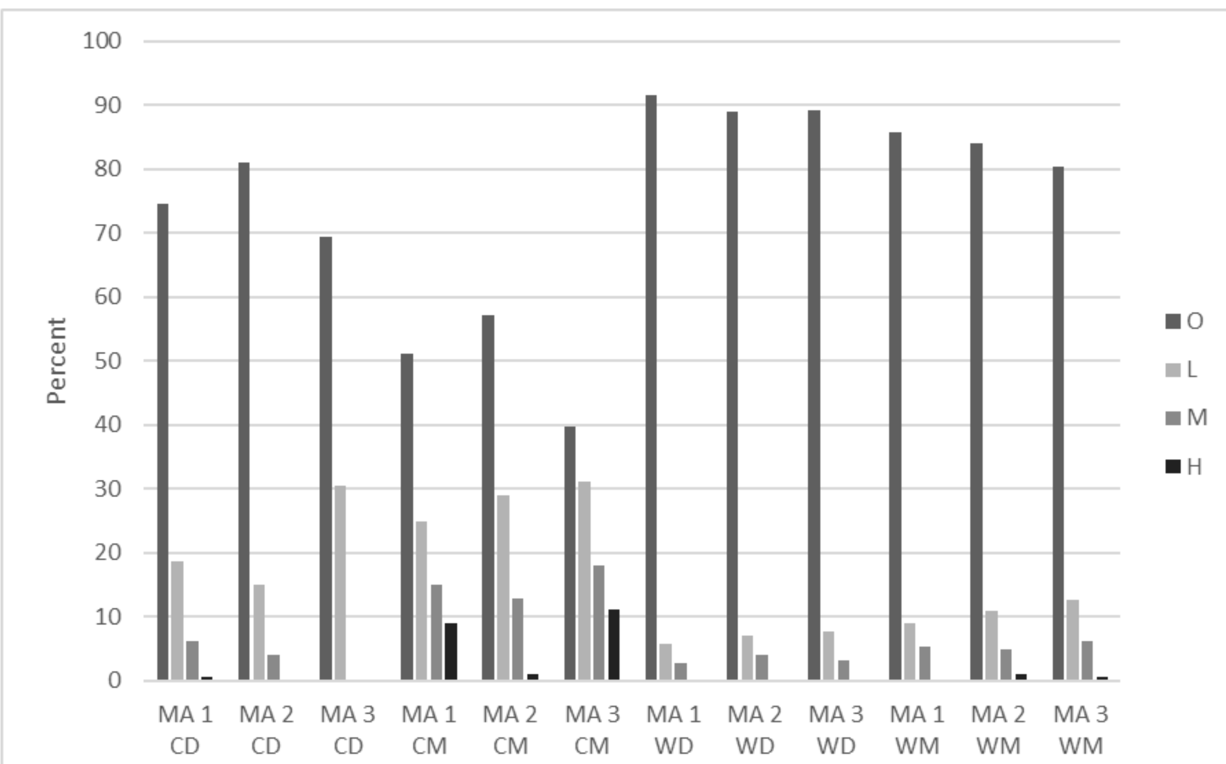

Figure 9. Percent Spruce beetle hazard rating for Engelmann spruce by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015

Dry true fir sites under natural fire regimes that were occupied by pines experience the highest levels of mortality during periods of drought. Fir engraver caused spectacular levels of mortality in true fir forests growing on very dry sites near the forest-grassland interface in southcentral Oregon during a protracted drought period in the late 1980s and early 1990s, sometimes resulting in death of entire stands (Malesky et al. 2020).

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Defoliation Insects: The balsam woolly adelgid (BWA) (*Adelges piceae*) is a non-native pest of true fir species that was detected in 1983 within the Palouse River Ranger District of north central Idaho (Livingston et al. 2000). This insect now spans the known range of subalpine fir in Idaho (Davis et al. 2020). Susceptibility of true fir species to BWA varies widely within and among species. Of the native western North American fir species, subalpine fir is the most susceptible. Within five years of infestation, up to 90 percent of stands dominated by subalpine fir died in western Oregon and Washington (Mitchell and Buffam 2001). Five years after BWA was first detected in Idaho, nearly 60 percent of the subalpine fir died, and within 18 years of infestation about 95 percent died across nine monitored sites (Lowrey and Davis 2018). Host susceptibility is probably influenced by genetic variation within species and environmental effects on the host-agent interaction (Newton and Hain 2005). Generally, larger and faster growing trees on preferred growing sites may be infested before suppressed subalpine fir (Mitchell and Wright 1967). There is a visual signature associated with BWA damage and mortality recorded during aerial detection surveys for insects and diseases. Approximately 290,000 acres have experienced some level of damage or tree mortality from this insect between 2000 and 2015. Damage from this pest is often not detectable from air until 30–50 percent of the stand is damaged (Lowrey and Davis 2018).

Management options are limited for this pest. Biological control attempted between 1957 and 1964 (Mitchell and Wright 1967) have not proven to control populations. Research by Havill et al. (Havill et al. 2020) provides a detailed adelgid phylogeny and invasion, including information that the species complex may be transitioning from sexual to asexual reproduction. Insecticides are effective at controlling BWA; however, they are generally limited to urban forests or developed areas and not a realistic option at landscape scales. Silvicultural options have not proven effective management for the balsam woolly adelgid, possibly because this insect can reproduce on true fir of all age classes and disperses passively by wind, birds, and mammals.

The western hemlock looper (*Lambdina fiscellaria lugubrosa*) has been detected on the Nez Perce-Clearwater. Western hemlock looper has become an important and cyclic disturbance agent of Nez Perce-Clearwater forests (Malesky et al. 2020). Tree mortality can occur rapidly, within two years of the start of infestation. The most severe infestations have occurred in coastal and interior wet belt regions, largely in mature hemlock and hemlock-cedar stands (Alfaro et al. 1999). During outbreaks, the western hemlock looper has been reported feeding on several other host tree species and some broad-leaved forest trees and shrubs (Alfaro et al. 1999, McCloskey 2007). Hemlock looper outbreaks may span one to five years and usually begin to collapse around year three due to natural predators, parasites, diseases, viruses, and sometimes weather. In early August 2019, western hemlock looper defoliation was mapped by aerial surveyors in Montana and Idaho. The 2019 aerial surveys were appropriately timed to capture the complete signature from hemlock looper feeding. Idaho had most of the mapped damage, and Montana had approximately 5 percent of the mapped acres of defoliation. The majority of 2019 aerially recorded defoliation occurred in Clearwater and Shoshone counties in northern Idaho and Lincoln County in Montana. The North Fork Ranger District on the Nez Perce-Clearwater experienced the highest number of National Forest System acres impacted from hemlock looper in 2019, equaling 140,076 of 297,000 total acres on the Nez Perce-Clearwater. Surveyors also mapped over 95 percent of the Idaho Panhandle National Forest's hemlock looper damage on the St. Joe Ranger District, totaling 79,000 acres.

Warmer and drier growing season conditions correlate with western hemlock looper population growth. McCloskey et al. (2007) reported periods of soil moisture deficits during the month of June were associated with the onset of western hemlock looper outbreaks, as were warmer and drier conditions during the growing season two years prior to the first year of visible defoliation. In northern Idaho, moderate and severe drought was recorded for multiple growing months in 2017, 2018, and 2019.

The larvae stage of this insect feeds on the live needles and shoots of hemlock species true firs, such as grand fir and subalpine fir, as well as Douglas fir. High levels of mortality were also observed in mature western redcedar. Field reconnaissance of the area indicated high levels of mortality among host species of all size classes. Causes for this outbreak are not yet known and monitoring continues to document the effects and scale of this disturbance. As with most host specific forest pests, the hemlock looper may have an impact on both species' composition and size class distribution of infected stands.

The Western spruce budworm (*Choristoneura occidentalis*) is a major defoliator that can cause mortality in spruce and fir forests under outbreak conditions. Recent decades have seen only endemic levels of this defoliating insect. At endemic levels, individual and small groups of host tree species are affected. Western spruce budworm feed on a wide range of hosts that most commonly include Douglas fir, true firs, spruce, and Western larch and occasionally hemlock and pine species. Outbreaks occur on a 20-to 30-year cycle possibly in association with amount of spring precipitation and may last a few years to over a decade. Such outbreaks often result in top-kill, reduced growth, loss of cone production, and mortality. Severely defoliated trees are more susceptible to attack by bark beetles.

Figure 8 displays estimated Western spruce budworm hazard. This hazard is most likely to be present on cold and cool moist broad potential vegetation types. However, spruce are often associated with riparian areas which occur within all broad potential vegetation types. Where susceptible Engelmann spruce are present, the hazard is primarily low and moderate. This may indicate lower host species density or smaller size classes.

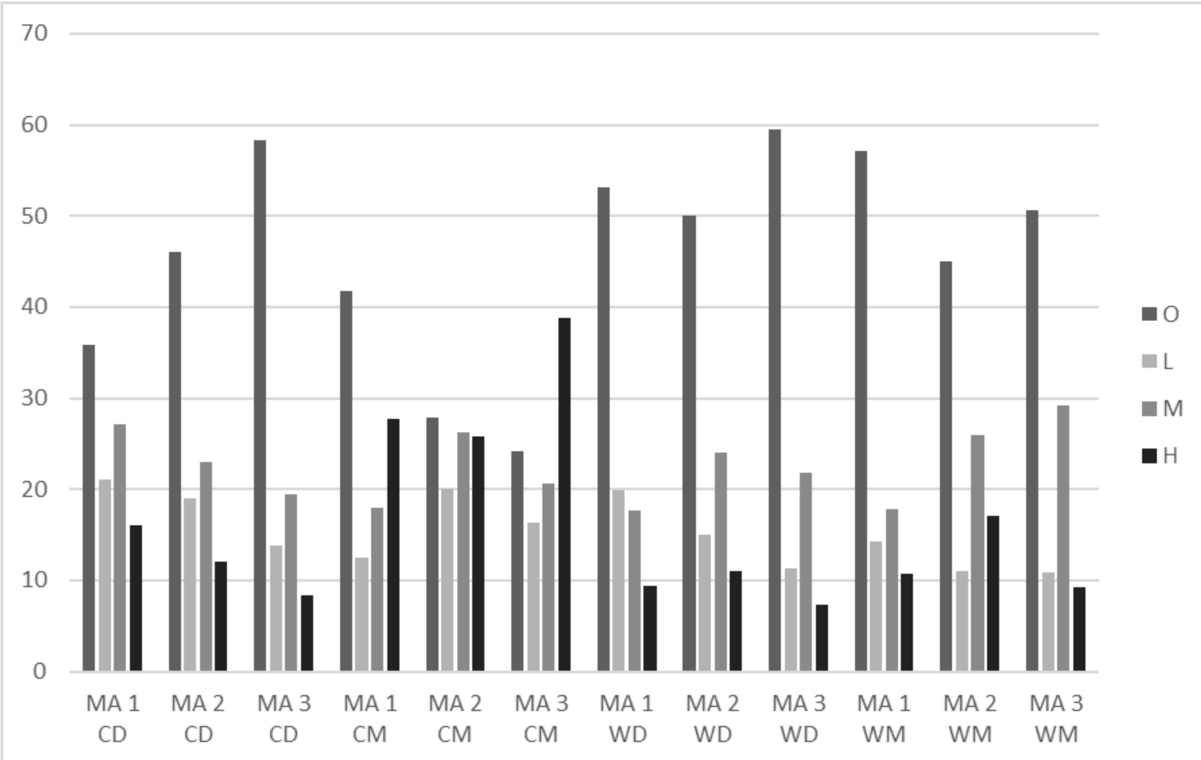


Figure 10. Percent Spruce budworm hazard rating by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015.

The cool moist and cold potential vegetation type groups have the highest levels of Western spruce budworm hazard, with averages of 20 percent of the area having a high-risk rating (Figure 8). The highest hazard is found in Management Area 3 within the cool moist broad potential vegetation type. This is generally the result of stands being managed at higher densities. There is a moderate and low hazard associated with all potential vegetation type groups across all management areas.

Root Disease: Root diseases are the most damaging group of tree diseases (U.S. Department of Agriculture n.d.) and are caused by fungi that spread from the roots of diseased trees, dead roots, and rhizomorphs through the soil to uninfected trees and stumps. The most common root pathogens known to occur on the Nez Perce-Clearwater include armillaria (*Armillaria ostoyae*), laminated root rot (*Phellinus weirii*), annosus root disease (*Heterobasidion annosum*), and schweinitzii root and butt rot (*Phaeolus schweinitzii*). These are found throughout the plan area and are associated mostly with stands dominated by true firs, western hemlock, and Douglas fir, although Armillaria and schweinitzii were also commonly found on Douglas fir, grand fir, Ponderosa pine, and Engelmann spruce. Tomentosus root disease was also noted on Engelmann spruce. Evidence for these pathogens includes decayed roots on recent blowdown trees, mycelial fans, basal resinosus, and symptoms of thinning, fading crowns. Root diseases historically contributed to the dominance of white pine and Western larch by reducing other species early in stand development (Smith and Fischer 1997). With the loss of white pine and larch due to the fires of 1910 and 1926, selective timber harvest, and white pine blister rust, the mixed mesic forest is now dominated by the grand fir-cedar-hemlock type with its inherent high susceptibility to root diseases. The heavy incidence of root diseases in this type makes intermediate harvests an untenable option in most situations.

Root disease study plots throughout northern Idaho show that the incidence of root disease has increased over the past 40 years, as has the resulting mortality in susceptible tree species. This increase has been in both the extent of root diseases and the intensity of the diseases. In many cases, this is a result of the loss of Western white pine, which has increased the presence of susceptible species such as Douglas fir and grand fir.

Root disease is the leading cause of tree mortality on the Nez Perce National Forest (22% of all mortality) and the Clearwater National Forest (49% of all mortality). Root diseases affect more acres on these National Forests than wildland fire, bark beetles, and timber harvest combined. Because root diseases can reduce tree growth and stocking densities for many decades, their effects on forest carbon stocks and flux are more persistent than the effects of other disturbance agents. Root disease can cause mortality as well as increase susceptibility of trees to bark beetle-caused mortality. According to Lockman (2016), "root diseases exceed all other forest insects and diseases in annual volume losses in forests of Northern Idaho and western Montana." Root disease hazard ratings are relative likelihoods that root diseases exist on a site and are causing significant impact to susceptible species, as shown in Figure 11.

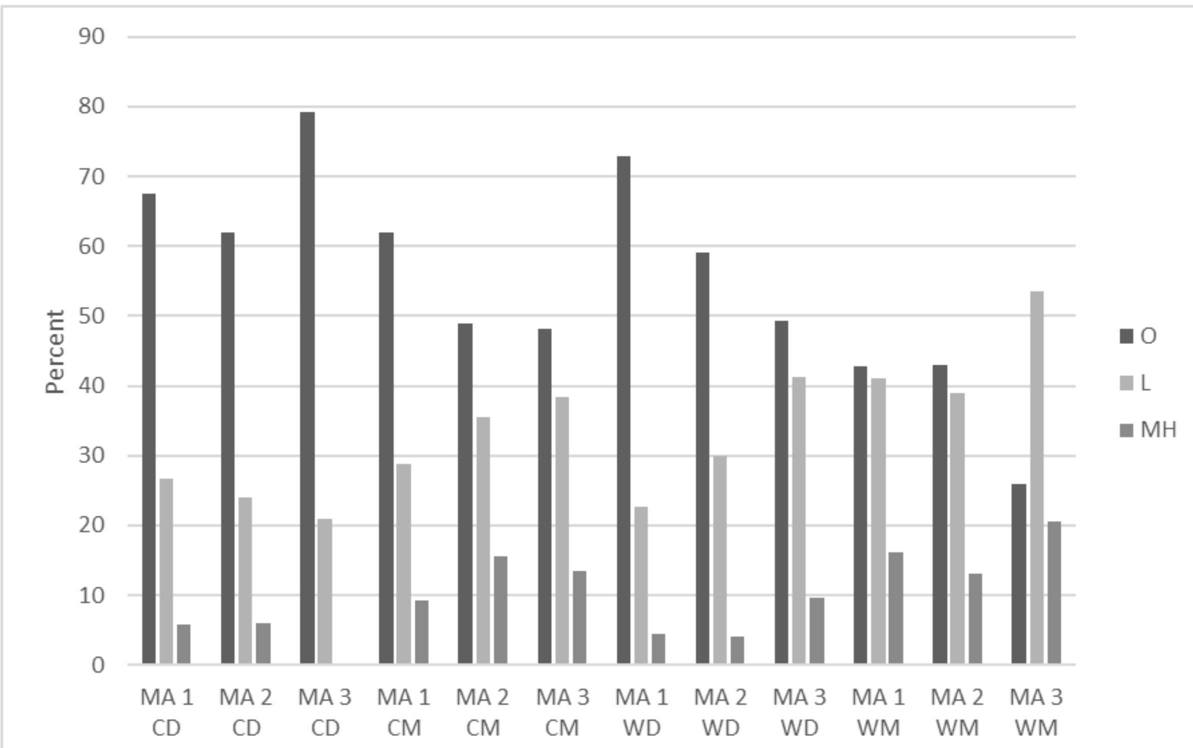


Figure 11. Percent Percentage of area exhibiting low, medium, and high ratings for root disease by management area and potential vegetation type (O=none, L=Low, M=Moderate, H=High hazard rating).

Data Source: R 1 Summary Database, R1_Hybrid_2015.

Incidence of root disease is summarized from Forest Inventory and Analysis (FIA) data. Root disease is generally at low levels across all potential vegetation type groups and management areas with an average of 33 percent low hazard rating. A low hazard rating includes data for FIA plots with no evidence of root disease, plots with evidence of root disease within 50 feet of the surveyed plot, and plots with minor evidence of root disease. Moderate root disease risk hazard is common across all potential vegetation type groups and management areas with an average of 18 percent of each area affected. Areas exhibiting moderate root disease are characterized as having between 20 and 50 percent canopy reduction and 30 to 50 percent of tree mortality is caused by root disease. High root disease hazard averages less than 10 percent forestwide. High root disease areas are characterized as 50 to 75 percent canopy reduction and most tree mortality is directly related to root disease.

White Pine Blister Rust: White pine blister rust is a non-native disease that entered the United States at the turn of the twentieth century. Its primary host species on the Nez Perce-Clearwater are Western white pine, whitebark pine, and five-needle pine (*Pinus parviflora*). It also infects Ribes species (currants and gooseberries) and possibly louseworts (*Pedicularis* spp.) and Indian paintbrush (*Castilleja* spp.), which are alternative hosts required for the disease to complete its life cycle (Geils et al. 2010). As blister rust has moved into fragile, high-elevation ecosystems, successional pathways have been altered, hastening the conversion to climax species, such as subalpine fir. Blister rust infections range in severity but often progress from infecting and girdling branches to killing trees of all sizes over time. Surviving trees are weakened and susceptible to other mortality agents, such as the mountain pine beetle. The interaction of warming climates; mountain pine beetle; fire exclusion, which has allowed shade tolerant species to outcompete whitebark pine; and blister rust has resulted in a bleak outlook for whitebark pine in many areas.

Because it is non-native, all levels of blister rust infection are outside the natural range of variation. There is no known method for eradicating the disease, although actions, such as pruning, can reduce points of spore entry and infections. A small percentage of host trees display one or more resistance traits that enable them to avoid or survive infection, encouraging natural or artificial regeneration from these seed sources and providing hope for perpetuation of the species. In addition to native resistance to white pine blister rust, there has been a successful western white pine resistance breeding program over the last 30 years that has produced improved stock which is currently out-planted to help maintain and expand this species current range. A selective breeding program has been initiated for whitebark pine to help stabilize this species current decline. There is currently no statistical means to estimate blister rust infection or hazard across the Nez Perce-Clearwater. Based on field experience, however, white pine blister rust is generally present wherever five-needle pines are found.

Timber Harvest

Previous harvest activities within the project area set the stage for forest cover types to depart from historical species distributions. Neuenschwander et al. (1999) give an excellent history on the decline of western white pine and the synergism between previous harvest and blister rust that caused the forest to be altered so radically:

"By the late 1950s, Inland Northwest National Forests accelerated timber harvests to meet timber demand resulting from the post-World War II housing boom. At the same time, despite Ribes control efforts, blister rust mortality accelerated in mature white pine. By the 1960s it became obvious that the war against Ribes was lost. In 1968, the Forest Service officially abandoned both its Ribes control efforts and its antibiotic treatments of white pine. This policy discontinued planting of non-blister rust resistant white pine, emphasized regeneration and thinning of species mixes that did not include white pine, and focused major commercial timber harvests on white pine groves threatened by blister rust. Commercial harvests after 1968 were clearcuts planted with Douglas fir. Most of the remainder were partial harvests that removed white pine and left other trees in the forests. Not only were dead and dying white pine harvested, but entire populations of white pine were removed, effectively also removing any blister rust-resistant genes that might have remained. From the 1960s through the mid-1970s the areas formerly holding the best mature white pine groves were being converted to other trees, predominantly Douglas fir, grand fir, and hemlock."

An example of disturbance history resulting from selective timber harvest can be found in the French Larch area of the Clearwater National Forest. The French Larch project area would not have been exempt from white pine management strategies and it is highly likely that the area was affected as described in the Neuenschwander et al. (1999) history.

About 6,524 acres of the French Larch project area have been regeneration harvested since 1964, with much of this harvest very likely focused on removing Western white pine. The earliest recorded regeneration harvest found through data query beginning in 1900 was in 1964. Areas that were regenerated up until the 1980s would likely not have been replanted with any white pine; these areas would probably have been planted with Douglas fir (Nuenschwander et al. 1999) or left to regenerate naturally. In areas where Western white pine salvage occurred as a partial harvest, canopy openings would have been small enough that growing conditions would be more favorable for more shade tolerant species. Likewise, in these areas, since the goal was to remove white pine before it was killed by blister rust, there would have been no seed source retained to allow white pine to regenerate naturally. Thus, due to past harvest removing seed sources creating conditions unfavorable for white pine and focusing on planting species other than white pine, the forest cover types in this area show their current departure from historic conditions.

In addition to natural ecosystem processes, human interventions change vegetation. Two broad categories of vegetation treatment are evaluated: timber harvest and prescribed fire. Timber harvest consists of three general types. Table 17 provides a summary of how treatments generally affect vegetation.

Table 17. Description of vegetation treatment types and effects.

Treatment	Description
Even-aged regeneration harvest	Even-aged regeneration harvest includes clearcuts, seed tree, and shelterwood cuts with or without reserves. These cuts remove most overstory trees and allow new seedlings to establish. The size class changes to seedling or sapling (single or two-storied structure), initially with low canopy cover. Cover type and species presence may change. Downed wood and snags may change often. Natural regeneration or tree planting occurs, which influences species composition and forest density. Later, non-commercial thinning may occur in sapling stands, reducing densities, and affecting species compositions and structure over the long-term.
Uneven-aged regeneration harvest	Single or group selection are types of uneven-aged silvicultural systems, which establish a new seedling or sapling size class and may change species composition. Unlike even-aged regeneration harvest, the conversion of existing stands occurs gradually over many decades, creating a multi-age and multi-size stand. Small openings are created with each entry while the remainder consists of the existing overstory. For example, a stand could have a treatment every 20 years, creating openings on 20% of the stand each time, resulting in the entire stand being treated over 100 years. Reforestation and stand tending may be used to affect species composition and structure. Reduction of downed wood and snags may occur.
Intermediate harvest	Intermediate harvests enhance growth, quality, vigor, and composition of an existing stand and do not cause a shift to a seedling or sapling condition. Treatments in this category include commercial thinning, liberation harvest, sanitation or salvage, and improvement cutting. These treatments leave a forest that is still dominated by trees larger than saplings. The focus is not on regenerating a new forest but in changing the condition of the current one. Not only is forest density reduced, but species compositions and forest size class may change. Tree growth is typically accelerated. Reduction of downed wood and snags may occur.
Prescribed fire and fuel reduction	Prescribed fires are planned ignitions where fire is deliberately applied to the landscape. In the past, prescribed fire and fuel treatments generally occurred after harvest to reduce woody fuels and prepare the site for reforestation. Today, fire and fuel reduction activities are also used to restore ecosystem processes, improve resilience, reduce fire risk, and to improve wildlife habitat, and may be implemented as

Treatment	Description
	stand-alone vegetation treatments. Outcomes of prescribed fire can vary depending on site conditions and objectives. Typically, more open forest structures and shade intolerant species compositions are enhanced. Other vegetation manipulations, such as slashing and piling of fuels, may also occur.

Harvest activities prior to the 1940s were associated with homesteading, mining, and railroad building. These activities were concentrated in easily accessible or productive forests. In some cases, forests were cleared for uses, such as fuelwood, while, in others, only the selected removal of the largest and best trees, or "high-grading," occurred. While no data are readily available to quantify early harvests, they undoubtedly helped shape the forests that exist today. Since the 1900s, harvest records have been kept. Since that time, harvest has impacted roughly 40 percent of the Nez Perce-Clearwater's landbase. Table 18 shows the acres of treatments conducted by decade since 1987.

Table 18. Average number of acres of vegetation treatments by decade, 1987-2021.

Decade	Harvest[1]	Prescribed Fire[2]	Fuel Reduction[3]
1987-1996	25,827 acres	24,706 acres	20,443 acres
1997-2006	10,299 acres	39,154 acres	15,667 acres
2007-2016	1,873 acres	8,028 acres	3,737 acres
2017-2021	2,555 acres	1,928 acres	1,700 acres

[1] Harvest activities include even-aged, uneven-aged, and intermediate harvest treatments.

[2] Includes overlap of burning in harvested stands. Prescribed fire activities include broadcast burning, jackpot burning, site preparation burning, and under burning. Wildfire acres are not included; see the Fire Management section for information on past wildfires, including those used for resource benefit.

[3] Fuel reduction treatments include burning of piled material, chipping of fuels, compacting or crushing of fuels, fuel break, miscellaneous treatment of natural fuels, piling of fuels, rearrangement of fuels, and thinning for hazardous fuels reduction.

Data Source: FACTS database, acres completed by fiscal year up to September of 2018.

Salvage Harvest

The term "salvage" indicates that trees being removed were killed by natural disturbance, most commonly wildfire or insects, with one purpose of the treatment being to capture their economic value. Salvage typically only occurs on lands suitable for timber production. Salvage is not modeled as a vegetation treatment as part of the potential forest management solution because it is unpredictable and would not contribute to estimated timber outputs, as defined in the planning directives. The term salvage is only used when the treatment is intermediate in nature; that is, a fully stocked stand remains in place after the cutting. In the case of stand-replacing disturbance, salvage results in an even-aged regeneration silvicultural system and is termed as such depending on the availability of desirable live trees, including clearcut, seed tree, or shelterwood harvest. Acres of "salvage," both intermediate salvage and regeneration harvest, are included in the acres of harvest listed in Table 18. As described in the Timber section, salvage has occurred on approximately 18 percent of the wildfire acres burned since 1987.

Salvage harvest activities have taken place on the Nez Perce-Clearwater for as long as harvesting of live timber. As white pine blister rust began to cause widespread mortality of mature Western white pine stands, the number of salvage harvest acres increased. Typical harvesting practices would also remove live Western white pine, along with salvaged timber. The result of this practice reduced the number and distribution of mature seed producing Western white pine, which in turn reduces Western white pine regeneration.

Wildland fire continues to be a cause of tree mortality and often generates the need for salvage harvesting. Wildland fire affects all dominance types across all potential vegetation type groups.

Prescribed Burning

The Nez Perce-Clearwater has used prescribed fire on the landscape for the past several decades. Objectives of treatment are varied and include reduction of forest fuels, site preparation following harvest, and improvement of wildlife habitat. Prescribed fire can influence vegetation conditions in a similar manner to wildland fires. The use of prescribed fire is intended to have an impact on successional pathways and stand development. As seral dominance types maintained on the landscape by natural wildland fire events emerge, the use of prescribed fire is used to mimic this natural disturbance pattern. Prescribed burning also has an impact on snag recruitment and retention, as well as coarse woody material accumulations. During the last 30 years, the Nez Perce-Clearwater has used prescribed burning on approximately 70,641 acres.

Terrestrial Vegetation

The coarse filter for vegetation composition is portrayed by two indicators: forested and non-forested cover types and tree species distribution. Desired conditions are enumerated in the Land Management Plan. These desired conditions would not necessarily apply to the No Action Alternative but are included in the analysis for all alternatives to provide for a consistent comparison.

Cover types are groupings of dominance types, which are used to simplify analysis at the broad scale. Dominance types describe the most common plant species present. Dominance type and cover type describe assemblages of species and are named after the most dominant species. Information on how dominance types are determined is found in Barber et al. (2011), and a description of cover types is found in Milburn et al. (2015) and Appendix B. There are seven coniferous cover types and one hardwood cover type on the Nez Perce-Clearwater and three vegetated non-forested cover types, as shown in Table 19. Currently all non-forested cover types are not classified. For the quantitative analysis, all vegetated non-forested cover types are lumped together. The non-forest cover type is tracked separately.

Table 19. Cover types and associated dominance type descriptions.

Cover type	Description of Dominance type
Ponderosa pine	This cover type includes sites dominated by Ponderosa pine or Douglas fir. A minor component of grand fir may be present. Ponderosa pine is found within the elevational band between non-forested types and Douglas fir forests. This cover type usually grows on the warm dry broad potential vegetation type.
Dry Douglas fir	This cover type is found on dry sites dominated by Douglas fir with potential components of Ponderosa pine and grand fir. This cover type occurs primarily on the warm dry broad potential vegetation type.
Mixed mesic conifer	This cover type encompasses moist sites dominated by Douglas fir, cedar, white pine, grand fir, and western hemlock. Stands may be mixed with lodgepole pine, Western larch, or subalpine fir and spruce. This type is found on sites moister and more productive than the dry Douglas fir type. This cover type is found on both warm dry and cool moist broad potential vegetation groups.
Western larch mixed conifer	These sites are dominated by Western larch with components of Douglas fir, grand fir, lodgepole pine, or spruce. This type is commonly found on the cool moist broad potential vegetation type.

Cover type	Description of Dominance type
Lodgepole pine	This type is dominated by lodgepole pine with minor components of other species. This cover type can occur on any forested broad potential vegetation group.
Aspen and hardwood	This cover type includes areas dominated by aspen or cottonwood, often with shrubs such as willow and alder. This type often occurs in association with riparian and moist upland areas and can be found in any forested broad potential vegetation group.
Spruce or fir	This cover type describes where subalpine fir or Engelmann spruce dominate with minor components of lodgepole pine and other species. These are often climax forests. This cover type most often occurs on the cool moist or cold broad potential vegetation group.
Whitebark pine	The whitebark pine cover type occurs at the high elevations, most commonly on the cold broad potential vegetation group but sometimes in cool moist. Minor components of subalpine fir, spruce, or lodgepole pine may be present.
Grass	Grass can dominate the xeric and mesic grassland broad potential vegetation groups and some dry forest types. Native plant communities include forb mixes: Idaho fescue, bluebunch wheatgrass, prairie junegrass, tufted hairgrass, mountain brome, needlegrass, and mixed grass. Common non-native species include timothy, orchard grass, Kentucky bluegrass, and annual brome.
Dry shrub	The dry shrub cover type occurs on the xeric shrub and woodland broad potential vegetation group, as well as some dry forest sites. Dominant shrubs include curl-leaf mountain mahogany and sumac.
Riparian Grass or shrub	This cover type occurs typically in the riparian or wetland broad potential vegetation group but also potentially in cool and wet forest habitat types. Common species include willow, alder, tufted hair grass, red top, mountain brome, smooth brome, dry sedge, and wet sedge or spikerush or juncus.
Non-Vegetated	Sites dominated by non-vegetative components, such as rock, water, and urban.

To estimate grassland areas and acreages, Region 1 VMap lifeform data was clipped to mollisol soils from the No SSURGO Data. This query identified 31,837 acres of grassland. To estimate meadow areas, Region 1 VMap data were clipped to the GIS management areas feature class (LIFEFORM = 3100 [HERB] and TREESIZE = 3100 [HERB] or LIFEFORM = 7000 [SPVEG] and TREESIZE = 7000 [SPVEG]) and SLOPE <= 5). This query identified 14,878 acres of meadow. A similar exercise identified an additional 3,000 acres of potential meadow with the encroachment of conifers.

Tree species presence indicates the proportion of an area where there is at least one live tree per acre of a given species. This measure gives an indication of how widely distributed the species is, although it is not necessarily dominant or even common in all the places it occurs. Most stands are composed of more than one tree species. As noted above, cover types are named for the dominant species representing the group, such as the Ponderosa pine cover type. However, Ponderosa pine as an individual species may also be found in other cover types. Therefore, the estimates for a cover type are not the same as the distribution of the individual tree species for which it is named. There are 14 native conifer tree species found on the Nez Perce-Clearwater: Ponderosa pine, Douglas fir, grand fir, lodgepole pine, Western larch, Western white pine, western redcedar, western hemlock, mountain hemlock, Pacific yew, Engelmann spruce, subalpine fir, alpine larch, and whitebark pine. Several hardwood tree species are present and may be intermixed with conifer species or may occur as single species patches on suitable landscapes. Hardwood species include quaking aspen, paper birch, water birch, cottonwood spp., mountain ash, mountain mahogany, and Rocky Mountain maple.

The following sections provide a summary of the ecological role of each tree species and non-forested vegetation type on the Nez Perce-Clearwater. Xeric ecotones and savannas, areas which straddle the concept of forested and non-forested potential vegetation types, are also discussed.

Aspen and Cottonwood

Persistent hardwood-dominated plant communities are rare on the Nez Perce-Clearwater but are important components of diversity, providing habitat for a variety of birds and other wildlife species. Aspen is more common than cottonwood on the Nez Perce-Clearwater. Aspen may occur as a persistent community in riparian areas or as a transitional community in upland areas. These communities often dominate in the early stages of forest succession immediately after disturbance. Aspen historically relied on fire or disease to remove the overstory, killing encroaching conifers and stimulating suckers from the existing clone root system (Shepperd 1990b). Without periodic self-regeneration, aspen stands become decadent and deteriorate as root systems decline; mature clones can also decline due to repeated animal herbivory (Shepperd et al. 2001). Aspen may coexist with conifers for decades after a disturbance, but aspen gradually declines and is replaced by conifer forest as conifers become more numerous and denser.

On the Nez Perce-Clearwater, cottonwood is confined to riparian areas with fluctuating water tables and is more common on the private lands outside of the forest boundary. While present in limited areas, it is poorly represented by available data. It is desirable to maintain and promote this species where it exists, but no quantitative desired condition was developed because it is absent from available data sources in all management areas.

Forestwide, the natural range of variation analysis indicates that the aspen or hardwood cover type is generally within its natural range for abundance, although it is at the low end or slightly below its natural range in all management areas. The modeling also showed that aspen species distribution is below its natural abundance at the forestwide scale and in the warm dry and cool moist broad potential vegetation groups. At the management area level, aspen is below the desired condition in all management areas. The desired condition ranges reflect a desired trend of maintaining and increasing aspen. The highest levels of aspen correlated with past warm, dry climate periods.

Ponderosa pine and Dry Douglas fir Forests

Ponderosa pine is often the only tree species that can colonize the hot, dry surface conditions of a disturbed site. This distinction is especially true on the biophysical settings adjoining the Salmon River, South Fork Clearwater River, and Selway River and, to a lesser extent, along the Lochsa River. Areas on the Palouse Ranger District adjacent to the prairie also support this dominance type. Over time, as Ponderosa pine matures, it provides a shaded environment where less heat tolerant Douglas fir and other species can establish. With frequent understory fires as part of the dominant low-severity fire regime, the thick-barked Ponderosa pine survives while the thinner-barked Douglas fir and Ponderosa pine seedlings do not. If frequent fires are sustained, the Ponderosa pine forest can develop into large patches of open grown old forest structure intermixed with smaller openings that can persist for centuries provided moisture and temperature regimes do not dramatically change. During a cool, wet climatic timespan or through fire suppression, young Douglas fir and Ponderosa pine may become established; in a few decades, this change can result in a dense forest structure. The increased biomass and structural heterogeneity of these dense stands allow fires to develop into large, active crown fires that bring the site back to the initial stand establishment phase or, if fire reburns these areas soon, may limit forest establishment due to loss of seed source, limited soil moisture, and high surface soil temperature.

Western larch Mixed Conifer Forests

These forests developed under fire regimes that included infrequent stand-replacing fires (more than 200 years) and more frequent (20–100 years) mixed severity fires. On mesic sites, these forests produced a diverse pattern of Western larch and Douglas fir with grand fir, Western white pine, and other species sometimes found in the mix. On cooler sites, these forests included Western larch mixed with lodgepole pine, Engelmann spruce, and subalpine fir. These sites were dominated by lethal fire regimes that produced very large patches with older legacy larch often represented. Many old Western larch trees can be found with evidence of fire scars dating back centuries. Western larch is not very susceptible to insects and diseases common to other associated tree species. As such, it brings fire and disease resistance to the forest, making the forest resilient to those disturbances. These forests are perhaps the most scenic with their October change in color.

All larch forests typically had relict, old trees with younger larch and other species forming a second cohort. This two-aged structure was maintained by periodic low-severity fire that visited many stands one, two, or even three times between stand-replacing fires. The presence of low-severity fire allowed complex, old forest structures to persist for many centuries as larch can be a very long-lived seral species.

Grand Fir, Douglas fir, Cedar, and Hemlock Forests

Mixed species shade-tolerant forests are found where fire return intervals are long, allowing these late seral fire-sensitive species to dominate. This is especially true on grand fir mosaic sites, which are cooler and moister than similar non-mosaic sites. Mosaic sites often have very little evidence of fire. Old grand fir or subalpine fir usually dominate there with some western redcedar, Engelmann spruce, and the occasional Western white pine.

Outside of the mosaic stands, these forests are the most diverse on the forest. Any native forest species can be found mixed with the dominant species here. They see a very wide range of fire occurrence. Stand-replacing fires occur every 25 to 200 plus years with shorter return intervals, seral shrub fields, and dominate seral conifer species. Between stand-replacing fire events, non-lethal or mixed severity fires result in a diverse forest with multiple age and size classes.

Root disease is widespread in these stands and is particularly damaging to Douglas fir and grand fir. Annual losses of 5 percent of the basal area in a stand are typical. Openings regenerate with the same species and are subsequently infected with root disease, then the cycle repeats. Western redcedar has long been considered to be tolerant of root disease, but recent observations indicate that it too is seeing the effects with increasing crown thinning and mortality.

Western white pine Forests

Western white pine was a prominent species on sites with western redcedar as the potential vegetation type. Most of this potential vegetation type is found north of the Lochsa River. Prior to the early 1900s and the introduction of white pine blister rust, white pine dominated these sites. Before the advent of blister rust, white pine stands originated after severe, stand-replacing fires that occurred during relatively dry climatic periods (Arno 1980). White pine was maintained by more frequent low- to mixed-severity fires. Blister rust is a non-native disease and white pine rapidly succumbed to infections since it had not coevolved with this pathogen over its history.

As white pine forests have been lost to white pine blister rust, the trees replacing them were often western hemlock, grand fir, and Douglas fir. These species are extremely susceptible to root disease. Douglas fir, for instance, often dies out by the time it is 80 to 100 years old. The stand regenerates to more grand fir, Douglas fir, or western hemlock in the North Fork Clearwater River drainage and on the Palouse Ranger

District. These young trees again succumb to root disease, and this cycle reduces regeneration of forests occupying these same sites today.

Significant progress has been made toward developing rust resistant white pine for out planting in many areas of northern Idaho. Trees grown from the current seed sources are about 60 percent resistant to blister rust. In addition, natural reproduction from surviving white pine trees has shown an approximately 18 percent survival rate and offers another source of blister rust resistance (Hoff et al. 1976).

Lodgepole pine Forests

Lodgepole pine stands are extensive on the subalpine biophysical settings, and lodgepole forests are typically even-aged, single-story forests. Once they reach 60 to 80 years old with a stand size over 8 inches diameter at breast height, they often experience severe mortality caused by mountain pine beetle activity, which creates snags and downed wood. These snags and downed wood produce fuel conditions that lead to potentially severe fire effects, depending on time since the infestation (Jenkins et al. 2008). On lodgepole pine-dominated sites, stand-replacing fire was common, and severity was affected by periodic outbreaks of mountain pine beetle that led to large fuel loads and pulse events for snags. Under moderate fuel loading and fuel moisture conditions, fire effects may result in a mosaic of tree mortality and fuel loading. Such stands may experience reburns which further promotes heterogeneity at landscape scales. If the stands avoid severe fires or reburns, they eventually go through succession to a forest of mixed subalpine fir and Engelmann spruce.

Whitebark Pine, Subalpine Fir, and Engelmann Spruce Forests

Whitebark pine is associated with high elevation and its distribution has been primarily influenced by the cold continental air masses in higher elevations in northern Idaho. On the Nez Perce-Clearwater, whitebark pine is typically found above 6,500 feet elevation. Forest associates are other high-elevation species, such subalpine fir, Engelmann spruce, mountain hemlock, and subalpine larch. The spruce-subalpine fir types are home to the Canada lynx, a species listed under the Endangered Species Act that is an important associate of forests at high elevations.

Whitebark pine trees may occur in pure stands on some of the higher ridges and mountain tops. When they occur at the lower elevations within their range, they typically serve as a minor early seral species in mixed conifer stands. At the other extreme, where they are found at the uppermost elevations above 8,000 feet in rather pure stands, they can serve as a major climax species. This tree is considered a “keystone” and “foundation” species because of its significant role in subalpine ecosystems (Keane and Parsons 2010, Jenkins 2011). Whitebark pine is listed as a threatened species under the Endangered Species Act by the United States Fish and Wildlife Service to be managed under the 4(d) Rule.

Whitebark pine is susceptible to mountain pine beetle. Three outbreaks of mountain pine beetle in the northern Rockies have occurred over the past 100 years. The first outbreak, in the 1920s to 1930s, killed significant areas of whitebark pine and left many “Ghost Forests.” These snags can still be seen today.

In the past couple of decades, white pine blister rust has arrived at the high elevation sites where whitebark pine lives and has been decimating the remaining trees. There is a western-wide effort to collect seed from apparently rust-resistant trees and begin a breeding program for rust-resistant whitebark pine. Seed from this effort would be used to restore whitebark pine as opportunities arise. In addition, as wildland fire occurs, openings in the subalpine forests create opportunities for natural regeneration from remaining rust-resistant trees and for selection for rust resistance.

Several outbreaks of spruce beetle have also occurred. This beetle has a two-year life cycle and can cause significant mortality in the large tree size class with greater than 20 inches diameter at breast height. Vast areas of large diameter spruce forests do not exist, so local mortality can be high when an outbreak of spruce beetle occurs because the beetle can fly a couple miles between host trees; however, acres infested were low compared to mountain pine beetle in whitebark pine and lodgepole pine.

Old Growth

Old growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics, which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function (Green et al. 2011).

The 2012 Planning Rule places a strong emphasis on natural range of variation and emphasizes natural patterns and processes and integrated thinking, rather than piecemeal protections. The tack of prohibiting all actions that would modify any stands such that they would no longer meet the definition of old growth as set forth in Green et al. (2011) does not account for the historic disturbances and patterns that the 2012 Planning Rule suggests are so important. Green et al. (2011) on page 2 states:

Many of the oldest stands of old growth are dominated by seral tree species that are maintained as dominants and protected from crown fire by repeated underburns that reduce ladder fuels and competition from more tolerant tree species…the bulk of presettlement upland old growth in the northern Rockies was in the lower elevation, ground-fire maintained Ponderosa pine/Western larch/Douglas fir types.

Thus, any sideboards for managing old growth should stem from a need to be consistent with natural patterns and processes and should be developed by thinking holistically about ecosystems, rather than just a blanket protection for all forests meeting the Green et al. (2011) old growth criteria. In total, Green et al. (2011) defined nine old growth types for north Idaho. These old growth types are presented in Table 20, along with the cover types and habitat type groups associated with each old growth type. Each old growth type is discussed in terms of the disturbance regimes necessary to develop each type, with excerpts from Green et al. (2011) presented in quotes. For a complete list of habitat types and groupings, refer to Green et al. (2011).

Table 20. Relationship between old growth types, cover types, and habitat groups. Quotations are from Green et al. 2011.

Old Growth Type	Old Growth Forest Cover Types	Habitat Type Group	Group Description
1	PP, DF, L	A, B	Ponderosa pine, Douglas fir, and Western larch that occur on warm, dry environments. “Prior to 1900, cool underburns at intervals of 5 to 25 years promoted open stands, while hotter stand replacing fires occurred every 150 to more than 300 years.”
2	LP	B, C, D, E, G, H, I, J, K	Lodgepole pine forest type on cool and cold environments. “Prior to 1900, repeated fires at less than 100 to 150 years favored the occurrence of large stands of nearly pure lodgepole pine.”
3	Y	C, C1, G1	Pacific yew forest type on cool, moderately moist environments. Generally limited to the Nez Perce but may occur on the Clearwater and Idaho Panhandle Forests. “Protection from frequent fire by topographic or climatic factors is required for the occurrence of this type.”

Old Growth Type	Old Growth Forest Cover Types	Habitat Type Group	Group Description
4A	DF, GF, L, SAF, WP, PP	C, C1, D, E	Douglas fir, grand fir, Western larch, Engelmann spruce/subalpine fir, Western white pine, and Ponderosa pine forest types on warm dry and warm moist environments. “Prior to 1900, infrequent stand replacing wildfires favored development of long lived seral and climax stands on grand fir and Douglas fir sites. Spruce and subalpine fir occur primarily within riparian zones.”
4B	DF, GF, L, WH, WP, PP	F, G, G1, H, I	Douglas fir, grand fir, Western larch, Engelmann spruce/subalpine fir, western hemlock, Western white pine, and Ponderosa pine forest types on warm moist and cool moist environments. “Prior to 1900, infrequent stand replacing wildfires favored development of long lived seral and climax stands on cedar and western hemlock sites.” Ponderosa pine is maintained only on sites with frequent fire return intervals.
5	SAF, MAF	F, G, H, I	Engelmann spruce/subalpine fir, mountain hemlock/subalpine fir types on cool moist environments positioned on north to east aspects at elevations above 4,000 feet. Groups F and G are composed of western redcedar (WRC) and western hemlock (WH) series habitat types, occurring on warm moist environments along low benches and riparian zones.
6	WBP	I, J, K	Whitebark pine (WBP) forest types. “Prior to 1900, repeated fires at intervals of less than 100 to 150 years favored the occurrence of whitebark pine stands.” This old growth type only occurs within the cool/moist and cold potential vegetation type groups.
7	C	F, G, G1	Western redcedar forest type on warm moist environments. The fire return interval is generally more than 200 years with stand replacing events being dominant, which favors development of long lived seral and climax stands on these sites. These types occur in areas protected from summer drought, which indicates that this type of old growth often occurs in riparian areas, areas with a very deep ash cap, and typically wet summer precipitation pattern.
8	DF, L, SAF, MAF, WP	J	Douglas fir, Western larch, Engelmann spruce/subalpine fir, mountain hemlock/subalpine fir, and white pine forest types on cool moist and cold environments. “Prior to 1900, repeated fires at intervals of 100 to 200 years favored the occurrence of nearly pure Douglas fir, Western larch, or white pine.”
9	SAF, MAF	K	Engelmann spruce/subalpine fir and mountain hemlock/subalpine fir forest types on very cold, harsh environments. “Fire suppression since 1900 has resulted in the conversion of many stands once dominated by seral whitebark pine to ES/SAF and MH/SAF.” This type is almost completely within the cold potential vegetation type group.

Topographic position can influence the probability of old growth development; areas protected from wildfire, such as riparian areas or rock features, may support vegetation legacy components. Such forest patches that survive wildfire may be referred to as “refugia” and can represent important biological legacies that contribute to future seed and biodiversity and may eventually develop into old growth patches in an otherwise “young” forest landscape. In the high elevation subalpine zone forests, the majority of the landscape would have stand ages of over 150 years. Fire regimes are varied in the subalpine zone with a mixture of low severity fires that maintain whitebark pine stands to stand replacing events, which promote patches of subalpine fir and mountain hemlock (Arno 1980). Drier Ponderosa pine and Douglas fir types developed under a more frequent disturbance regime (Arno et al. 1995, Tesch 1981, Seidl et al. 2014, Franklin et al. 2008) characterized by frequent fire return intervals (30-100 years) with low to mixed severity fire events. Old growth patches occurring within mid elevational mesic forests are developed and influenced by both low severity and mixed severity fire occurring at frequencies less than the maximum biological age of late successional species (Agee 2007, Hessburg, Reynolds, et al. 2007, Hessburg, Salter, and James 2007). Higher elevation, cool moist habitats are often dominated by Engelmann spruce-subalpine fir and lodgepole forest cover types, which were largely established from stand-replacement events (Arno et al. 1993).

From an early successional seedling stage, it would take 150 to 200 years for a forest to become old growth. Wildfire influences old growth development. The likelihood of a particular forest stand experiencing wildfire within 30 to 150 years would be high across many parts of the forest. Therefore, long-lived, early successional, fire tolerant tree species play a critical role in the development of old growth. These trees have a chance of surviving wildfires and persisting well into the late successional stages and include Ponderosa pine, Douglas fir, Western larch, and whitebark pine. They become the large diameter, old trees that are key features of the old growth forest. Old growth dominated by shade tolerant trees, such as grand fir, western redcedar, and Engelmann spruce, also occur particularly in riparian areas or other sites protected from disturbance. These old growth types typically contain early seral species along with a dominant overstory composed of late successional species (Arno et al. 2000).

Snags and Snag Retention

Snags and snag retention were brought forward as a concern during public scoping. Developed plan components are intended to ensure the retention of the desired number of snags per unit area to provide habitat elements and to promote long-term recruitment of coarse woody debris. Dominance type affects the species of snags occurring on the landscape, as well as the duration of snags. Seral species' snags tend to remain standing for longer periods than snags derived from climax species, except for western redcedar. Size class distribution affects the size of snags occurring on the landscape. Desired conditions for size class distribution will influence the average snag diameter. Snag recruitment is affected by and influences disturbance regimes.

Tree mortality results from a host of factors. Moisture stress due to droughty conditions may cause mortality, particularly within dense stands. Stand density may promote mortality due to competition for moisture and sunlight. Small scale disturbances, such as endemic levels of insect and disease agents, are constantly causing natural levels of mortality. Wildland fire is another cause of mortality which disproportionately affects small diameter trees and can consume snags of any size.

Non-Forested Vegetation

Persistent non-forested plant communities are widespread on many of the management areas on the Nez Perce-Clearwater. These communities are maintained by site conditions that preclude establishment of trees or by frequent disturbances, such as fire. The most common communities found on the Nez Perce-Clearwater are grasslands, but wetlands, riparian areas, and alpine communities are also present. In some places, communities with grasses, forbs, and shrubs occur as a transitional type in the earliest stages of forest succession.

Non-forested vegetation communities have shifted in extent, composition, and structure but are less explicitly represented and modeled with available data than forested types. Grazing and associated reduction in fire frequency due to the loss of fine fuels are the primary causes of woodland expansion, although climate change is also suggested as a contributing factor (Hessburg and Agee 2003). Fire exclusion and drought have allowed conifers to invade grasslands and altered the mosaic of conifer savannah (Heyerdahl et al. 2006, Barrett et al. 1997). Invasive plants also are a primary threat to communities with grasses, forbs, and shrubs. Historical grazing practices have contributed to shifts to non-native species in these types to an unquantified degree. High elevation grassland or herbaceous types are less likely to be substantially altered from historic conditions because factors, such as grazing and invasive plants, are less common.

The desired condition ranges indicate the need to maintain or increase the abundance of non-forested cover types collectively on most management areas. This increase would primarily occur in the grassland types, although the maintenance of healthy riparian, wetland, and alpine areas is also important. The desired condition includes maintaining the dominance of non-forested plant communities on non-forested potential vegetation groups, as well as on some forest potential vegetation groups, primarily the driest sites found in the warm dry broad potential vegetation group. Such areas would have been maintained in a non-forested condition or one with very sparse tree cover by frequent fire. Increased conifer expansion in some of these areas is considered to be encroachment.

Xeric and Mesic Grasslands

Slope and moisture regimes divide grasslands into two general types in the plan area. The grasslands on the moister north and east facing slopes or at higher elevations are generally dominated by Idaho fescue and prairie junegrass. The grasslands on drier sites, such as lower elevation or southwest facing slopes, are dominated by Idaho fescue and bluebunch wheatgrass. Grasslands range in size from extensive canyon slopes to small patches within the forested communities to large open parks located on montane to foothill zones. Grasslands are dominated by cool-season perennial bunchgrasses and forbs with sparse shrub or tree representation. Various shrub and tree species may occur with low cover, typically less than 10 percent.

The desired condition of xeric grassland communities, such as the bluebunch wheatgrass habitat type groups, is to have vegetation dominated by native bunchgrasses while conifers are absent or occur as scattered individuals. Dominant vegetation includes bluebunch wheatgrass and Sandburg's bluegrass, along with a variety of native forbs, including arrowleaf balsamroot, lupine, phlox, and yarrow. Individual species can vary greatly in the amount of production depending on growing conditions. Plant litter is a common component and available for soil building and moisture retention. There is very little movement of plant litter off-site with natural plant mortality typically being low. Biological soil crusts are found on almost all soil types but are more commonly found in arid areas where plant cover is low and plants are more widely spaced. Bare ground is present because of the warm dry nature of these sites but at low amounts.

The desired condition of mesic grassland communities, such as fescue habitat type groups, is to have vegetation dominated by native grasses and sedges, including Idaho fescue, prairie junegrass, Sandburg's bluegrass, western needlegrass, elk sedge, Hood's sedge, and assorted native forbs, including cinquefoil, pearly pussytoes, buckwheat, biscuitroot, pinkfairies, and Geum. Biological soil crusts are found on almost all soil types while these moister habitats generally support more lichens and mosses than other types of crusts. Bare ground is typically low across most sites; plant litter is the dominant ground cover and available for soil building and moisture retention. Plant litter rarely moves off-site. Conifers are absent or occur as scattered individuals.

Xeric Shrubland/Woodlands

Xeric shrubland plant communities occur infrequently on drier sites, and the desired condition is to support shrub species, such as mountain mahogany and sumac. The understory should typically be dominated by native grass species, such as bluebunch wheatgrass, Idaho fescue, and Sandberg bluegrass. Canopy cover varies depending on the site and growing conditions but should typically be low to moderate. Xeric woodlands are typically hot and dry or are steep with shallow, skeletal soil.

Riparian/Wetland Vegetation

This section discusses the existing and desired vegetation characteristics of riparian areas and wetlands. Refer to the Water Resources section for information on the hydrologic function of riparian areas and wetlands and the Aquatic Ecosystems and Fisheries section for information pertaining to the relationship of riparian vegetation with the aquatic biota.

Riparian systems occur along creeks and rivers and occupy floodplains, streambanks, islands in rivers, narrow bands in steep channels, and backwater channels. This system is dependent on a hydrologic regime that has annual to episodic flooding. Riparian vegetation should be comprised of a mosaic of plant communities dominated by species which tolerate periodic flooding and an associated seasonally high-water table. Trees may be present along with riparian shrubs and herbaceous species. In wide valley bottoms, the vegetation typically should be a mosaic of all lifeforms with patterns reflecting the meander patterns of the stream or river. Key tree species include aspen, cottonwood, Engelmann spruce, and subalpine fir; on drier sites, Douglas fir and Rocky Mountain juniper may be present. Dominant shrubs may include mountain alder, various species of willows, river birch, dogwood, hawthorn, chokecherry, rose, silver buffaloberry, Rocky Mountain maple, and snowberry. A wide variety of herbaceous species, including grasses, sedges, rushes, spikerushes, bulrushes, and forbs, should be present in the understory. Threats to the riparian system include heavy grazing, invasive species, road construction and maintenance, drought, recreation, and climate change.

Wetlands are characterized by dominant vegetation adapted to saturated anaerobic soil conditions. The vegetation complex should be represented by a mosaic of herbaceous and woody plant communities that provide excellent erosion control. Low willow species, bog birch, and bog blueberry are often the representative woody species in a wetland system. Herbaceous species may be dominated by cattails, sedges, rushes, spikerushes, or bulrushes. Bryophytes, including sphagnum, are often well represented in fens. Threats to wetlands include alteration of the original hydrology or hydric soils, such as diversion, draining, development, road construction, and heavy grazing; invasive species; and climate change.

Willows (*Salix* spp.) are of particular importance in riparian and wetland plant communities. Willows require a seasonally high-water table and free water in the soil to survive and regenerate. Most species are shade-intolerant and those species that occur along streams in narrow steep valleys will likely not persist if conifers overtop them. Browsing pressure by both native and domestic ungulates can lead to reduced density and vigor of willow stands. Coyote willow regenerates vegetatively; all other willows germinate successfully in bare, moist, mineral substrate stream bars. Regeneration is less likely to occur on other substrates. There are two main categories of willows.

Tall willows, including various species of tall-stature typically up to 20 to 30 feet tall, occur along streams in broad valley bottoms at low- to mid-elevations. They occur as a mosaic with various other riparian shrubs, graminoids, and forbs in the understory, forming a riparian complex. Tall willow species include, but are not limited to, Booth's (*Salix boothii*), geyer (*S. geyeriana*), bebb (*S. bebbiana*), coyote (*S. exigua*), drummond (*S. drummondiana*), and whiplash (*S. lasiandra*) willow.

Low willows, including low-statured willows typically up to 4 feet tall occur in higher elevation valleys, usually associated with subalpine forests. They occur as a riparian strip along streams and as a complex either associated with sinuous streams or in wet meadows or fens in wide, flat valleys associated with standing water. Low willow species include, but are not limited to, planeleaf (*S. planifolia*), wolf (*S. wolfii*), and mountain (*S. eastwoodiae*) willow. Bog birch (*Betula pumila*) and bog blueberry (*Vaccinium uliginosum*) may also be present in the low willow complex. Riparian or wetland graminoids and forbs are typically present in varying amounts and can be present with high cover in a low willow or herbaceous vegetation mosaic or riparian or wetland complex.

Aggressive fire suppression over the last 100 years, coupled with implementation of the PACFISH and INFISH amendments to the existing forest plans in 1995, has greatly reduced natural disturbance regimes within riparian systems. Forest succession in the absence of disturbance, particularly wildland fire, has resulted in encroachment of conifer species into much of the riparian system. Conifer species have replaced much of the tall woody species, such as willows, cottonwood, and birch. Only tolerant hardwood species are generally present. Restoration of natural fire regimes would reestablish tall hardwood components and help to maintain a mosaic of vegetation patterns which are important for a wide variety of wildlife species.

Alpine and Rocky Habitats

Alpine and subalpine ecosystems occupy harsh high elevation sites, resulting in short stature and relatively slow growth for trees, shrubs, and herbaceous species. Wetland communities are present in snowload depressions and support various willow species, along with wetland herbaceous species. Alpine ecosystems are mostly treeless, although some conifers may be present with minor cover, often with a krummholz growth form. Vegetation cover should typically be low to moderate. The non-forested plant communities are dominated by several shrubs, forbs, and graminoids, including arctic willow (turf community), mountain avens (cushion plant community), mountain heather, and moss-heather (snow bed communities).

Rocky habitats are often associated with the alpine potential vegetation type, including rock outcrops and scree. Vegetation is sparse or largely lacking. Bryophytes and lichens often occur in crevices and flourish on open rock surfaces where the competition from vascular plants is absent. Rock outcrop and scree habitats may also be found at lower elevations. Rocky habitats are often fragile systems.

Xeric Ecotones and Savannas

Ecotones are the boundaries between ecosystems or biomes (Allen and Breshears 1998). These areas are often sparsely vegetated and occupy the fringes of adjacent systems. On the Nez Perce-Clearwater, the xeric ecotone represents the transition from non-forested xeric grass and shrub communities to dry forest communities. Scattered trees and shrubs, including Ponderosa pine, Douglas fir, and mountain mahogany, may be common. Species composition can vary, depending on the moisture regime and adjacent communities. Xeric ecotones are complex because they overlap forested and non-forested potential vegetation types. The plant communities found may shift between grass, shrub, and conifers based on climate and disturbances (mainly fire). Depending on the vegetation composition and structure, these areas may be typed as non-forested cover types or possibly the Ponderosa pine or Douglas fir cover type where substantial cover of conifers has established.

Savannas are a particular forest structure within xeric ecotones. For this analysis, savannas are defined as communities found on either non-forested or the warm dry broad potential vegetation group, which contain very open tree cover (5-10 percent canopy cover) and an overall dominance of xeric grasses or shrubs. Savannas are likely to be found on the hottest, driest sites in the warm dry broad potential vegetation group. Historically, frequent fire would have maintained the dominance of grasses and shrubs while promoting the development of very large widely scattered individual or patches of Ponderosa pine or Douglas fir, limiting the establishment of small conifers. However, fire exclusion has resulted in the shift of some of these areas to more densely forested areas, often with the development of Douglas fir ladder fuels, a decrease in grass and shrub vigor, and an increase in crown fire potential. As this occurs, the large, old trees of the savannah become vulnerable to mortality from uncharacteristic fire effects or insect infestations.

It is desirable to promote the open character of forest savannahs and a dominance of grass and shrub communities in most xeric ecotones, particularly given expected future warm and dry climate conditions. Due to limitations in available data sources and modeling tools, the overall desired extent of these plant communities is encompassed within the desired range of non-forested cover types. For additional information on existing condition of rangelands, including grasslands and meadows, see the Livestock Grazing section.

Existing and Desired Condition by Management Area

This section describes the existing condition for each ecological component used for analysis within this report. These ecological components include vegetation composition, size class distribution, density, landscape resilience, rare and unique habitat elements, and old growth. Vegetation composition is described by dominance type and size class distribution. Forest density is described by canopy cover. Resilience is described with a combination of three elements including insect and disease hazard ratings, projected wildland fire, and vegetation patch size. Together, these three elements describe the degree to which current forest conditions are departed from natural range of variation and the current resiliency of the forest to natural disturbances. Rare and unique habitat elements are described qualitatively in the context of current and desired abundance and distribution of quacking aspen. Old growth is also described qualitatively in terms of the current and desired percentage and distribution of old growth types found on the Nez Perce-Clearwater.

Each of these components is discussed in turn and are described for each management area and broad potential vegetation type group. These components are expected to change over time in the absence of management and in responses to proposed management regimes. Each proposed alternative will have varying effects on each of these components.

Management Area 1

Dominance Type

The dominance types in Management Area 1 are displayed in the following tables compared with the ranges for desired conditions, given as a percentage of Management Area 1. For the current conditions, Management Area 1 is equated to wilderness. While there may be small acreage differences between the Management Areas in the various alternatives, the existing condition is shown by currently delineated areas that are not expected to change to give a consistent picture of conditions among all alternatives, rather than having fluctuations due to changing delineations of where boundaries are drawn.

Table 21. Current and desired dominance types within the Cold potential vegetation type in Management Area 1.

Dominance Type	Current Condition1	Desired Range
Lodgepole pine	28%	30–40%
Subalpine fir/Engelmann spruce	35%	3–10%
Whitebark pine	0%	35–50%
Douglas fir/Western larch	4%	0–5%
Mountain hemlock	0%	2–5%
Seral stage grass/shrub	23%	5–15%

1Current condition is based on the proportion of the potential vegetation type group and management area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Table 22. Current and desired dominance types within Cool Moist potential vegetation type in Management Area 1.

Dominance Type	Current Condition[1]	Desired Range
Douglas fir	7%	2–4%
Lodgepole pine	10%	20–30%
Western larch	0%	5–10%
Douglas fir/Western larch	1%	1–2%
Grand fir/mountain hemlock	1%	1–2%
Western white pine	0%	5–10%
Subalpine fir/Engelmann spruce	53%	25–40%
Whitebark pine	0%	2–10%
Seral stage grass/shrub	28%	5–25%

[1]Current conditions are based on the proportion of the potential vegetation type group and management area that is classified as a "tree" lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as "intolerant mix."

Table 23. Current and desired dominance types within Warm Dry potential vegetation type in Management Area 1.

Dominance Type	Current Condition[1]	Desired Range
Ponderosa pine	16%	50–60%
Douglas fir	25%	15–20%
Lodgepole pine	3%	5–12%
Western larch	0%	1–2%
Douglas fir/Western larch	4%	0–2%
Grand fir	22%	5–15%
Seral stage grass/shrub	28%	2–10%

[1]Current conditions are based on the proportion of the potential vegetation type group and management area that is classified as a "tree" lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as "intolerant mix."

Table 24. Current and desired dominance types within Warm Moist potential vegetation type in Management Area 1.

Dominance Type	Current Condition[1]	Desired Range
Ponderosa pine	0%	5–20%
Douglas fir	28%	5–10%
Lodgepole pine	0%	1–2%
Western larch	0%	5–10%
Douglas fir/Western larch	4%	5–10%
Grand fir/western redcedar	61%	15–25%
Western white pine	0%	10–20%
Subalpine fir/Engelmann spruce	2%	0–2%
Grand fir	43%	10–20%
Early Seral stage grass/shrub	5%	5–20%

[1]Current conditions are based on the proportion of the potential vegetation type group and management area that is classified as a "tree" lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as "intolerant mix."

Size Class Distribution

The size class distributions within Management Area 1 are displayed in the following tables compared with the ranges for desired conditions given as a percentage for each size class. All size classes sum to 100 percent because each class is represented as a percent of all size classes represented within Management Area 1. Each size class distribution table is summarized by potential vegetation type group to facilitate comparisons across alternatives.

Table 25. Current and desired size class distribution for Cold potential vegetation type group in Management Area 1.

Size Class	Current Condition	Desired Range
Seral grass or shrub	27%	5–20%
0–4.9” DBH	6%	15–30%
5–9.9” DBH	33%	5–25%
10–14.9” DBH	26%	5–15%
15–19.9” DBH	6%	25–50%
20” + DBH	2%	0–5%

Table 26. Current and desired size class distribution for Cool Moist potential vegetation type group in Management Area 1.

Size Class	Current Condition	Desired Range
Seral grass or shrub	34%	5–25%
0–4.9” DBH	3%	15–30%
5–9.9” DBH	15%	10–25%
10–14.9” DBH	27%	10–25%
15–19.9” DBH	13%	15–30%
20” + DBH	8%	5–10%

Table 27. Current and desired size class distribution for Warm Dry potential vegetation type group in Management Area 1.

Size Class	Current Condition	Desired Range
Seral grass or shrub	33%	2–10%
0–4.9” DBH	4%	10–25%
5–9.9” DBH	14%	10–20%
10–14.9” DBH	20%	10–20%
15–19.9” DBH	29%	20–35%
20” + DBH	23%	10–25%

Table 28. Current and desired size class distribution for Warm Moist potential vegetation type group in Management Area 1.

Size Class	Current Condition	Desired Range
Seral grass or shrub	10%	5–20%
0–4.9” DBH	4%	10–25%
5–9.9” DBH	14%	10–20%
10–14.9” DBH	20%	10–20%
15–19.9” DBH	29%	20–30%

Size Class	Current Condition	Desired Range
20” + DBH	23%	10–20%

Management Area 2

Dominance Types

The dominance types in Management Area 2 are displayed in the following tables compared with the ranges for desired conditions, given as a percentage of Management Area 2. For the current conditions, Management Area 2 is equated to Idaho Roadless Areas (IRAs) and the Forest Inventory and Analysis classification of Other Protected/Administrative Areas (OPAAs). While there may be acreage differences between the Management Areas in the various alternatives, the existing condition is shown by currently delineated areas that are not expected to change to give a consistent picture of conditions among all alternatives, rather than having fluctuations due to changing delineations of where boundaries are drawn.

Table 29. Current and desired dominance types within Cold potential vegetation type group in Management Area 2.

Dominance Type	Current Condition[1]	Desired Range
Lodgepole pine	34%	30–35%
Subalpine fir/Engelmann spruce	26%	5–15%
Whitebark pine	2%	35–50%
Douglas fir/Western larch	0%	0–5%
Mountain hemlock	22%	0–5%
Seral stage grass/shrub	16%	5–15%

[1]Current conditions are based on the proportion of the potential vegetation type group and management area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Table 30. Current and desired dominance types within Cold Moist potential vegetation type group in Management Area 2.

Dominance Type	Current Condition[1]	Desired Range
Douglas fir	10%	2–4%
Lodgepole pine	19%	20–30%
Western larch	3%	5–10%
Douglas fir/Western larch	2%	1–2%
Grand fir/mountain hemlock	9%	1–2%
Western white pine	0%	5–10%
Subalpine fir/Engelmann spruce	41%	25–40%
Whitebark pine	1%	2–10%
Seral stage grass/shrub	16%	5–25%

[1]Current conditions are based on the proportion of the potential vegetation type group and management area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Table 31. Current and desired dominance types within Warm Dry potential vegetation type group in Management Area 2.

Dominance Type	Current Condition[1]	Desired Range
Ponderosa pine	6%	50–65%
Douglas fir	29%	15–20%
Lodgepole pine	13%	5–15%

Dominance Type	Current Condition[1]	Desired Range
Western larch	1%	1–2%
Douglas fir/Western larch	2%	0–1%
Grand fir	25%	2–10%
Seral stage grass/shrub	21%	1–10%

[1]Current conditions are based on the proportion of the potential vegetation type group and Management Area that is classified as a "tree" lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as "intolerant mix."

Table 32. Current and desired dominance types within Warm Moist potential vegetation type group in Management Area 2.

Dominance Type	Current Condition[1]	Desired Range
Ponderosa pine	1%	5–20%
Douglas fir	20%	5–10%
Lodgepole pine	6%	1–2%
Western larch	1%	10–20%
Douglas fir/Western larch	7%	5–10%
Grand fir/western redcedar	20%	15–25%
Western white pine	1%	20–35%
Subalpine fir/Engelmann spruce	3%	1–2%
Grand fir	28%	5–15%
Seral stage grass/shrub	11%	5–20%

[1]Current conditions are based on the proportion of the potential vegetation type group and Management Area that is classified as a "tree" lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as "intolerant mix."

Size Class Distributions

The size class distributions within Management Area 2 are displayed in the following tables compared with the ranges for desired conditions given as a percentage for each size class. All size classes sum to 100 percent because each class is represented as a percent of all size classes represented within Management Area 2. Each size class distribution table is summarized by potential vegetation type group to facilitate comparisons across alternatives.

Table 33. Current and desired size class distribution for Cold potential vegetation type group in Management Area 2.

Size Class	Current Condition	Desired Range
Seral grass or shrub	17%	5–15%
0–4.9" DBH	10%	15–30%
5–9.9" DBH	34%	7–25%
10–14.9" DBH	28%	7–15%
15–19.9" DBH	10%	25–50%
20" + DBH	2%	0–5%

Table 34. Current and desired size class distribution for Cool Moist potential vegetation type group in Management Area 2.

Size Class	Current Condition	Desired Range
Seral grass or shrub	20%	5–25%
0–4.9" DBH	5%	15–30%

Size Class	Current Condition	Desired Range
5–9.9” DBH	23%	10–25%
10–14.9” DBH	32%	10–20%
15–19.9” DBH	11%	15–30%
20” + DBH	9%	5–10%

Table 35. Current and desired size class distribution for Warm Dry potential vegetation type group in Management Area 2.

Size Class	Current Condition	Desired Range
Seral grass or shrub	25%	1–10%
0–4.9” DBH	0%	7–25%
5–9.9” DBH	18%	7–20%
10–14.9” DBH	27%	10–25%
15–19.9” DBH	17%	20–35%
20” + DBH	13%	15–25%

Table 36. Current and desired size class distribution for Warm Moist potential vegetation type group in Management Area 2.

Size Class	Current Condition	Desired Range
Seral grass or shrub	15%	5–20%
0–4.9” DBH	1%	10–25%
5–9.9” DBH	11%	12–20%
10–14.9” DBH	30%	12–20%
15–19.9” DBH	26%	15–25%
20” + DBH	17%	10–25%

Management Area 3

Dominance Types

The dominance types in Management Area 3 are displayed in the following tables compared with the ranges for desired conditions, given as a percentage of Management Area 3. For the current conditions, Management Area 3 is equated to lands managed for multiple uses including timber production within the constraints of forest practices regulations, laws, and special management restrictions. All areas suitable for timber production are within Management Area 3. While there may be acreage differences between the management areas in the various alternatives, the existing condition is shown by currently delineated areas to allow comparison among all alternatives.

Table 37. Current and desired dominance types within Cold potential vegetation type group in Management Area 3.

Dominance Type	Current Condition[1]	Desired Range
Lodgepole pine	56%	30–40%
Subalpine fir/Engelmann spruce	26%	3–10%
Whitebark pine	0%	35–50%
Douglas fir/Western larch	6%	0–5%
Mountain hemlock	0%	2–5%
Seral stage grass/shrub	14%	5–15%

[1]Current conditions are based on the proportion of the potential vegetation type group and Management Area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Table 38. Current and desired dominance types within Cold Moist potential vegetation type group in Management Area 3.

Dominance Type	Current Condition[1]	Desired Range
Douglas fir	3%	2–4%
Lodgepole pine	12%	20–30%
Western larch	4%	5–10%
Grand fir/mountain hemlock	9%	1–2%
Western white pine	0%	5–15%
Subalpine fir/Engelmann spruce	60%	25–35%
Whitebark pine	0%	2–10%
Seral stage grass/shrub	10%	5–25%

[1]Current conditions are based on the proportion of the potential vegetation type group and Management Area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Table 39. Current and desired dominance types within Warm Dry potential vegetation type group in Management Area 3.

Dominance Type	Current Condition[1]	Desired Range
Ponderosa pine	17%	50–60%
Douglas fir	14%	15–20%
Lodgepole pine	13%	10–15%
Western larch	2%	1–2%
Douglas fir/Western larch	3%	1–2%
Grand fir	33%	2–10%
Seral stage grass/shrub	17%	1–10%

[1]Current conditions are based on the proportion of the potential vegetation type group and Management Area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Table 40. Current and desired dominance types within Warm Moist potential vegetation type group in Management Area 3.

Dominance Type	Current Condition[1]	Desired Range
Ponderosa pine	2%	10–20%
Douglas fir	11%	2–5%
Lodgepole pine	2%	1–2%
Western larch	2%	5–15%
Douglas fir/Western larch	5%	5–10%

Grand fir/western redcedar	17%	10–20%
Western white pine	3%	25–40%
Subalpine fir/Engelmann spruce	4%	1–2%
Grand fir	45%	5–15%
Seral stage grass/shrub	10%	1–5%

[1]Current conditions are based on the proportion of the potential vegetation type group and Management Area that is classified as a “tree” lifeform. The total does not sum to 100 percent due to rounding and some nondescript classifications, such as “intolerant mix.”

Size Class Distributions

The size class distributions within Management Area 3 are displayed in the following tables compared with the ranges for desired conditions given as a percentage for each size class. The grass or forb and 0–4.9” diameter at breast height size classes are maintained as distinct size classes within Management Area 3. This recognizes the need to maintain desired stocking levels on lands suitable for timber production, as well as the need to allow for temporary openings to achieve wildlife management objectives. Openings within the forested canopy may still be maintained to promote other resource objectives as suggested by the broad range of desired conditions for this size class. All size classes sum to 100 percent because each class is represented as a percent of all size classes represented within Management Area 3. Each size class distribution table is summarized by potential vegetation type group to facilitate comparisons across alternatives.

Table 41. Current and desired size class distribution for Cold potential vegetation type group in Management Area 3.

Size Class	Current Condition	Desired Range
Grass or shrub	36%	5–15%
0–4.9” DBH	11%	15–30%
5–9.9” DBH	28%	10–25%
10–14.9” DBH	22%	5–15%
15–19.9” DBH	0%	25–50%
20” + DBH	3%	0–5%

Table 42. Current and desired size class distribution for Cool Moist potential vegetation type group in Management Area 3.

Size Class	Current Condition	Desired Range
Grass or shrub	17%	5–25%
0–4.9” DBH	3%	15–30%
5–9.9” DBH	23%	10–25%
10–14.9” DBH	32%	10–20%
15–19.9” DBH	16%	15–30%
20” + DBH	8%	5–10%

Table 43. Current and desired size class distribution for Warm Dry potential vegetation type group in Management Area 3.

Size Class	Current Condition	Desired Range
Grass or shrub	18%	1–10%
0–4.9” DBH	4%	5–25%
5–9.9” DBH	26%	10–20%

Size Class	Current Condition	Desired Range
10–14.9” DBH	24%	10–20%
15–19.9” DBH	14%	20–35%
20” + DBH	14%	15–28%

Table 44. Current and desired size class distribution for Warm Moist potential vegetation type Group in Management Area 3.

Size Class	Current Condition	Desired Range
Grass or shrub	11%	1–5%
0–4.9” DBH	4%	5–25%
5–9.9” DBH	23%	10–20%
10–14.9” DBH	23%	10–20%
15–19.9” DBH	21%	20–35%
20” + DBH	19%	15–33%

Large-tree Structure

Large-tree structure, as defined in Appendix B of the Land Management Plan, identifies where large and very large trees are present in sufficient numbers to contribute to key ecosystem processes. This large-tree structure metric may be quantified as having large trees (15-19.9" DBH) only, very large trees (20+" DBH) only, or both large and very large trees concurrently. Large-tree structure may occur within any forest size class. Based on forestwide Forest Inventory and Analysis (FIA) data, a large-tree structure is found in 0 percent of the seed or sap class; 10 percent of the small tree class; 36 percent of the medium tree class; 26 percent of the large tree class; and 12 percent of the very large tree class. Given the high level of productivity associated with most of the forested areas of the Nez Perce-Clearwater, areas of the forest meeting large tree structure criteria are common. Areas of the forest meeting the “Both” structural criteria are more meaningful in terms of legacy trees, genetic refugia, and wildlife habitat components. Based on forestwide FIA data, the Both (large tree and very large tree) structure is found in 0 percent of the seed or sap class; 1 percent of the small tree class; 15 percent of the medium tree class; 49 percent of the large tree class; and 61 percent of the very large tree class. Desired conditions are not expressly derived for the large tree structure attribute within the Land Management Plan. Plan components FW-DC-FOR-05, 08, and 11 express the desired condition of having legacy tree components to be distributed among all size classes present on the forest. As Table 45 illustrates, there is an opportunity to incorporate large tree structure within the seedling and sapling size classes. SIMPPLLE does not track these classes explicitly. However, as discussed in the size class section, this attribute can be directly compared to the SIMPPLE natural range of variation outputs for large and very large tree size classes.

Table 45. Large tree structure distribution among size classes.

Size Class	Large	Both (Large and Very Large)	None
Seedling	0%	0%	100%
0.1–4.9” DBH	0%	0%	100%
5.0–9.9” DBH	10%	1%	89%
10.0–14.9” DBH	36%	15%	49%
15.0–19.9” DBH	26%	49%	25%
20.0–24.9” DBH	12%	61%	27%
25+” DBH	8%	59%	33%

Large-tree Structure does not total 100 percent due to inclusion of non-forest areas.

Data Source: R1 Summary Database 2015 Hybrid dataset.

Current and Desired Conditions Common to All Management Areas

Density

Desired conditions for forest density classes are informed by the natural range of variation (NRV) analysis and enumerated in the following table. Vertical structures are discussed through narrative description. These desired conditions would not necessarily apply to the No Action Alternative but are included in the analysis for all alternatives to provide for a comparison.

Table 46 displays the current forestwide proportions of forest density classes compared to the natural range of variation. An array of density classes across the landscape would contribute to desired ecological, social, and economic conditions. Forest density influences wildlife habitat, forest resilience, timber productivity, and crown fire potential. More open densities tend to be more resilient to fire, as well as insects and diseases, and promotes the growth of large trees. Moderate densities tend to maximize timber production. Higher densities provide valuable wildlife habitat conditions particularly in the warm moist broad potential vegetation group. The desired conditions, based on the natural range of variation, indicate that low to medium and medium to high forest densities are below the desired range, and the abundance of high density is above the desired range.

Table 46. Forestwide canopy cover percentage by tree density class.

Tree Density Class	Canopy Cover Range	Forest-wide Existing Condition	Natural Range of Variation
Non-forested	<10%	23%	16%
Low to Medium	10–39.9%	25%	49%
Medium to High	40–59.9%	52%	35%

Data Source: R1 Summary Database 2015 Hybrid dataset.

The natural range of variation analysis indicated that the low to medium canopy cover class was common forestwide, especially on the warm dry broad potential vegetation group. Fire exclusion has resulted in higher canopy densities across all potential vegetation type groups which would otherwise have been maintained at more open densities by frequent low intensity fire. Many forests on the cool moist sites also had low to medium density, which were likely forests in their early and mid-successional stages or older forests where disturbances removed trees and opened the canopy. In all types, the shift toward higher densities reflects the impacts of fire exclusion and the increased abundance of shade tolerant species. Low to medium density forests were at the higher end of their natural ranges during warm dry periods, whereas medium-high and high-density forests were at the lowest end. In pine dominated forests, the mountain pine beetle may cause changes in the forestwide averages. It is likely that some of the high-density Ponderosa pine areas may shift into open classes because of the combined effects of pine beetle and wildfire. In lodgepole pine systems, the combination of mountain pine beetle caused mortality and wildfire may reduce stand density in the short term but has a greater effect on stand structural class. Lodgepole pine stands may shift from a high-density stem exclusion stage into a high density stand initiation stage.

Figures found in Appendix B also display the current proportions of vertical structure classes compared to the natural range of variation. There are no desired conditions developed specifically for this attribute. Single-storied forests are more common than they were historically, while multi-storied forests are less common, especially in the warm dry and cold broad potential vegetation types. The cool moist potential vegetation type appears to be within the natural range of variation for all vertical structure classes.

Areas with less than 10 percent canopy cover are considered non-forested. This class may include open forest savannas or persistent grass or shrub communities that occur on the cold and warm dry broad potential vegetation groups. Such sites may have multiple age classes but large, fire resistant, and drought tolerant trees such as Ponderosa pine are favored. This class also includes areas on any potential vegetation type that has been recently de-forested through disturbance and trees have not yet re-established. Finally, true non-forested communities are included (grasslands, riparian or wetlands, and alpine communities).

Low and medium tree canopy cover classes represent relatively open forests with 10 to 39.9 percent canopy cover. This class is common in young forests. In addition, low densities are found in dry forest types at all stages of succession, particularly in the warm dry broad potential vegetation group, where site conditions or disturbances maintain low tree density. Cool moist or cold forests may also be in this condition particularly where they are impacted by disturbances such as mountain pine beetle infestations or wildland fire.

The medium to high tree canopy cover class represents a more fully stocked forest, a condition which is common in more moist forests of shade tolerant species, often found on the cool moist and warm moist broad potential vegetation groups. Examples of forests with this density could include mature single-storied lodgepole pine or spruce or fir multistoried stands. Dry forests may also be in this density class particularly where fire has been excluded and understory layers have developed.

The high canopy cover class includes forests with a relatively closed canopy, most often on productive sites on the cool moist broad potential vegetation group. This density class is common in stands with a spruce or fir component in a multi-storied condition. This condition also arises in single-storied lodgepole pine and sometimes Ponderosa pine or Douglas fir that regenerate to extremely high densities after fire. High tree density can limit tree growth as well as sunlight to the understory, limiting vegetation in the understory. This condition may also occur in dry forests that have missed natural fire entries and developed layers in the understory.

Landscape Resilience

The spatial pattern of vegetation can affect ecological processes, including wildlife and plant habitat and dispersal; disturbance risk, spread, and size; reforestation; watershed health; carbon storage; wildlife habitat quality; and aesthetic values. Connectivity can be affected by natural factors such as topography, soils, variation in precipitation, and wildfire but also by human developments and activities. It is also one of the most complex attributes of ecosystems to quantify. The goal of assessing connectivity and pattern is to better understand the mosaic of conditions that make up a resilient landscape.

Heterogeneity is the quality of consisting of dissimilar elements, as with mixed habitats or cover types occurring on a landscape. Heterogeneity on forest landscapes may occur as mosaics of patches generated by many events, but also may be created by single large events that occur infrequently (Kashian et al. 2005). The ecological, social, and economic values that forests provide are heavily influenced by spatial patterns on the landscape (Turner et al. 2013). Connectivity and pattern also influence the genetic flow of plant material, which has implications for the adaptability of vegetation. Seed dispersal strategies will depend on spatial heterogeneity and the suitability of future site conditions. Maintaining a robust genetic base is a primary foundation of resilience.

Generally, a resilient landscape is made up of a mosaic of age classes, composition, and successional stages because this ensures that not all areas are equally susceptible to the same drivers, such as wildfire and insects, at the same time. For example, homogeneous large areas of dense forests can create higher potential for large, high severity fire. The spread of wildfires and the potential for large fire growth can be limited by reducing fuel continuity (Ager et al. 2010, Collins et al. 2009, Finney et al. 2007, Finney 2003, Hessburg, Reynolds, et al. 2007, Safford et al. 2009, Stephens et al. 2009). Large landscapes where wildfires have been allowed to burn can develop such fuel heterogeneity; therefore, future fires could be limited in size relative to landscapes that have more homogeneous fuels (Bollenbacher 2010, Collins et al. 2009, Rollins et al. 2002, Van Wagtendonk 2004). Similarly, large expanses of forests with susceptible characteristics can create higher potential for bark beetle outbreaks (Fettig et al. 2007, Samman and Logan 2000). For bark beetles, the severity of outbreaks and tree mortality can be reduced in extent by increasing the diversity of stand ages, size classes, and tree species (Bentz et al. 2010, Fettig et al. 2007).

It is impossible to effectively model and analyze all the possible metrics of landscape pattern, or to capture all of those that would be meaningful for the variety of wildlife species in the plan area. The abundance, average, and range of sizes of early successional forest patches (transitional and seedling or sapling size classes) have been identified as the key ecosystem characteristics to represent landscape pattern because this condition is quantifiable, represents likely patterns of older forests, and is meaningful for many species. Openings in the forest are created after a stand-replacing disturbance and are the most distinct and easily detectable structural conditions in a forested landscape because they are dominated by grass, forbs, shrubs, and short trees. They are meaningful to many wildlife species because of their distinctive composition and openness, which affects the growth and survival of plants that wildlife depends on, and strong contrast to adjacent mid or late successional forest ("edge"). They also represent the initiation point in forest development, the foundation upon which rests the pattern of the future forest.

Results of the natural range of variation analysis were used to inform the desired conditions for earlier successional forest patches (Table 47). Refer to the document "Using Natural Range of Variation Modeling to Estimate Historic Opening Size on the Nez Perce-Clearwater National Forests" found in the project record for a detailed discussion of opening size calculations. An eighteen-acre filter was used to remove polygons less than 18 acres is size. The three indicators used are:

Average patch size, which is a simple arithmetic mean of cumulative area of patches divided by the number of patches; and

Area weighted mean patch size, in which the mean is weighted based on the proportion of the area of patches relative to the total. This metric indicates whether there are large patches in the landscape, or if most patches are close to the average. For example, in a forest with a 99-acre patch and a 1-acre patch, the average size is 50 acres, and the area-weighted mean is (99*0.99 + 1*0.01) 98.02 acres.

Jenks Natural Breaks Distribution: This algorithm arranges opening size values into logical size classes that minimize the within-class variance while maximizing the between-class variance.

An opening was included in the calculation for as long as it remained in the seedling or sapling size class. This provides the full ecological picture of the extent and duration of forest openings. A patch analysis was also run to inform the development of timber standards related to maximum opening sizes that can be created with even-aged timber harvest; refer to Appendix B and the Timber section.

Table 47. Early successional forest patch size acres by broad potential vegetation group, existing condition, and natural range of variation.

Broad Potential Vegetation Group	Existing Condition-Mean. Patch Size (acres)	Existing Condition-Area Weighted Mean of Patch Sizes (acres)	Natural Range of Variation-Mean Patch Size of Patches (acres)	Natural Range of Variation-Area Weighted Mean Patch Size (acres)
Forestwide	79	736	350	28,207

Broad Potential Vegetation Group	Existing Condition-Mean. Patch Size (acres)	Existing Condition-Area Weighted Mean of Patch Sizes (acres)	Natural Range of Variation-Mean Patch Size of Patches (acres)	Natural Range of Variation-Area Weighted Mean Patch Size (acres)
Cold	31	124	95	1,094
Cool Moist	59	390	188	6,579
Warm Dry	35	95	77	1,442
Warm Moist	54	331	160	9,536

Data Source: Existing condition and natural range of variation data from SIMPPLLE

Historically, there was rarely, if ever, a decade when there were not openings created by fire somewhere on the Nez Perce-Clearwater. The majority of fires were relatively small (as indicated by the arithmetic average). However, when the big fires did occur, they were very large (as indicated by the area weighted mean). These large fires would typically be associated with warm climatic periods and drought conditions.

The natural range of variation (NRV) for patch sizes on the Nez Perce-Clearwater helps to inform the desired condition for patch sizes and the relative distribution of patches within a given potential vegetation type group. The forestwide existing condition of patch sizes is well below the natural range of variation range. Each broad potential vegetation group has calculated means below the natural range of variation average means, as well as area weighted means which are very departed from the natural range of variation ranges. These differences between existing means and natural range of variation means are directly related to fire suppression over the last century and limitations on maximum patch size allowed for even-aged silviculture treatments. The decrease in mean patch size at the broad potential vegetation type group level has increased fragmentation. Early successional patches in the warm dry and cold broad potential vegetation groups are smaller than in cool moist and warm moist, due to a more frequent low severity disturbance regime which causes a complex mosaic of within-stand structures including small patches and canopy openings. Patches in the warm moist and cool moist broad potential vegetation group tend to be larger, due to a preponderance of lodgepole pine and infrequent, high severity disturbances. The largest patch sizes are correlated with warm dry climate periods.

Insect and Disease Hazard Ratings

There are five insect and disease factors that are considered for describing the effects these agents have on forest health and overall forest resiliency (Table 48). These factors have been developed after consultation with various members of the Forest Health Protection group, primarily Joel Egan, a Forest Entomologist, from the Northern Region Regional Office in Missoula, Montana; Daniella Malesky, a Forest Entomologist from Forest Health Protection in Coeur d' Alene, Idaho; and Christy Cleaver, a Plant Pathologist in Coeur d' Alene, Idaho. Risk factors are based on hazard and potential for occurrence, rather than actual occurrence of insects.

For the insect factors, mountain pine beetle was assessed using Egan's GIS layer that shows severe outbreak probability for mountain pine beetle. It has been vetted and offers extremely accurate predictions. For Douglas fir beetle, the Douglas fir beetle Hazard Rating map is used. This combined beetle risk rating methodology provides a coarse filter approach for assessing beetle risk across all potential vegetation type groups and can be described for each Management Area. Spruce beetle and spruce budworm status are also presented in Table 48.

For consideration of root disease, the best tool to use would be Blakey Lockman's (Pacific Northwest Region, Regional Plant Pathologist) root disease hazard rating map (Lockman and Kearns 2016). Christy

Cleaver talked with Blakey Lockman about using this and their joint recommendation was to give equal priority to those areas with moderate and high ratings on the map. While there is value in considering other diseases, there is a lack of tools to be able to do this effectively. Root disease is, by far, the most significant disease affecting current and desired dominance types.

The combined insect and disease hazard rating factor includes mountain pine beetle, Douglas fir beetle, and root disease hazards. Each is given equal weight for describing the overall impact these agents have on forest resiliency and suggests a priority for silvicultural treatment.

Table 48. Existing insect and disease hazard rating by broad potential vegetation type (PVT).

Existing insect and disease hazard rating by broad PVT	PTV Effect %	PTV Effect %	PTV Effect %	PTV Effect %
Mountain Pine Beetle (PP and LP Combined)	**None**	**Low**	**Medium**	**High**
Cold PVT	36%	37%	20%	7%
Cool Moist PVT	48%	20%	21%	10%
Warm Dry PVT	60%	11%	17%	12%
Warm Moist PVT	81%	9%	8%	3%
Douglas fir Beetle	**None**	**Low**	**Medium**	**High**
Cold PVT	83%	14%	3%	0%
Cool Moist PVT	80%	7%	9%	3%
Warm Dry PVT	47%	32%	17%	5%
Warm Moist PVT	46%	25%	22%	7%
Spruce Beetle	**None**	**Low**	**Medium**	**High**
Cold PVT	75%	21%	3%	0%
Cool Moist PVT	49%	28%	15%	7%
Warm Dry PVT	90%	7%	3%	0%
Warm Moist PVT	83%	11%	6%	1%
Spruce Budworm	**None**	**Low**	**Medium**	**High**
Cold PVT	47%	18%	23%	12%
Cool Moist PVT	31%	16%	22%	31%
Warm Dry PVT	54%	15%	22%	9%
Warm Moist PVT	51%	12%	24%	12%
Root Disease	**None**	**Low**	**Medium**	**High**
Cold PVT	70%	24%	4%	4%
Cool Moist PVT	53%	34%	13%	13%
Warm Dry PVT	60%	31%	6%	6%
Warm Moist PVT	37%	45%	17%	17%

Data Source: R 1 Summary Database, R1_Hybrid_2015.

Trends for each insect and disease agent are similar in proportion across hazard ratings (Table 48). Insect and disease agents are predominantly rated as low risk. Variations in the abundance of host species within each potential vegetation type group is the primary factor driving the medium and high-hazard ratings. For root disease, the highest percentages for medium and high-hazard ratings are associated with the warm moist potential vegetation type group. Douglas fir and grand fir are the species associated with the highest rates of root disease infection and is also the species comprising the largest percentage of species composition within this group.

The mountain pine beetle follows a similar pattern, with the largest proportion of acres having a low hazard rating. One notable exception is the cold potential vegetation type group. Only 48 percent of this group has a low hazard rating and averages 26 percent of medium hazard and over 25 percent high hazard. This is due to the composition of lodgepole pine in this group.

The Douglas fir beetle again follows the typical pattern of most acres having a low-risk hazard rating and a smaller proportion of medium and high-risk ratings. The warm dry potential vegetation type group has the largest percentage of both medium (27 percent) and high (3 percent) hazard ratings. This reflects the abundance and distribution of Douglas fir within this group.

Projected wildfire may also be used to describe the degree of departure from fire regimes associated with each potential vegetation type group. Fire regimes function within the natural range of variation concept. For the Nez Perce-Clearwater, the forested landscape is composed of approximately 22 percent warm dry, 38 percent warm moist, 23 percent cool moist, and 12 percent cold broad potential vegetation types. All these types are composed of varying ratios of fire regime groups.

For example, the warm moist potential vegetation type group is composed of approximately 82 percent Fire Regime Group III, while the cool moist potential vegetation type group is composed of only 28 percent of Fire Regime Group III. As discussed previously, each fire regime group exhibits different ratios of low, mixed, and high severity fire. Differences in fire severity between fire regime groups and the differences between the ratios of fire severity between broad potential vegetation type groups gives rise to differences between existing conditions on the landscape and desired conditions informed by the natural range of variation.

Table 49 presents the existing number of acres burned per decade by each broad potential vegetation type group, compared to the natural range of variation mean average of acres burned by severity class. The warm dry potential vegetation type group is currently experiencing only 42 percent of mixed severity fire and 34 percent of high severity fire that would be expected under a naturally functioning ecosystem. For the warm moist potential vegetation type group, most of which is within Management Area 3, the level of departure is 64 percent for mixed severity and 62 percent for high severity fire. This is largely due to fire suppression within this potential vegetation type group. The cool moist potential vegetation type group exhibits a difference in fire severity types with a deficit of 24 percent for mixed severity fire and an excess of high severity fire. This is due in part to a high percentage of this potential vegetation type group occurring in wilderness areas where fire suppression is absent or in roadless areas where fire suppression is limited. Similarly, the cold potential vegetation type group exhibits a surplus of both mixed severity and high severity fire due to most of these acres occurring in either wilderness or roadless areas of the Nez Perce-Clearwater. The cool moist and cold potential vegetation type groups are generally higher elevation sites, which are more affected by drought than lower elevation sites. Many high elevation sites experienced droughty conditions between 2015 and 2017 with a corresponding increase in fire.

Table 49. Comparison of existing and projected wildland fire per decade by fire regime and broad potential vegetation type. NRV = natural range of variation analysis.

Broad Potential Vegetation Type	Existing Mixed Severity Fire	NRV projected Mixed Severity Fire
Warm Dry	21,525	37,241
Warm Moist	22,873	64,325
Cool Moist	29,626	38,933
Cold	30,068	20,313
Broad Potential Vegetation Type	**Existing High Severity Fire**	**NRV projected High Severity Fire**
Warm Dry	16,643	25,132

Broad Potential Vegetation Type	Existing Mixed Severity Fire	NRV projected Mixed Severity Fire
Warm Moist	16,430	43,409
Cool Moist	30,934	26,274
Cold	32,028	13,708

Source: Calculation_SRF_MF.xlsx.

Rare and Unique Habitat Elements

Quacking aspen (*Populus tremuloides*) is poorly distributed and represented on the Nez Perce-Clearwater. The Forest Inventory and Analysis Summary Database indicates that less than 1 percent of the forested area is composed of the aspen cover type. Abundance and distribution of aspen on the Nez Perce-Clearwater is poorly understood and represented in literature. On the Nez Perce-Clearwater, aspen is most commonly associated with the cool moist and warm moist broad potential vegetation type groups. There are no known climax stands of aspen on the Nez Perce-Clearwater, indicating that aspen on this forest is primarily a seral component following disturbance.

Aspen is dependent on wildland fire as the disturbance regime required for regeneration. Fire suppression and associated forest succession has likely reduced aspen presence during the last half century (Keyser et al. 2005, Shinneman et al. 2013). As canopy density of conifers has increased and shifted from seral conifer components to climax conifer components the presence of aspen has declined.

The desired conditions for dominance types presented in the plan would improve conditions for successful regeneration of existing aspen clones following wildland fires. There is no defined metric for tracking the success of aspen recruitment following proposed management actions or natural disturbance. As a proxy for improved forest conditions for aspen presence, the dominance types and size class objectives will likely improve conditions for aspen success and persistence. The persistence of aspen is dependent upon management regimes which attempt to mimic the natural range of variability for wildland fire.

In addition to aspen, there are several other rare and unique tree species present on the Nez Perce-Clearwater. Paper birch (*Betula papyrifera*) occupies areas typified as riparian within the cool moist and warm moist potential vegetation type groups. The ecology of paper birch is like that of aspen. It requires periodic disturbance to reduce overstory competition from conifer species to successfully reproduce. At higher elevations primarily within the cold potential vegetation type group, subalpine larch (*Larix lyallii*) is another rare species on the Nez Perce-Clearwater. This timberline species is poorly represented in part due to the limited ecotone and in some measure fire suppression. As with aspen and paper birch distribution of dominance types which allow for the reintroduction of fire is likely to promote the persistence of subalpine larch.

Old Growth

The distribution of estimated old growth forest varies across the Nez Perce-Clearwater as a function of varying distributions of broad potential vegetation types, land use allocations, and disturbance history. Based on estimates derived from the R1 Summary Database Hybrid 2015 dataset, about 11 percent of the Nez Perce-Clearwater is characterized as meeting minimum screening criteria for old growth forest. This equates to about 400,000 acres of potential old growth forest. Estimates derived from Forest Inventory and Analysis data contained in the R1 Summary Database, Hybrid 2015 dataset are not spatially explicit relative to location but do represent statistically sound estimates of old growth presence on the Nez Perce-Clearwater (Bush et al. 2018).

Table 50 compares forestwide estimates of old growth for each management area. Management Area 3 has the largest relative percentage of old growth forest cover types due to a larger percentage of this management area occurring within the warm moist potential vegetation type group and fire suppression over the last 100 years.

Table 50. Distribution of old growth forest cover types by management area.

Management Area	Estimated Old Growth Cover	Confidence Interval Low (90%)	Confidence Interval High (90%)
Forestwide	11%	9%	12%
Management Area 1	12%	9%	15%
Management Area 2	8%	5%	11%
Management Area 3	13%	10%	16%

Source: R1 Summary Database, FIA Hybrid 2015 dataset.

As discussed above, the spatial distribution of old growth forest cover types is highly influenced by the distribution of broad potential vegetation types. Table 51 illustrates the relative distribution of old growth as a function of potential vegetation type group. Fire regimes vary with potential vegetation type group by both return intervals and fire severity. Both warm moist and cool moist potential vegetation type groups contain the largest relative percentage of old growth forest cover types. These two potential vegetation type groups are also characterized as having a mixed severity fire regime. Such a mixed severity fire regime would give rise to a wide variety of forest cover types and structural stages. Old growth forest cover types would also be expected to be highly variable, exhibiting both homogeneous cover types dominated by a single species or limited species mix of either early or late successional species and heterogeneous species compositions containing a combination of both early seral and late successional species.

Table 51. Distribution of old growth forest cover types by broad potential vegetation type (PVT).

Broad PVT group	Estimated Old Growth Forest PVT Percent Cover	Confidence Interval Low (90%)	Confidence Interval High (90%)
Warm Dry	22%	15%	30%
Warm Moist	36%	28%	45%
Cool Moist	34%	26%	42%
Cold	7%	3%	12%

Includes ALL old growth habitat type/dominance type.
Source: R1 Summary Database, FIA Hybrid 2015 dataset.

Existing old growth on the Nez Perce-Clearwater occurs as several cover types (Figure 12). Grand fir is the most common old growth cover type followed by Douglas fir and Engelmann spruce or subalpine fir. Both grand fir and Douglas fir occur primarily within the warm moist potential vegetation type group, while Engelmann spruce or subalpine fir along with lodgepole pine occurs within the cool moist potential vegetation type group. Only a trace amount (0.04 percent) of Pacific yew (*Taxus brevifolia*) is estimated to occur on the forest. This old growth cover type is generally associated with grand fir and Western redcedar habitat types. The cover type noted as “None” reflects plots where the dominant species could not be classified.

Old growth forest cover types on the Nez Perce-Clearwater may exists across a range of broad potential vegetation type groups, as well as gradients between broad potential vegetation type groups. Table 52 illustrates the distribution of old growth cover types across broad potential vegetation type groups as a percentage of each dominant cover type. The table does not include potential combinations of species, which may make up the total species composition of a given old growth patch.

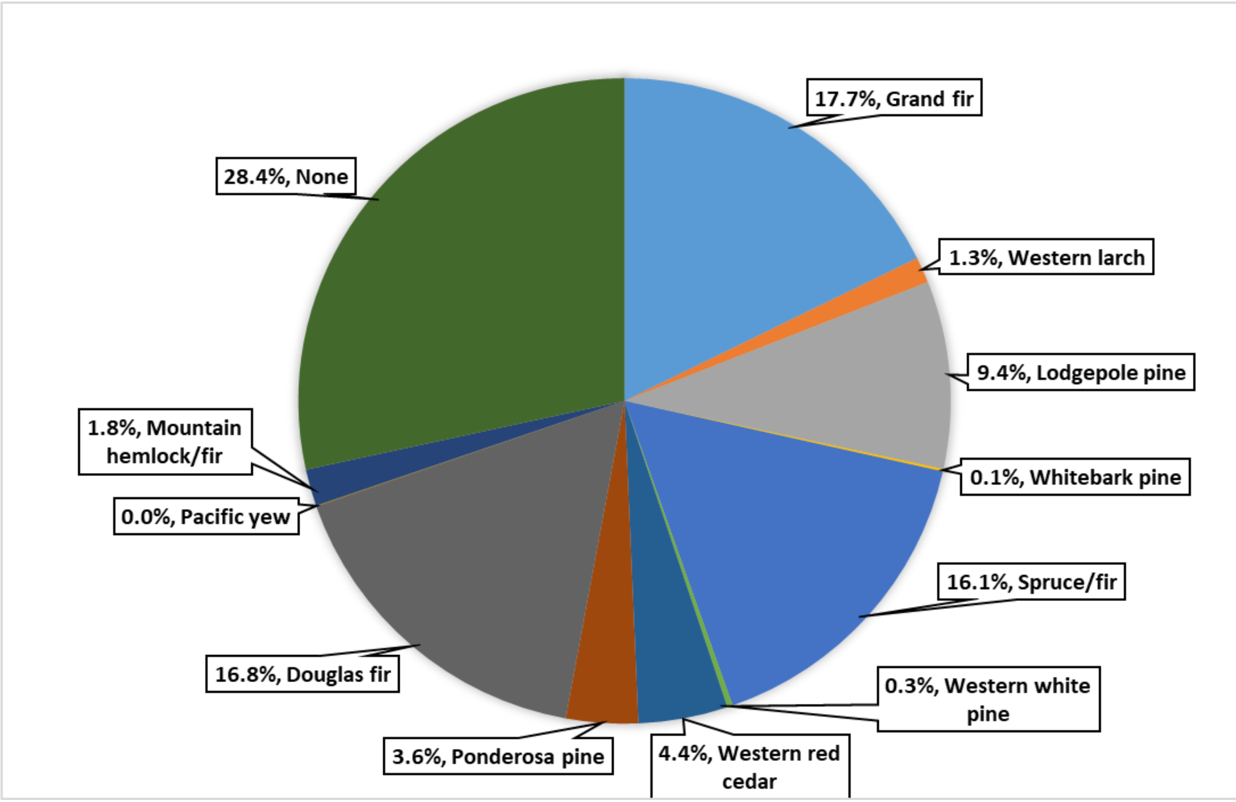


Figure 12. Cover type distribution of old growth.

Data Source: R1 Summary Database, FIA Hybrid 2015 dataset.

Table 52. Distribution of old growth cover types within broad potential vegetation types.

Old growth cover type	Warm Dry	Warm Moist	Cool Moist	Cold
Grand fir	34%	64%	2%	0%
Western larch	33%	50%	0%	17%
Whitebark pine	0%	0%	100%	0%
Lodgepole pine	23%	11%	30%	36%
Engelmann spruce or subalpine fir	2%	5%	67%	26%
Western white pine	0%	100%	0%	0%
Ponderosa pine	100%	0%	0%	0%
Douglas fir	42%	36%	20%	1%
Western redcedar	1%	99%	0%	0%
Pacific yew	0%	100%	0%	0%
Mountain hemlock or subalpine fir	0%	8%	54%	38%

Data Source: R1 Summary Database, FIA Hybrid 2015 dataset.

Each old growth habitat type may be expressed by several dominant old growth cover types. Cover types may occur as a single dominant species or more commonly as combinations of co-dominant species (Milburn et al. 2015) (Cooper et al. 1991). Table 53 illustrates the relationship between old growth habitat types and potential old growth cover types as a function of broad potential vegetation type. For old growth habitat type group “A,” 100 percent of all old growth cover types occur within the warm dry broad potential vegetation type. Within each old growth habitat group, the old growth cover type expressed at any point in stand development is largely the result of both succession and disturbance events. The nexus between climate regime and fire regime determines both the frequency and severity of disturbance events. A late seral old growth structure may develop into a near climax structure with a more tolerant species composition in the absence of disturbance. This same late seral old growth stand may maintain species composition following a disturbance, resulting in the maintenance of the late seral old growth structure.

Table 53. Relationship between old growth habitat type group and potential cover types.

Old Growth Habitat Type Group	Broad Potential Vegetation Type	Potential Old Growth Cover Types	Estimated Percent Cover Type Within Habitat Type Group
A	Warm Dry	PIPO, PSME	100%
B	Warm Dry	PIPO, PSME	97%
B	Warm Moist	PIPO, PSME, LAOC, PICO	1.7%
C	Warm Moist	PIPO, PSME, ABGR, LAOC, PICO, PIMO, TABR, PIEN/ABLA	100%
C1	Warm Moist	ABGR, TABR, PIEN/ABLA, LAOC, PSME, PIMO, PIPO	100%
D	Warm Dry	PSME, ABGR, PIPO, LAOC, PIMO, PIEN/ABLA, PICO	100%
E	Warm Dry	PIPO, PSME, LOAC, ABGR	99.5%
E	Warm Moist	ABGR, PIMO, PIEN/ABLA, PSME, LAOC, PIPO, PICO	0.5%
F	Warm Moist	THPL, ABGR, PSME, PIMO, LAOC, TSHE, PIEN/ABLA, TSME/ABLA, PIPO	100%
G	Warm Moist	THPL, TSHE, ABGR, PICO, PIMO, PSME, LAOC, PIEN/ABLA, TSME/ABLA, PIPO	99.7%
G	Non forest	none	0.3%
G1	Warm Moist	THPL, TABR, PSME, ABGR, LAOC, TSHE, PIMO, PIEN/ABLA, TSME/ABLA, PIPO	100%
H	Warm Moist	PIEN/ABLA, ABGR, PSME, LAOC, TSHE, PIMO, PIPO, PICO	0.86%
H	Cool Moist	PIEN/ABLA, TSME/ABLA, LAOC, PSME, PIMO, PICO	94.8%
H	Cold	PIEN/ABLA, TSME/ABLA, PICO	4.3%
I	Warm Moist	PIEN/ABLA, ABGR, PSME, LAOC, TSHE, PIMO, PIPO, PICO	0.93%
I	Cool Moist	PIEN/ABLA, TSME/ABLA, LAOC, PIMO, PICO, PIAL	79.6%
I	Cold	PIEN/ABLA, TSME/ABLA, PICO, PIAL	19.4%
J	Cool Moist	PIEN/ABLA, PICO, PSME, LAOC, TSME/ABLA, PIMO, PIAL	44.9%

Old Growth Habitat Type Group	Broad Potential Vegetation Type	Potential Old Growth Cover Types	Estimated Percent Cover Type Within Habitat Type Group
J	Cold	PIEN/ABLA, TSME/ABLA, PICO, PIAL	55.1
K	Cold	PIEN/ABLA, TSME/ABLA, PICO, PIAL	100%

Data Source: R1 Summary Database 2015 Hybrid dataset

Possible management strategies to promote and maintain each old growth type are presented in Table 54. Opportunities for maintaining and promoting old growth types do not exist for all old growth types found on the Nez Perce-Clearwater. For example, an Old Growth Type 2 stand expressed as a lodgepole pine old growth cover type within the warm dry broad potential vegetation type is very unlikely to persist given the associated fire regime. Old Growth Type 4 may occur within several broad potential vegetation types and exhibit numerous old growth cover types. Such an Old Growth Type 4 stand could be managed to maintain late seral old growth structure which may improve stand resiliency from effects of wildfire.

Table 54. Old growth forest potential management strategies.

Old growth type	Old growth habitat type group	Potential management strategies
1	A, B	This old growth type has a minimum age of 150 years and, since it was maintained by frequent low severity fire, plan components seek to restore and maintain this old growth type in a late seral structure by using treatments that mimic this type of disturbance. Potential treatments may include prescribed burning to minimize the development of a shade tolerant understory which reduces stand resiliency.
2	B, C, D, E, G, H, I, J, K	Since fires historically occurred at frequencies of less than 100 years to 150 years, the maximum length of time this old growth type would have persisted would be 30 years. However, since that is the maximum length of time, it is unlikely that this would have been a historically abundant type of old growth and indicates that these forest types often did not historically meet old growth criteria. This old growth type will not be emphasized due to rare opportunities for management and the fire return frequencies needed to meet other resource objectives.
3	C, C1, G1	This type has a minimum age of 150 years old. It appears that this type occurred before the advent of effective fire suppression and, therefore, may have been important in small quantities. Plan components are designed to promote this rare old growth type through appropriate application of fire suppression where Pacific yew occurs.
4	C, C1, D, E F, G, G1, H, I	This type primarily occurs where Western white pine and Western larch were historically important cover types (Jain et al. 2004). The habitat types where Engelmann spruce (ES)/subalpine fir (SAF) would have occurred historically at greater than incidental amounts are within the cool moist potential vegetation type group as categorized by Milburn, Bollenbacher, Manning, and Bush (2015). The sites specified for Douglas fir, grand fir, Western larch, Western white pine, and Ponderosa pine old growth types are all within either the warm dry or warm moist potential vegetation type where Engelmann spruce/subalpine fir would have only occurred in incidental amounts. Since approximately 85 percent of the Engelmann spruce/subalpine fir potential vegetation type group occurs within Management Area 1 and Management Area 2, management for the purpose of maintaining the Engelmann spruce/subalpine fir old growth type is not emphasized within this group. Douglas fir and grand fir cover types are overrepresented on the forest and often do not reach sufficient age to meet old growth on the Nez Perce-Clearwater. Since these forest types are over-represented compared with historic conditions and often do not long persist as old growth, these old growth types are not specifically protected by Land Management Plan components. Western larch, Western white pine, western hemlock, and Ponderosa pine old growth types are all under-represented across all potential vegetation type groups and management areas. Plan components that maintain them as old growth will be emphasized to meet both old growth retention and dominance type objectives.

Old growth type	Old growth habitat type group	Potential management strategies
5	F, G, G1, H, I	Groups F and G are within the western redcedar (WRC) and western hemlock (WH) series habitat types. Engelmann spruce/subalpine fir and mountain hemlock/subalpine fir would have been historically unimportant within these habitat type groups. Stand dynamics indicate that even if these old growth types developed within a frost pocket on an otherwise WRC or WH site, they would not have long persisted as old growth because they would have been supplanted by WRC or WH. This is verified in Green et al. that on the wetter WRC habitat types, SAF and ES "develop rot early and seldom reach ages of more than 190 years." Thus, the most important occurrence of this type of old growth would be in the cool/moist potential vegetation type group, of which 85 percent is within roadless or wilderness areas. Maintenance and protection are emphasized for the WRC and WH habitat types.
6	I, J, K	Fire suppression has resulted in conversion of many stands to subalpine fir. This old growth type only occurs within the cool/moist and cold potential vegetation type groups. Plan components for this old growth type focus on restoration and maintenance where this type occurs due to severe underrepresentation of whitebark pine (WBP) on the landscape and the supplanting of WBP by subalpine fir.
7	F, G, G1	These types occur in areas protected from summer drought, which indicates that this type of old growth often occurs in riparian areas, areas with a very deep ash cap and typically wet summer precipitation pattern. Observations on the Clearwater National Forest suggest that historically this old growth type may have developed underneath an overstory of Western white pine. Plan components are intended to promote this old growth type.
8	J	This old growth type occurs almost exclusively in the cool/moist potential vegetation type group. Since WWP, WL, and DF are associated with warm moist potential vegetation type groups they are not a significant component of this old growth type. Plan components, which favor maintenance of Engelmann spruce/subalpine fir and mountain hemlock/subalpine fir old growth types, are emphasized.
9	K	This type is almost completely within the cold potential vegetation type group and this type gained in prevalence at the expense of the whitebark pine type. Plan components are designed to promote and maintain whitebark pine within this old growth type due to the prevalence of Engelmann spruce/subalpine fir and mountain hemlock/subalpine fir types and the declining whitebark pine component.

Over the last century, a combination of fire suppression and selective logging practices has promoted the development and retention of old growth forest cover types dominated by intolerant species. Intolerant species such as grand fir are highly susceptible to effects of wildfire and are the preferred host species for a wide variety of forest pests and plant diseases (U.S. Department of Agriculture 2014e). Climate change models are predicting a shift toward a warmer drier climatic regime for the western United States which may increase moisture stress within forested ecosystems (Millar and Stephenson 2015). Projected changes in climatic regime are predicted to influence the frequency, intensity, and duration of disturbance events at all scales (Dale et al. 2001, Marlon et al. 2012), which is projected to challenge the resiliency of forest ecosystems to stresses. The primary stressor effecting forest ecosystems of the Nez Perce-Clearwater will be wildland fire. The Land Management Plan focuses proposed management actions on forest cover types which are fire adapted to promote a species composition more resilient to changes in fire regimes (Hessburg et al. 2015).

The estimated distribution of dominance types across the Nez Perce-Clearwater is considerably outside of the natural range of variation for dominance types based on the natural range of variation analysis generated from the SIMPPLLE model (see Appendix B). Both grand fir and Douglas fir comprise approximately 35 percent of all old growth cover types on the forest based on current Forest Inventory and Analysis data. Given that the composition of grand fir and Douglas fir is outside of the modeled natural range of variation for these species, any proposed old growth management strategy should incorporate thinking about forested vegetation as a whole, rather than simply restricting activities within all old growth (Bollenbacher et al. 2014). To do this, plan components are designed to deal with our underrepresented dominance types while allowing vegetation management within overrepresented dominance types.

Old growth cannot be modeled because the definition requires information, which is only available in plot or stand-level field inventory; such data is not mapped across the Nez Perce-Clearwater, nor can it be derived with SIMPPLLE. Therefore, there is no means to determine a quantifiable estimate of the natural range of variation for old growth amount, patch size, or distribution. The historic condition must be inferred from other attributes. Tree size class can be reliably estimated using Forest Inventory and Analysis and R1 VMap. Because old growth definitions are based in part on the presence of large trees, a correlation can be drawn with the presence of large-tree structure. The definition of large-tree structure was developed using the minimum large tree criteria found in old growth definitions as a reference point (Green et al. 1992, Milburn et al. 2019). These areas are the most likely to contain sufficient large trees to be old growth.

Estimates of the natural range of variation derived from the North Idaho analysis area suggest a mean of about 22 percent (range 19–24%) of the landscape had large-tree structure. Refer to Appendix B for a discussion of the natural range of variation analysis for large-tree structure in the North Idaho analysis area. On the Nez Perce-Clearwater, large-tree (15–19.9” diameter at breast height [DBH]) structure is not as ecologically meaningful as very large tree (20 +” DBH) structure for most cover types. Exceptions occur within the cold potential vegetation type group including lodgepole pine, Engelman spruce or subalpine fir, or mountain hemlock or subalpine fir old growth cover types. These types rarely achieve diameters over 15” DBH. Much of the land area of the Nez Perce-Clearwater is highly productive and capable of growing trees 15–19.9” DBH within 80 years. These trees are much younger than the minimum screening criteria age for most old growth forest types.

The natural range of variation analysis area revealed very few areas meeting the selection criteria of very large trees only. This indicates that very large trees are highly correlated with the presence of large trees. The preponderance of the area meeting large-tree structure and classified as “both,” which indicates that the area meets both large-tree and vary large-tree criteria. The mean of this “Both” natural range of variation analysis estimate is 24 percent (range 21–27%). The estimated mean for large-tree structure meeting the large-tree only classification is 22 percent (range 19–24%). Not all areas would have been old growth because factors, such as tree age and density, are not reflected. It is important to recognize that not all old growth forest types can grow into the large-tree structure classification of “Both” due to site limitations and species characteristics. Species such as lodgepole pine and mountain hemlock or subalpine fir old growth types generally to not achieve diameters larger than 20 inches. To estimate a possible proportion, the current relationship between large-tree structure and old growth is explored.

About 20 percent (range 15–25 percent) of the Forest Inventory and Analysis plots that currently have a large-tree structure classification of large-tree only on the Nez Perce-Clearwater classify as old growth. Approximately 55 percent (range 49–61 percent) of Forest Inventory and Analysis plots are currently classified as having both large-tree and very large tree structure and classified as old growth. See Appendix B, Table 12, and Table 13 for an illustration of the calculations for the natural range of variation estimate of old growth forest cover types.

If this proportion were applied to the natural range of variation estimates of large-tree and both large-tree and very large tree structures, then it can be postulated that a natural range of old growth forestwide may have been 4–5 percent for old growth types meeting the large-tree only (15–19.9” DBH) class. These old growth types are generally associated with the cold and cool moist broad potential vegetation types and include lodgepole pine, mountain hemlock or subalpine fir, and Engelmann spruce or subalpine fir old growth types. The natural range of variation estimate for old growth types meeting the "Both" large-tree structure classification has a mean between 12 and 15 percent. Based on this, it is reasonable to conclude that the current level of old growth on the Nez Perce-Clearwater (11 percent) is likely within historical levels of old growth. This conclusion is supported by the finding that the existing abundance of large-tree structures and size classes are appropriate to maintain old growth structure on the forest. Roughly one-half of all old growth forest types occur within the warm dry and warm moist broad potential vegetation type groups. These old growth types are typically capable of growing into the very large diameter class and are associated with the large-tree structure classification of "Both" exhibiting both large and very large tree structures. By contrast, the other one-half of all old growth forest types are associated with the cool moist and cold broad potential vegetation type groups. Old growth forest types occurring within these types generally do not grow into the very large diameter class and are typically associated with the large-tree structure class of large-tree only.

Fire exclusion, particularly in low elevation warm dry sites, has altered vegetation structure and composition. Increasing tree densities, canopy layers, and shade tolerant species have increased tree stress and vulnerability to insects, disease, and wildfire. Old growth that may have existed on non-National Forest System lands has probably been removed over the past 100 to 120 years through harvest or conversion of lands to other uses, such as agriculture. Spatial arrangement and patch size are important characteristics of old growth. The average size of remaining old growth patches on all land ownerships are likely less than they were in the more recent past, particularly in areas where large patches were fragmented by disturbance and land development patterns.

All old growth components in the action alternatives are applicable only in Management Area 3 because neither Management Area 1 nor Management Area 2 are suitable for timber production. In public interactions regarding old growth, the chief concern with old growth appears to be the extent to which timber harvest would impact the amount of old growth on the national forest. Management Area 1 includes lands that are designated, such as wilderness, and where timber harvest is not expected to occur. Management Area 2 is comprised primarily of Idaho Roadless Areas, with much of the land inaccessible for timber harvest and where timber harvest is allowable as a tool to reach desired conditions, but timber harvest may not be used for the sole purpose of producing timber as a commodity. Because of this, management of old growth is not expected to cause measurable variation in old growth in Management Area 1 and Management Area 2 between the action alternatives and the no action alternatives. Thus, the following discussion is focused on how lands within Management Area 3 would be managed and the effect that management would have on old growth.

The 2012 Planning Rule (U.S. Department of Agriculture 2012c) states that "The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account…System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change. (v) Wildland fire and opportunities to restore fire adapted ecosystems."

Snags and Snag Retention

Plan components for Alternatives W, X, Y, and the Preferred Alternative require a specified number of snags per 100 acres with a diameter of 15 inches diameter at breast height (DBH) or larger. Plan components for Alternative Z require a specified number of snags per 100 acres that are 10 inches DBH and greater. Existing conditions for all snag species combined are described at the forestwide scale for each management area and broad potential vegetation type group in the following tables. Estimates for existing snags per acre are derived from Forest Inventory and Analysis data located in the Northern Region Summary Database.

Table 55. Forestwide desired condition and estimate of snags per acre by potential vegetation type (PVT) group and size class. DBH = diameter at breast height.

Dominance Group	PVT Group	≥ 10' DBH Desired Minimum[1]	≥ 10' DBH Existing Condition	≥ 15" DBH Desired Minimum	≥ 15" DBH Existing Condition	≥ 20" DBH Desired Minimum	≥ 20" DBH Existing Condition
Lodgepole pine	All	1	23	1	5	1	1
All Other Species	Warm Dry	1	15	2	5	1	2
All Other Species	Warm Moist	1	16	3	9	3	4
All Other Species	Cool Moist	4	23	3	7	1	2
All Other Species	Cold	4	24	3	4	1	1

[1]Desired minimum snags per acres ≥10" DBH applies only to Alternative Z.

Source: R 1 Summary Database, R1_Hybrid_2015.

Table 56. Estimate of existing snags by Management Area (MA) and potential vegetation type group.

Broad Potential Vegetation Type	MA1 Snags >10"	MA1 Snags >15"	MA1 Snags >20"	MA2 Snags >10"	MA2 Snags >15"	MA2 Snags >20"	MA3 Snags >10"	MA3 Snags >15"	MA3 Snags >20"
Cold	21	4	1	29	5	1	27	1	0
Cool Moist	22	8	2	24	7	2	21	6	2
Warm Moist	11	6	3	15	5	2	17	5	2
Warm Dry	19	6	1	19	11	6	13	8	4

Source: R 1 Summary Database, R1_Hybrid_2015.

Desired conditions for snags are based on the publication Estimates of Snag Densities for Northern Idaho Forests in the Northern Region (Bollenbacher et al. 2009b). Forest Inventory and Analysis plot data analyzed at the management area scale reveal that all management areas and broad potential vegetation type groups currently meet the desired conditions for the minimum number of snags per acre except the cold potential vegetation type group in Management Area 3. This is likely due to the combination of species compositions, such as lodgepole pine and subalpine fir which rarely grow to the 20-inch diameter at breast height size, and slow growth rates associated with the cold potential vegetation type group.

Non forested vegetation

The desired condition is to maintain or increase the extent of non-forested plant communities, primarily grass, and riparian grasses or shrubs. Non-forested cover types will be promoted with future warm and dry climate. Although modeling is limited for these types, the subsequent section provides more description of the existing and desired conditions for non-forested potential vegetation groups, cover types, and specific species. It is desirable to limit the encroachment of coniferous tree species onto non-forested potential vegetation types.

Climate change

It is the conclusion of the authors of the Northern Rockies Adaptation Partnership climate change assessment (Keane et al. 2018), that "assessing vegetation change and vulnerabilities is currently more of an educated guess based on inconsistent and contradictory studies rather than a highly confident evaluation of comprehensive scientific investigation." Therefore, taking a relatively broad approach to management of the Nez Perce-Clearwater is prudent, focusing on strategies that increase the resilience of vegetation to allow adaptation to whatever changes the future may bring.

Climate is integrated into the SIMPPLLE model and a major driver of vegetation change and effects of the alternatives over time. There is a great deal of uncertainty surrounding climate change and its potential effect on vegetation conditions. However, best available science was used to guide both the integration of future climate conditions into the SIMPPLLE model, and the evaluation of the vegetation change related to direct and indirect effects of climate change. Whether it is invasive species (for example, white pine blister rust), drought, uncharacteristic wildfires, elevated native insects and disease levels, unusually high forest densities, or some other agent or combination of agents that serves to stress trees and forest ecosystems, recent research suggests that climate change will likely exacerbate those stressors and "stress complexes" will continue to manifest themselves (Halofsky, Peterson, et al. 2018a, b).

Environmental Consequences

Effects Common to All Alternatives

Warm and dry climate, vegetative succession, wildfire, and insect and disease activity would be the primary shapers of vegetation under all alternatives. While planned treatments could vary by alternative and alter the probability or effects of some drivers, these processes will remain dominant. Recent studies have indicated that climate and drought, coupled with natural disturbances, have the potential to impact ecosystems much more than human interventions but that management within that context may be important to reduce the potential for forest decline or ease transitions into new, more resilient states (Cohen et al. 2016, Millar and Stephenson 2015, Golladay et al. 2016, Halofsky, Peterson, et al. 2018a, b).

Under all alternatives, vegetation characteristics will influence, and be influenced by, spatial heterogeneity of landscapes and interrelated drivers such as wildfire, climate, and insects. Fire suppression will continue to alter successional processes, although vegetation treatments may mitigate this influence somewhat. Fire exclusion would favor shade-tolerant species, small to medium size classes, and denser forests. Conversely, large fires will influence vegetation in a variety of ways such as reducing density, returning sites to an early successional stage, promoting large tree growth, or favoring fire tolerant species depending on the severity of fire. Warmer, drier climates will influence species distributions and successional processes in complex and uncertain ways. For example, species better adapted to warm, dry conditions such as Ponderosa pine may gain a competitive advantage. Drought may inhibit tree growth in some areas.

There has been a general trend of decreasing patch size and increased landscape fragmentation compared to the historic condition within the Nez Perce-Clearwater plan area. Spatial heterogeneity will play particularly important roles for the production of wildlife habitat, with thresholds in habitat quality, habitat connectivity, or patch size apparent for many species (Turner et al. 2013).

The terrestrial vegetation indicators modeled into the future vary by alternative; however, this variance is very subtle at the broad scale. This is because all alternatives were modeled and projected with a similar climate regime and similar levels of natural disturbance. Natural disturbance regimes are the primary influences on vegetation across the vast majority of the Nez Perce-Clearwater, due to the extent of areas where little active management occurs (such as wilderness, recommended wilderness, inventoried roadless areas, primitive recreation settings, and the like). Vegetation management actions such as timber harvest projected by the PRISM model were applied in the SIMPPLLE model. While these treatments undoubtedly result in modified vegetation characteristics where they occur, the overall level of treatment is not substantially different across alternatives and the impacts of treatments are generally outweighed by other influences when the key indicators are summarized at the broad scale.

The following sections display expected trends for terrestrial vegetation indicators for the 50-year modeling period. Thirty simulations are run to capture a range of variation around the estimated conditions. Tables and figures in the following sections indicate the mean estimate of each condition depicted across 30 model runs, along with the existing condition and desired condition ranges. In some cases, the existing condition (based on Forest Inventory and Analysis plots) is not consistent with the starting condition of SIMPPLLE (based on R1-VMap), due to the disparity in data sources as described in Appendix B. The expected trend is more crucial to the analysis than the overall endpoint. See Appendix B for additional charts and modeling results.

Non-forested vegetation, forest savannas, and xeric ecotones

At the forestwide scale, non-forested cover type acres are predicted to increase from decades 1 to 3 and then slightly decrease but remain above the existing condition. The starting condition for SIMPPLLE is below the actual condition estimated with Forest Inventory and Analysis plots, and the expected trend would likely result in conditions within but trending toward the lower bound of the desired range for most future decades at the forestwide scale, as well as in in the warm dry and cold broad potential vegetation types. Conditions would be at the mid to upper end of the desired range in the warm moist and cool moist broad potential vegetation types.

Non-forested cover types are not expected to decrease in any management area. Potential decreases in non-forest cover types may occur as both a result of desirable reforestation of disturbed areas, as well as the loss of historic grass communities to conifer encroachment. In no management area does the model predict that the abundance of non-forested cover types increases substantially.

At the forestwide broad scale, the expected effects of future warm dry climate and drought include the maintenance or expansion of non-forested communities (particularly xeric types) as sites become too dry or frequently disturbed to support forest cover. At the local scale, modeling indicates that such a trend would not be substantially realized in the next 50 years, although the results are complicated by our inability to tease apart the relationship between the reforestation of disturbed forested sites, versus the expansion or loss of true non-forested plant communities. Further, other factors such as fire suppression play a role.

Xeric ecotones are among the most sensitive ecosystems to climate change (Tomback et al. 2011). Lower treeline woodlands are often thought to be “invading” desirable grass types due to fire suppression and grazing; however, ecotones also naturally move along elevational gradients based on the dynamics of vegetation, climate, and fire (Tomback et al. 2011). Drivers of this trend are primarily fire exclusion which would have killed encroaching trees when they were of a small size, possibly exacerbated by grazing which reduced fine fuel loads and further influenced fire exclusion. Threats to the xeric ecotone include loss of tree species to disease, insects, and fire as well as shifts in warming and drying patterns because of climate change.

Vegetation Composition

Vegetation composition is expected to change through time as depicted in the following sections for dominance types within broad potential vegetation type groups and non-forested cover types. Appendix B contains tables and figures showing the model results. For all broad potential vegetation type groups, the expected trends are similar across all alternatives and negligible when viewed at the forestwide scale.

The expected trend of some dominance types would move towards the desired condition, including increases in tree species presence and cover types associated with Ponderosa pine, Western white pine, and Western larch and decreases in tree species' presence and cover types associated with grand fir. Conversely, other results indicate a trend away from the desired condition, including a static condition in the extent and dominance of western redcedar and increases in lodgepole pine. Several key species, including aspen and whitebark pine, are projected to increase above current levels. The forestwide trends and conclusions do not apply equally to every broad potential vegetation type or every management area.

Indirect effects common across all Management Areas

Forest Density

Forest density class and vertical structure is expected to change through time as depicted in the following sections and figures. Appendix B contains charts of model outputs. For all types, the expected trends are similar across all alternatives and negligible when viewed at the forestwide scale.

At the forestwide scale, the expected trend of density class distribution would generally move towards the natural range of variation, including increases in the low to medium class and decreases in the high class in response to increased frequency of disturbance at landscape scales. The trends are expected to be positive relative to forest resilience because, in general, the denser the forest the greater the likelihood that fuel characteristics could support a fast-moving intense crown fire due to greater fuel quantities and the vertical and horizontal continuity of fuels. Lower forest densities are desired near communities or other values at risk to fire. In addition, as the density increases, a deficit of soil moisture may develop and trees lose their ability to withstand attacks by insects, pathogens, and parasites (Safranyik et al. 1974). Lower densities also support enhanced individual tree growth, and therefore the expected shifts likely contribute to the increases in the large tree size classes and concentrations described above. The forestwide trends and conclusions do not apply to every potential vegetation type or every management area; these variances are described in the sections below and in Appendix B.

For the purposes of density class, areas are considered non-forested or do not have a density class assigned when there is less than 10 percent canopy cover of trees present. Such areas are considered in the early seral stage of development. This early seral stage may persist from one to several decades in Management Areas 1 and 2 in the absence of artificial regeneration practices. There is overlap in the occurrence of forest savannas in areas considered non-forested for density class. Only forested density classes are discussed in this section.

Low to Medium Density: Forestwide, the SIMPPLLE model projects that the low to medium density class (10–39.9% canopy cover) would decrease over the first two decades and begin to trend upward by the end of the projection period (5 decades). This trend is consistent with all alternatives and is on the lower bound of the desired condition range. The decrease in this condition may be due to natural disturbances, which increase the percent of area in the early seral stage. Forest succession moves these areas from early seral stage into areas of dense regeneration. In some cases, these areas may also encompass sites that were previously non-forested where forest cover has become established.

The trend for all broad potential vegetation types is a decrease in the number of acres exhibiting the low to medium density class, with the most dramatic decrease occurring in the warm dry potential vegetation type group. The decrease is more subtle in the warm and cool moist broad potential vegetation types as the forests found there tend to naturally grow at higher densities (such as grand fir and lodgepole pine), and in fact may exceed the desired condition range for one to several decades until natural disturbance events reduce densities.

Medium to High Density: Forestwide, the medium to high-density class (40%+ canopy cover) increases over time. The starting condition for SIMPPLLE is particularly far removed from the actual existing condition measured on Forest Inventory and Analysis plots. However, the trend of increase would indicate that this class moves above the desired range by the end of the modeling period. The increase in the high-density class likely corresponds to the decrease in the low to medium class across all broad potential vegetation types.

This class increases on cool moist types, which over time achieves the desired range; most forest types on these sites would naturally grow in this density condition at least in the later stages of stand development. This condition fluctuates on the cold broad potential vegetation type, remaining within the desired range.

All broad potential vegetation types include similar increases of this density class, along with existing conditions that are not well-represented by the SIMPPLLE starting condition. The trends in the warm dry and cool moist types would achieve and possibly move above the desired ranges by the end of the modeling period, whereas the increase would still be trending toward desired conditions in the cold type. Drought conditions and expected future disturbances are likely the main drivers for future reductions in the medium to high density class. The reductions of the high-density class could result in higher forest resiliency to disturbances in many cases, and result in promoting large trees and shade-intolerant species. Conversely, in some cases shifts to lower densities could equate to the loss of habitats of interest (such as dense spruce and fir for lynx habitat).

Landscape resiliency

The following indicators of key ecosystem characteristics for landscape resiliency each effect and are affected by application of each alternative. Taken together, vegetation pattern, vegetation condition class, and insect and disease hazard rating are indicators of departure from desired conditions.

Vegetation Pattern

The size of early successional forest openings is expected to change over time. The effects analysis was conducted allowing patches to be considered openings for as long as they remained in the seedling or sapling size class condition. Rates of forest succession vary between broad potential vegetation types as well as between habitat types within each group. Patches may persist in the seedling or sapling stage from one to several decades. The two indicators used are the average patch size, which is a simple arithmetic mean and the area weighted mean, as defined in the affected environment section. Appendix B contains charts forestwide and for each broad potential vegetation type for each alternative, compared to the desired ranges. The expected trends are similar across all alternatives and negligible when viewed at the forestwide scale; therefore, the outputs for the alternatives are averaged in the figures below.

Figure 13 provides the trend over 5 decades of average patch size and Figure 14 shows area weighted mean patch size. The natural range of variation for patch size is illustrated for comparison of trends. Forestwide, the average size of early successional forest patches is projected to increase through decade 5. This trend moves into the bottom quartile of the natural range of variation and remains within the natural range of variation through decade 5. The average patch size increases for Management Area 1 at a faster rate than for the other management areas but remains below the forestwide average.

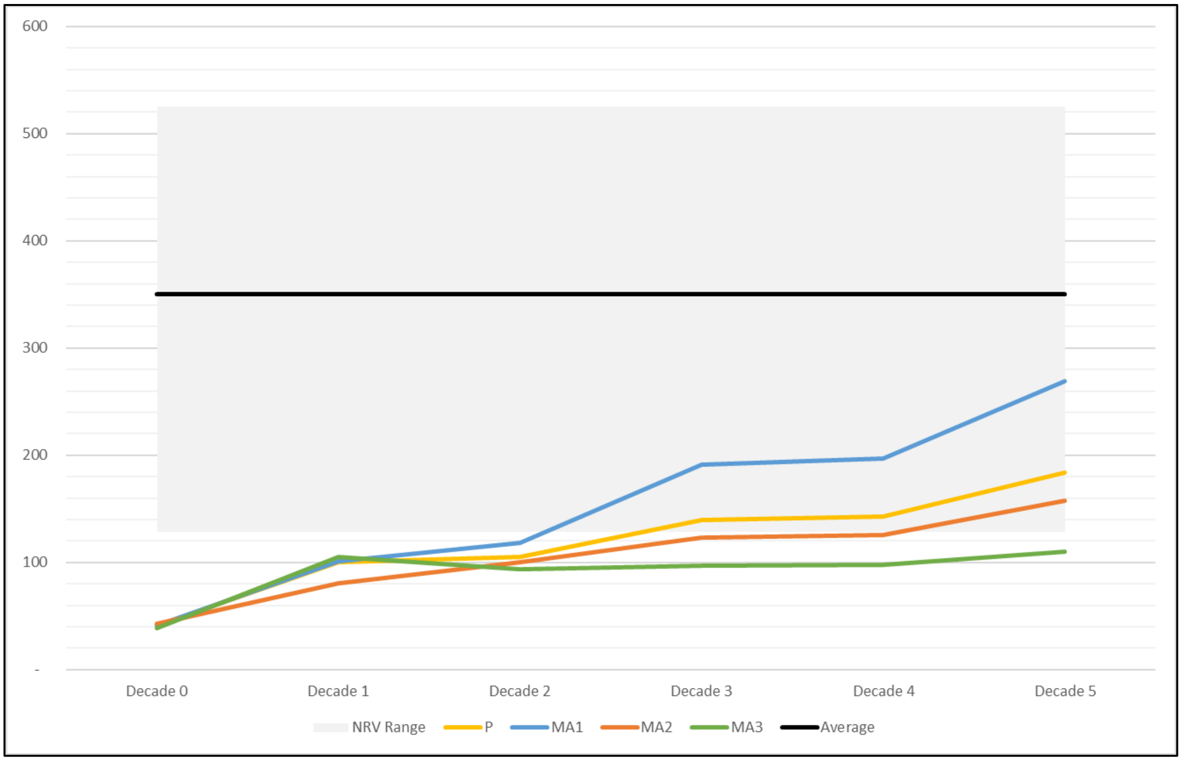


Figure 13. Average early successional forest patch size (in acres, average of alternatives) by decade.

NRV=Natural range of variation. P=Preferred Alternative. MA=Management Area. Average=Forest-wide average.
Data Source: SIMPPLLE model.

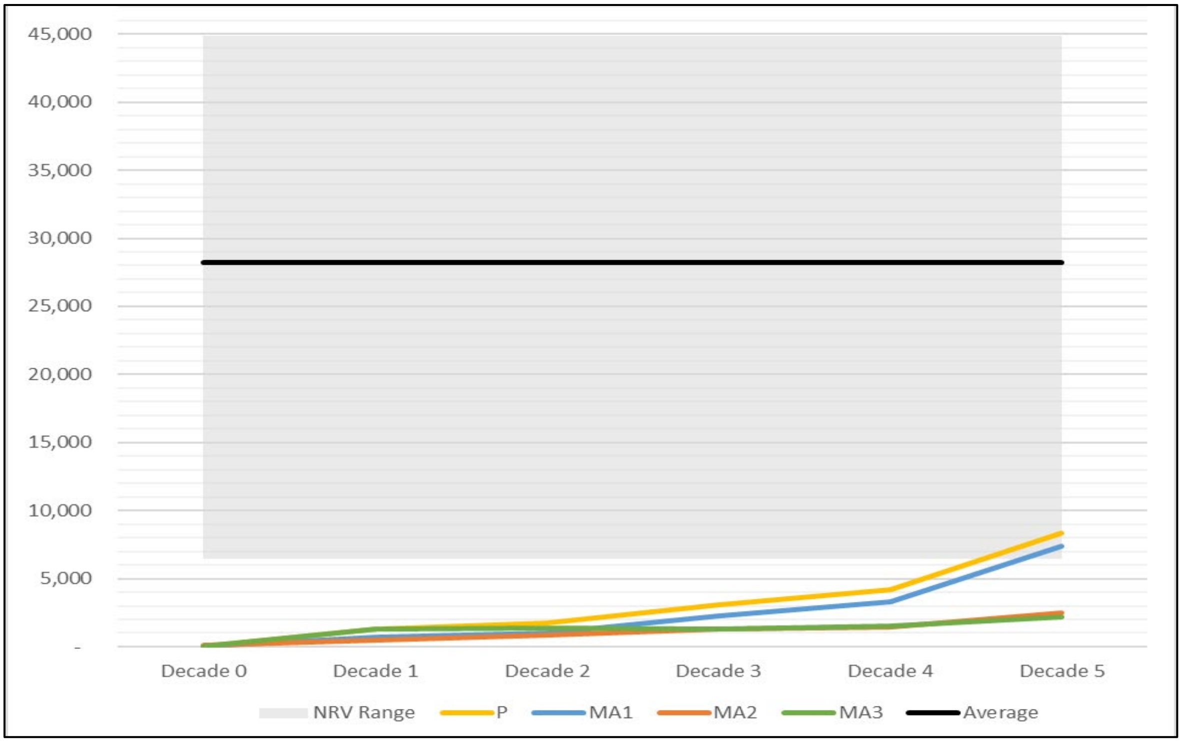


Figure 14. Area weighted mean for early successional forest patch size (in acres, average of alternatives) by decade.

NRV=Natural range of variation. P=Preferred Alternative. MA=Management Area. Average=Forest-wide average.
Data Source: SIMPPLLE model.

The area weighted mean patch size generally increases forestwide through decade 5 and for all management areas. The forestwide trend increases rapidly after decade 2 and approaches the bottom quartile of the natural range of variation by decade 5. Area weighted mean patch size increases for all management areas. The trend line for Management Area 1 increases at a faster rate than trends for Management Areas 2 and 3 but remains below the natural range of variation average. Area weighted mean patch size increases for Management Areas 2 and 3 but generally remains below the natural range of variation range. Trends are similar for all management areas but differ in magnitude from Management Area 1. The trend for the Preferred Alternative is like the trend for Management Area 1.

In the short term, the increase in area weighted mean patch size is the result of the combined effects of increased vegetation management, forest restoration, and wildfire events. The magnitude of predicted change within Management Area 3 reflects continued fire suppression within the roaded front. Increases in the predicted size of large fires are reflected by the trend line for Management Area 1.

Increases in the harvest schedules associated with the action alternatives indicate a slower increase in the trend toward the natural range of variation average for Management Area 3. The existing condition falls at the low end of natural range of variation for all management areas. Through the fifth decade, projections of area weighted mean patch size generally remain below the natural range of variation for all management areas.

Fire would continue to be the primary event that creates early successional forest openings, particularly the large sized openings. The pattern of openings intermixed with mid and late successional forest would be ever-changing over time and space. The primary cause of increasing patch size of early successional forests is likely the result of changing climate and land allocation decisions. Timber harvest and prescribed burning also create early successional forest patches, but at the forestwide scale the extent of these activities would be minor and not likely to affect mean patch sizes to a large degree. The increase in patch size is likely due to a history of fire suppression within the fire regimes typified by the potential vegetation type groups. A large proportion of the forested acres have missed several fire return intervals and are becoming increasingly susceptible to high severity fire affects.

The estimated patch sizes through time trends toward the natural range of variation for all broad potential vegetation types. Conversely, the patch size increases estimated across all broad potential vegetation types approaches the lower bound of the natural range of variation for Management Area 1. Seral species dominated forests, which are desirable forestwide, are adapted to reforesting large openings following disturbances; a coarser grained mosaic of patch sizes could provide for the maintenance of shade intolerant species such as Western white pine and Western larch in suitable areas.

Please refer to the Effects that Vary by Alternative section, Effects from plan components associated with timber management, for further discussion on Land Management Plan components that could influence the patch size of early successional forests.

Insect and Disease

Insect and disease hazard ratings and occurrence are expected to change over time in response to shifts in species composition, stand density, and size class distributions. The effects analysis performed with the SIMPPLLE model estimates a hazard rating for each insect and disease vector of interest based on species composition and size class over time. Changes in species composition, stand density, and size class due to management activities as well as natural disturbance events are modeled under a warmer and drier climatic regime and include other abiotic considerations such as elevation and slope position.

Effects of proposed forest management activities and natural disturbance events are consistent between alternatives. There is no defined desirable range for insect and disease occurrence at the forestwide scale. Figure 15 illustrates the expected trends in insect and disease occurrence over the 5-decade comparative period.

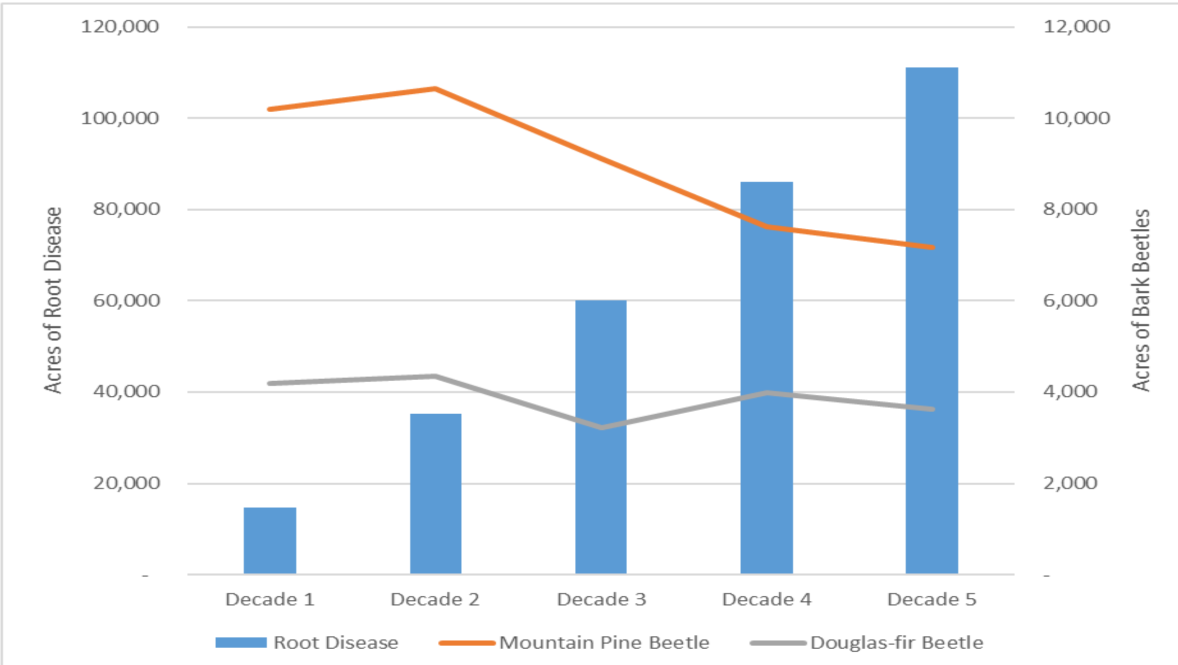


Figure 15. Insect and disease occurrence forestwide (average of alternatives) in acres of root disease (left axis, bars) and acres of bark beetles (right axis, lines).

Data Source: SIMPPLLE model

At the forestwide scale, root disease increases in each decade across all alternatives and broad potential vegetation type groups. The increase in root disease is correlated with the continued dominance of host species (Douglas fir and grand fir) as well as the continued expansion of existing root disease centers. As grand fir and Douglas fir composition rebounds following disturbances, so does the occurrence of root disease. Wildland fire would be expected to maintain levels of root disease at the decade 5 level.

Mountain pine beetle occurrence is a combination of host specific beetles effecting lodgepole pine, ponderosa pine, and whitebark pine. Beetle attacks are highly correlated with stand density and size class. In the short term through decade 3, there is a reduction in both lodgepole pine stand densities and size class which reduces the occurrence of mountain pine beetle. As lodgepole pine stands increase in size through decade 5, mountain pine beetle occurrence increases until disturbance once again reduces stand densities. Ponderosa pine follows a similar pattern and again is closely tied to stand density. Whitebark pine populations are increasingly affected by mountain pine beetle because of climate change effects and expanding whitebark pine populations.

Douglas fir beetle follows a pattern of decline over the 5-decade projection period. There is a significant reduction in Douglas fir beetle in the short term through decade 4, followed by a static trend through decades 4 and 5. The reduction in Douglas fir beetle is influenced by reductions in host species composition, stand densities, and size class.

Projected Wildfire

Wildfire frequency and severity is expected to shift toward the natural range of variation associated with each fire regime. This shift will influence ecosystem processes on the forest. A shift towards warmer-drier climatic cycle will produce conditions conducive to fire starts and wildfire spread which will influence species composition, stand densities, and size class distributions.

Trends for projected wildfire are consistent across all alternatives. At the forestwide scale, the percentage of seral species composition including Western white pine, Western larch, Ponderosa pine, and whitebark pine are increasing. Increases in seral species abundance are due to both improved conditions for establishment of seral species following fire disturbance and the Land Management Plan objectives of increasing the planting of seral species following wildland fire. Seral species composition, including aspen, is expected to increase approximately 10–20 percent over current levels in the 20-year short term comparative period and between 30 and 40 percent over the 50-year long-term comparative period. Western white pine is projected to increase from 4 percent to 8 percent of total species composition. Grand fir is projected to decline by 40–50 percent for the same 50-year comparative period.

Canopy structure is expected to shift toward more closed canopies (Figure 16). This trend is largely due to increases in early seral conditions which often composed of high seedling densities. These young forest stands develop into closed canopy stand until natural succession processes and disturbances begin to thin the canopy. At the forestwide scale, closed canopy conditions are projected to decrease slightly from an average of 54 percent to an average of 43 percent. During the same projection period, open canopy structures are modeled to trend from 42 percent downward to 29 percent. Early seral canopy openings are projected to increase from 4 percent to 28 percent. These changes in seral species composition and canopy structure are predicted to trend vegetation toward more resilient conditions functioning within the fire regimes of the forest.

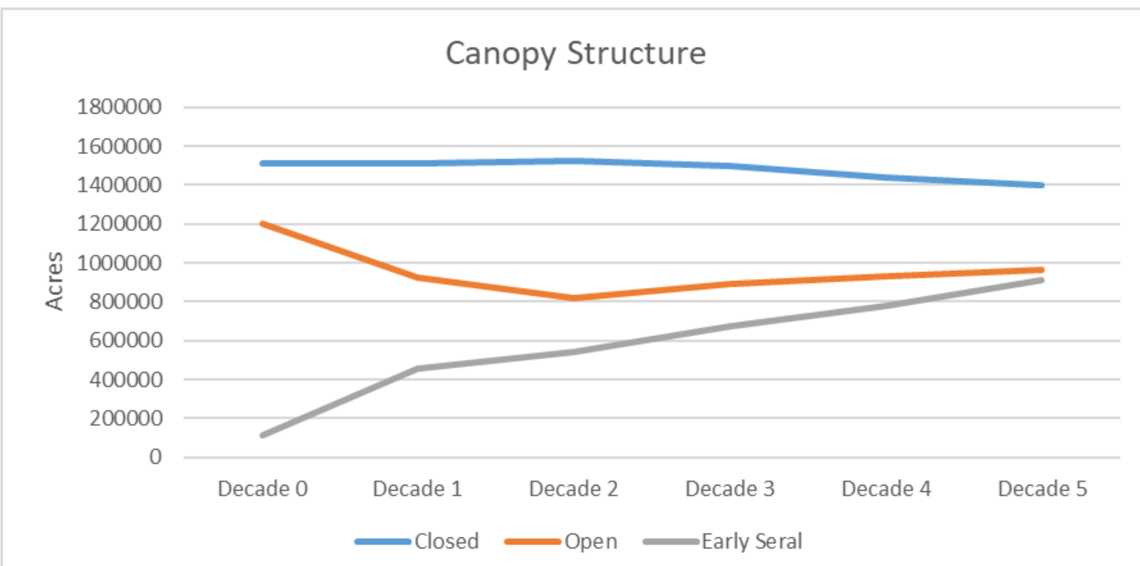


Figure 16. Forestwide canopy structure.

Data Source: SIMPPLLE model

Rare/Unique Habitat Elements

Under the No Action Alternative, the presence of aspen is not likely to change from the existing conditions. Existing disturbance agents and patterns may promote aspen regeneration in areas already occupied by aspen. Forest succession and lack of disturbance will likely continue to promote dominance of climax conifer species. Analysis of data derived from the SIMPPLLE model do not indicate an increase in either distribution or abundance of aspen. The primary driver for increases in aspen presence is stand replacing wildland fire within the cool moist and warm moist potential vegetation type groups.

Old Growth

The 1987 Clearwater Forest Plan specifies maintaining 10 percent of the national forest in old growth habitat, with 5 percent of each old growth analysis unit maintained as old growth. Additionally, former Forest Supervisor, Tom Reilly, issued direction prohibiting regeneration harvest in old growth and forest stands within 20 years of meeting old growth criteria until the national forest met its old growth goals.

The expectation at that time was that by following this strategy, the Clearwater Forest would achieve the 10 percent criteria and exceed it by the year 2012 as forest succession occurred. The Northern Region Summary Database 2015 Hybrid dataset indicates that the national forest has met the old growth standard at the 90 percent confidence level.

The report that showed that the Clearwater Forest did not meet the 10 percent criteria was taken from data collected between 1998 and 2002 (Bush et al. 2007). Bush et al. (2007) showed that with a 90 percent confidence interval, the estimated amount of old growth on the Clearwater Forest was 9.4 percent, the lower bound was 7.3 percent, and the upper bound was 11.8 percent. In this same report, they also state that all acres effected by harvest and fire that occurred between their estimates and the time the report was authored were considered to not meet old growth criteria.

The most current data available for analysis is referred to as the Hybrid 15 dataset and the Forest Inventory and Analysis data used for this dataset was collected between 2011 and 2017 (Bush et al. 2006). From the Hybrid 15 dataset, old growth estimates for the Nez Perce-Clearwater are calculated with a 90 percent confidence interval. Plots which experienced wildfire between 2015 and 2017 were re-measured and updated in the database. The current estimate of old growth forest structure is 10.55 percent, with a lower bound of 9.03 percent and an upper bound of 12.11 percent.

A best-case analysis indicates that the current strategy has kept old growth amounts near current levels and has done little to increase old growth. A worst-case analysis indicates that the amount of old growth on the Nez Perce-Clearwater may significantly decrease with an anticipated increase in stand replacing fire events. Since levels have remained about static with the current policy in place, it is reasonable to conclude that this policy of management has not had the desired effect and there may be some other reason why the amount of old growth has not increased as intended.

Forest Inventory and Analysis data show that about 84 percent of the Nez Perce-Clearwater is dominated by grand fir and Douglas fir, which are two of the tree species most susceptible to the most damaging root diseases on the national forests. Root disease modeling indicates that 17.3 percent of the Clearwater National Forest and 11.8 percent of the Nez Perce National Forest have moderate to high severity root disease (Lockman and Kearns 2016). This same report indicates a 25.8 percent and 25.5 percent of low severity root disease for the Clearwater National Forest and Nez Perce National Forest, respectively. When left untreated, root disease patches often develop into long-term brushfields (Hagle 2004).

Current management of old growth on the Nez Perce-Clearwater has been to avoid actions that would modify stands classified as old growth. According to Green et al. (2011), “Many of the oldest stands of old growth are dominated by seral tree species that are maintained as dominants and protected from crown fire by repeated underburns that reduce ladder fuels and competition from more tolerant tree species…the bulk of presettlement upland old growth in the northern Rockies was in the lower elevation, ground-fire maintained Ponderosa pine/Western larch/Douglas fir types." If the No Action Alternative is selected, it is likely that stands classified as old growth would not be managed to maintain them.

If the No Action Alternative is selected, short-term amounts of old growth are likely to stay constant as evidenced by the modest increase between numbers from 2006 and present. Longer term, given the prevalence of root disease-caused mortality and the lack of disturbance in stands where disturbance is necessary for maintenance, it is likely that the amount of old growth on the Nez Perce-Clearwater will decrease. As described above, root disease is expected to cause mortality in stands dominated by Douglas fir and grand fir, and these stands are not expected to persist as old growth. Additionally, the absence of disturbance favors these species, and they will eventually dominate old growth sites and supplant long-lived early seral species. In this way, a lack of management of old growth stands could cause the amount of old growth on the Nez Perce-Clearwater to remain at the same level as current or decrease.

As evidenced in the introduction to this section, the 2012 Planning Rule places a strong emphasis on natural range of variation, natural patterns and process, and integration among resources, rather than promoting a paradigm of preserving systems in a static condition. The direction from the existing Forest Plans focuses on preservation of an existing condition of old growth and does not deal with the need for restoring the ecology of the systems.

Action Alternatives – Indirect Effects

The action alternatives contain one standard (MA3-STD-FOR-01), two desired conditions (MA2-DC-FOR-10, MA3-DC-FOR-10), and eight guidelines (MA2 & MA3-GDL-FOR-01, MA2 & MA3-GDL-FOR-02, MA2 & MA3-GDL-FOR-03, and MA2 & MA3-GDL-FOR-04) that relate to old growth management. These plan components support desired conditions expressed in MA2 and MA3-DC-FOR-10 to support retention of resilient old growth cover types across all broad potential vegetation types.

If any of the action alternatives are selected, the combination of standard MA3-STD-FOR-01 and associated desired conditions guidelines would be expected to maintain the abundance of Ponderosa pine, Western larch, Western white pine, Pacific yew, Western redcedar, Western hemlock, and whitebark pine old growth cover types. These standard and associated guidelines would permit management of these old growth cover types consistent with historic disturbance processes that maintained these old growth cover types. For instance, some old growth cover types were maintained by low severity fire and were protected from stand replacing disturbance by these low severity disturbances (Green et al. 2011). These components would be expected to encourage disturbance that maintains these old growth cover types, and as a result, the amounts of the listed old growth cover types would be maintained.

Old Growth Conclusions

The action alternatives are consistent with the 2012 Planning Rule emphasis on restoration of pattern and process in that they promote disturbance for maintenance of old growth as well as promoting restoration of the more resilient old growth cover types that were historically prevalent.

The No Action Alternative seeks preservation of the existing old growth stands, but analysis shows that preservation may be infeasible, even with complete protection. The No Action Alternative seeks to exclude disturbance from old growth, whereas the action alternatives seek to use disturbance in a manner consistent with principles of disturbance ecology.

The action alternatives promote creation of resilient old growth by emphasizing creation of the types of old growth that were ecologically sustainable, longest-lived, and most prevalent (MA3-STD-FOR-01, MA3-GDL-FOR-01).

For the reasons listed above, the action alternatives best meet the 2012 Planning Rule and are most likely to result in resilient old growth.

Effects that Differ by Alternative

Dominance types

The following section describes dominance types resulting from modeled silviculture treatments and natural disturbances for each alternative. Modelling results are displayed for each management area and potential vegetation type group. The extent to which desired conditions for dominance type is achieved is a measure of the desirability of the alternative for vegetation management.

Dominance type is an important indicator of forest structure, forest resiliency, and disturbance regime. Dominance type influences the ability to use prescribed fire as well as wildfire effects. Snag and downed woody debris recruitment are affected by dominance type. Snags resulting from seral species tend to remain standing for longer periods than snags resulting from climax species. Long-term sustainability of forested ecosystems requires a species mix which is resilient to disturbance.

The following tables illustrate the extent to which forest vegetation trends toward desired dominance types in each alternative. The tables are projections of 20-year short term and 50-year long term comparative periods specific to each alternative from the present and show the effect each alternative has on dominance type by management area. Percent species compositions do not all sum to 100 percent due to exclusion of minor species components and non-forested acres, as well as differences in acres suitable for timber production specific to each alternative.

Table 57. The 20-year and 50-year projections for Cold potential vegetation type dominance types within Management Area 1 by alternative.

Dominance Type	LP	AF/ES	WBP	DF/WL	MH	Seral Stage grass/shrub
Desired Range %	30–40%	3–10%	35–50%	0–5%	2–5%	5–15%
No Action % 20 Yr. Projection	6	40	5	3	2	44
No Action % 50 Yr. Projection	27	41	8	9	2	19
Alt W % 20 Yr. Projection	6	40	5	3	2	44
Alt W % 50 Yr. Projection	27	41	8	9	2	19
Alt X % 20 Yr. Projection	7	40	5	2	2	44
Alt X % 50 Yr. Projection	27	41	8	9	2	19
Alt Y % 20 Yr. Projection	6	40	5	3	2	44
Alt Y % 50 Yr. Projection	27	41	8	9	2	19
Alt Z % 20 Yr. Projection	7	40	5	2	2	44
Alt Z % 50 Yr. Projection	27	41	8	9	2	19
Preferred Alt % 20 Yr. Projection	9	41	5	3	2	40
Preferred Alt % 50 Yr. Projection	27	41	8	9	2	19

Table 58. 20-year and 50-year projections for Cool Moist potential vegetation type dominance types within Management Area 1 by alternative.

Dominance Type	LP	AF/ES	WBP	DF/WL	MH	Seral Stage grass or shrub	Dominance Type	LP	AF/ES
Desired Range %	2–4%	20–30%	25–40%	2–10%	1–2%	5–10%	5–10%	1–2%	5–25%
No Action % 20 Yr. Projection	7	5	39	0	7	0	0	1	40
No Action % 50 Yr. Projection	13	18	34	6	6	10	4	2	10
Alt W % 20 Yr. Projection	5	7	39	0	7	0	0	1	40
Alt W % 50 Yr. Projection	13	18	34	6	6	10	4	2	10
Alt X % 20 Yr. Projection	6	6	39	0	7	0	0	1	40
Alt X % 50 Yr. Projection	13	18	34	6	4	10	4	2	10
Alt Y % 20 Yr. Projection	6	6	39	0	7	0	0	1	40
Alt Y % 50 Yr. Projection	13	18	34	4	6	10	4	2	10
Alt Z % 20 Yr. Projection	5	7	39	0	7	0	0	1	40
Alt Z % 50 Yr. Projection	13	18	34	6	6	10	4	2	10

Dominance Type	LP	AF/ES	WBP	DF/WL	MH	Seral Stage grass or shrub	Dominance Type	LP	AF/ES
Preferred Alt % 20 Yr. Projection	7	9	39	1	7	2	1	1	40
Preferred Alt % 50 Yr. Projection	13	18	34	4	6	10	4	2	10

Table 59. The 20-year and 50-year projections for Warm Dry potential vegetation type dominance types within Management Area 1 by alternative.

Dominance Type	PP	DF	LP	WL	GF	DF/WL	Seral Stage grass/shrub
Desired Range %	50–60%	15–20%	5–12%	1–2%	5–15%	0–2%	2–10%
No Action % 20 Yr. Projection	17	22	7	0.1	14	1	39
No Action % 50 Yr. Projection	20	51	10	0.2	3	2	20
Alt W % 20 Yr. Projection	13	23	6	0.1	19	1	39
Alt W % 50 Yr. Projection	20	51	10	0.2	3	2	20
Alt X % 20 Yr. Projection	11	24	6	0.1	19	1	39
Alt X % 50 Yr. Projection	20	51	10	0.2	3	2	20
Alt Y % 20 Yr. Projection	13	24	7	0.1	17	1	39
Alt Y % 50 Yr. Projection	20	51	10	0.2	3	2	20
Alt Z % 20 Yr. Projection	20	41	8	0.1	31	1	0
Alt Z % 50 Yr. Projection	25	65	11	0.2	4	2	0
Preferred Alt % 20 Yr. Projection	11	25	6	0.1	19	1	39
Preferred Alt % 50 Yr. Projection	20	51	9	0.2	3	2	20

Table 60. The 20-year and 50-year projections for Warm Moist potential vegetation type dominance types within Management Area 1 by alternative.

Dominance Type	PP	DF	LP	WL	GF/WRC	WP	AF/ES	DF/WL	GF	Seral Stage grass/shrub
Desired Range %	5–20%	5–10%	1–2%	5–10%	15–25%	10–20%	0–2%	5–10%	10–20%	5–20%
No Action % 20 Yr. Projection	3	17	7	6	17	4	10	1	32	24

Dominance Type	PP	DF	LP	WL	GF/WRC	WP	AF/ES	DF/WL	GF	Seral Stage grass/shrub
No Action % 50 Yr. Projection	4	26	8	8	13	4	6	2	24	13
Alt W % 20 Yr. Projection	3	19	6	5	17	4	10	1	31	24
Alt W % 50 Yr. Projection	4	16	8	9	13	4	6	2	24	13
Alt X % 20 Yr. Projection	3	19	8	5	17	4	9	1	30	24
Alt X % 50 Yr. Projection	4	26	7	9	13	4	6	2	24	13
Alt Y % 20 Yr. Projection	3	18	6	5	17	4	11	1	31	24
Alt Y % 50 Yr. Projection	4	25	8	9	13	4	6	2	24	13
Alt Z % 20 Yr. Projection	3	20	7	5	17	4	9	1	30	24
Alt Z % 50 Yr. Projection	4	26	7	9	13	4	6	2	24	13
Preferred Alt % 20 Yr. Projection	3	20	8	5	17	4	9	1	29	24
Preferred Alt % 50 Yr. Projection	4	26	7	10	13	4	6	2	24	13

Comparison of effects across alternatives for Management Area 1 indicates similar results. Given that changes in vegetation composition derive only from natural disturbance events, the rate of change as indicated by each alternative is slow. Within the cold potential vegetation type groups, the subalpine fir and Engelmann spruce dominance type continues to dominate species composition beyond the desirable range. Increases in the grass or shrub seral stage in the short term are the result of wildland fire events. These disturbed areas are dominated by subalpine fir and Engelmann spruce dominance types in the long term. This is in part due to a lack of whitebark pine seed sources. This suggests that the modeled natural disturbance levels are sufficient to restore this high elevation ecosystem, but declines in whitebark pine populations continue to promote spruce and fir dominance types. Within the cool moist potential vegetation type modest gains are made in whitebark pine, Western larch, and Western white pine composition which reduces the percentage of subalpine fir and Engelmann spruce dominance type. Within the warm dry and warm moist potential vegetation type groups, the grand fir components decline toward the desired range and only modest gains in seral species composition is indicated. Douglas fir continues to dominate species composition in part due to available seed sources. As with the higher elevation vegetation types, this suggest a sufficient disturbance level to restore the warm dry and warm moist potential vegetation type groups to the desired ranges for species composition, but seral seed sources are lacking to promote Western white pine, Western larch, and Ponderosa pine dominance.

Management Area 2 is managed under the protocols identified in the Idaho Roadless Rule. Active management of these lands is limited in both scope and scale. Only 1 percent of these lands are subject to mechanical vegetation management per year. Wildland fire is the primary management tool used to achieve desired conditions. The effects of the limited vegetation management approach are illustrated in the following tables.

Table 61. The 20-year and 50-year projections for Cold potential vegetation type dominance types within Management Area 2 by alternative.

Dominance Type	LP	AF/ES	WBP	DF/WL	MH	Seral Stage grass/shrub
Desired Range %	30–35%	5–15%	35–50%	0–5%	0–5%	5–15%
No Action %						
20 Yr. Projection	32	17	2	7	7	36
50 Yr. Projection	40	21	9	10	5	19
Alt W %						
20 Yr. Projection	34	18	2	4	7	37
50 Yr. Projection	40	21	9	10	5	19
Alt X %						
20 Yr. Projection	32	16	2	7	8	36
50 Yr. Projection	40	21	9	10	5	19
Alt Y %						
20 Yr. Projection	25	25	2	5	8	36
50 Yr. Projection	28	25	8	10	6	19
Alt Z %						
20 Yr. Projection	22	28	2	4	8	37
50 Yr. Projection	29	29	8	11	6	23
Preferred Alt %						
20 Yr. Projection	25	28	2	5	7	35
50 Yr. Projection	37	25	8	10	5	18

Table 62. The 20-year and 50-year projections for Cool Moist potential vegetation type dominance types within Management Area 2 by alternative.

Dominance Type	DF	LP	AF/ES	WBP	GF/MH	WL	WP	DF/WL	Seral Stage grass/shrub
Desired Range %	2–4%	20–30%	25–40%	2–10%	1–2%	5–10%	5–10%	1–2%	5–25%
No Action %									
20 Yr. Projection	6	23	29	4	16	3	4	1	18
50 Yr. Projection	12	24	27	8	10	10	8	2	7
Alt W %									
20 Yr. Projection	7	23	29	1	21	1	1	1	18
50 Yr. Projection	12	24	27	8	10	10	8	2	7
Alt X %									
20 Yr. Projection	6	23	29	4	15	4	4	1	18
50 Yr. Projection	12	24	27	7	10	10	7	2	7
Alt Y %									
20 Yr. Projection	9	15	31	0	28	0	1	1	18
50 Yr. Projection	12	24	27	4	11	10	8	2	7
Alt Z %									
20 Yr. Projection	8	16	24	0	34	0	1	1	18
50 Yr. Projection	12	19	22	4	30	5	2	2	7

Dominance Type	DF	LP	AF/ES	WBP	GF/MH	WL	WP	DF/WL	Seral Stage grass/shrub
Preferred Alt %									
20 Yr. Projection	7	20	30	1	26	1	1	1	18
50 Yr. Projection	12	23	27	4	11	10	7	2	7

Table 63. The 20-year and 50-year projections for Warm Dry potential vegetation type dominance types within Management Area 2 by alternative.

Dominance Type	PP	DF	LP	WL	GF	DF/WL	Seral Stage grass/shrub
Desired Range %	50–65%	15–20%	5–15%	1–2%	2–10%	1–2%	1–10%
No Action %							
20 Yr. Projection	38	21	8	0.1	13	1	20
50 Yr. Projection	44	35	8	0.5	3	2	10
Alt W %							
20 Yr. Projection	28	22	7	0.1	23	1	20
50 Yr. Projection	44	35	8	0.4	4	2	9
Alt X %							
20 Yr. Projection	38	21	8	0.1	13	1	20
50 Yr. Projection	44	35	8	0.4	3	2	9
Alt Y %							
20 Yr. Projection	19	25	6	0.1	30	1	20
50 Yr. Projection	41	35	8	0.4	7	2	9
Alt Z %							
20 Yr. Projection	20	25	8	0.1	27	1	21
50 Yr. Projection	40	37	6	0.4	7	2	11
Preferred Alt %							
20 Yr. Projection	27	22	8	0.1	24	1	20
50 Yr. Projection	43	35	8	0.4	4	2	9

Table 64. 20-year and 50-year projections for Warm Moist potential vegetation type dominance types within Management Area 2 by alternative.

Dominance Type	PP	DF	LP	WL	GF/WRC	WP	AF/ES	DF/WL	GF	Seral Stage grass/shrub
Desired Range %	5-20%	5-10%	1-2%	10-20%	15-25%	20-35%	1-2%	5-10%	5-15%	5-20%
No Action % 20 Yr. Projection	3	19	5	8	11	5	3	1	42	5
No Action % 50 Yr. Projection	4	22	5	10	9	7	2	2	38	5
Alt W % 20 Yr. Projection	3	18	5	7	12	5	4	1	41	6
Alt W % 50 Yr. Projection	4	22	5	10	9	7	2	2	36	5
Alt X % 20 Yr. Projection	3	19	4	9	11	5	3	1	42	5

Dominance Type	PP	DF	LP	WL	GF/WRC	WP	AF/ES	DF/WL	GF	Seral Stage grass/shrub
Alt X % 50 Yr. Projection	4	22	5	10	9	7	2	2	38	5
Alt Y % 20 Yr. Projection	3	16	5	6	11	5	4	1	43	6
Alt Y % 50 Yr. Projection	4	21	6	10	10	7	2	2	36	5
Alt Z % 20 Yr. Projection	3	18	5	6	11	5	4	1	44	10
Alt Z % 50 Yr. Projection	4	22	6	9	9	7	3	2	36	8
Preferred Alt % 20 Yr. Projection	3	17	6	6	11	5	4	1	44	6
Preferred Alt % 50 Yr. Projection	4	21	5	10	9	8	2	2	35	7

Consistent trends are evident when comparing effects across alternatives for Management Area 2. Management actions for moving vegetation composition toward desired conditions is limited to silvicultural treatments on lands suitable for timber harvest and wildland fire. It is expected that natural wildfire ignitions will be managed to promote ecological functions and limit negative effects to resource values of concern. Only 1 percent of the Idaho Roadless Rule area is subject to active forest management per year and prescribed burning is limited by budgets, physical capability, and airshed constraints.

Within the cold potential vegetation type group, lodgepole pine, and subalpine fir and Engelmann spruce composition increase slightly, while modest gains are made in whitebark pine and Douglas fir and Western larch dominance types. Response to disturbance produces similar results within the cool moist broad potential vegetation type group, lodgepole pine, and subalpine fir and Engelmann spruce remain static and modest gains are realized in seral species composition. Both trends, which are similar for all alternatives, are inconsistent with desired species composition. Modest gains are achieved to promote whitebark pine composition across all alternatives. No alternative performs to substantially increase either Western larch or Western white pine. This is in part due to a lack of available seed sources and the slow progress of artificial regeneration.

Within the warm dry broad potential vegetation type groups, Ponderosa pine species composition trends toward the desired range and Douglas fir increases above the desired range across all alternatives. Grand fir is reduced to within desired ranges within the warm dry potential vegetation type group across all alternatives. Disturbance levels within the warm moist broad potential vegetation type are sufficient to trend seral species toward desired ranges but generally remain outside of desired ranges. Tolerant species composition remains static.

The potential consequences of limited management and reliance on natural disturbance processes in Management Area 2 promote slower progress toward seral species dominance and retention of tolerant species. Shade tolerant species promote potential increases in acres affected by insect and disease, an increase in severe fire effects under a warmer and drier climate regime, subsequent negative impacts to soils and water resources and recreational esthetics, as well as loss of certain wildlife habitats. Snag densities are expected to substantially increase.

All alternatives maintain or trend most dominance types toward desired conditions for Management Area 3, as shown in the following tables. No alternative achieves target desired conditions for Western larch, Western white pine, Ponderosa pine, or whitebark pine. The distinguishing difference between alternatives is the number of acres treated. Within the cold potential vegetation type group, modest gains are achieved through reduction of subalpine fir and Engelmann spruce composition and trending toward desired conditions for lodgepole pine composition. The cool moist broad potential vegetation type group exhibits similar results for lodgepole pine, but subalpine fir and Engelmann spruce composition increases slightly. This contrasts with subalpine fir and Engelmann spruce and lodgepole pine trends for Management Areas 1 and 2. Within Management Area 3 the scale of disturbance is proportional to Management Areas 1 and 2, but the addition of silviculture treatments increases the pace of restoration. Grand fir composition trends down toward desired conditions within the cool moist type for all alternatives except Alternative Z. Within the warm dry broad potential vegetation type group, Ponderosa pine composition is increased, and grand fir is decreasing, each trending toward desired conditions. Within the warm moist broad potential vegetation type group, all species are trending toward the desired ranges, and grand fir composition is reduced to a greater extent for Alternatives W, X, Y, and the Preferred Alternative. As with Management Area 2, achieving desired conditions for dominance type is largely a function of the number of acres that can be treated per decade and the availability of seral seed sources.

Table 65. The 20-year and 50-year projections for Cold potential vegetation type dominance types within Management Area 3 by alternative.

Dominance Type	LP	AF/ES	WBP	DF/WL	MH	Seral Stage grass/shrub
Desired Range %	30–40%	3–10%	35–50%	0–5%	2–5%	5–15%
No Action % 20 Yr. Projection	332	22	34	2	1	22
No Action % 50 Yr. Projection	31	17	35	5	1	11
Alt W % 20 Yr. Projection	41	16	22	4	1	20
Alt W % 50 Yr. Projection	36	14	35	4	1	11
Alt X % 20 Yr. Projection	37	26	28	3	1	20
Alt X % 50 Yr. Projection	32	14	39	4	1	15
Alt Y % 20 Yr. Projection	41	31	11	4	1	15
Alt Y % 50 Yr. Projection	39	22	31	6	1	12
Alt Z % 20 Yr. Projection	51	34	6	5	1	3
Alt Z % 50 Yr. Projection	42	27	22	6	1	6
Preferred Alt % 20 Yr. Projection	42	33	19	3	1	15

Dominance Type	LP	AF/ES	WBP	DF/WL	MH	Seral Stage grass/shrub
Preferred Alt % 50 Yr. Projection	37	21	35	4	1	10

Table 66. The 20-year and 50-year projections for Cool Moist potential vegetation type dominance types within Management Area 3 by alternative.

Dominance Type	DF	LP	AF/ES	WBP	GF/MH	WL	WP	DF/WL	Seral Stage grass/shrub
Desired Range %	2–4%	20–30%	25–35%	2–10%	1–2%	5–10%	5–15%	1–2%	5–25%
No Action % 20 Yr. Projection	8	20	27	7	20	6	8	1	13
No Action % 50 Yr. Projection	7	25	27	8	8	11	15	2	5
Alt W % 20 Yr. Projection	8	17	30	7	22	2	10	1	9
Alt W % 50 Yr. Projection	6	21	34	9	8	7	15	2	5
Alt X % 20 Yr. Projection	7	21	29	6	18	6	11	1	9
Alt X % 50 Yr. Projection	6	23	31	7	8	10	15	2	5
Alt Y % 20 Yr. Projection	9	17	30	7	25	1	8	1	11
Alt Y % 50 Yr. Projection	6	24	31	8	8	9	15	2	7
Alt Z % 20 Yr. Projection	7	17	30	3	27	4	10	1	6
Alt Z % 50 Yr. Projection	8	18	28	5	20	7	13	2	2
Preferred Alt % 20 Yr. Projection	8	25	27	0	21	3	0	1	17
Preferred Alt % 50 Yr. Projection	6	28	29	4	8	8	5	2	20

Table 67. The 20-year and 50-year projections for Warm Dry potential vegetation type dominance types within Management Area 3 by alternative.

Dominance Type	PP	DF	LP	WL	GF	DF/WL	Seral Stage grass/shrub
Desired Range %	50–60%	15–20%	10–15%	1–2%	2–10%	1–2%	1–10%

Dominance Type	PP	DF	LP	WL	GF	DF/WL	Seral Stage grass/shrub
No Action % 20 Yr. Projection	55	21	10	0.2	11	1	8
No Action % 50 Yr. Projection	56	17	12	0.4	11	2	4
Alt W % 20 Yr. Projection	36	14	8	0.2	27	1	15
Alt W % 50 Yr. Projection	52	22	13	0.2	10	2	10
Alt X % 20 Yr. Projection	54	16	10	0.2	12	1	10
Alt X % 50 Yr. Projection	50	22	14	0.2	10	2	10
Alt Y % 20 Yr. Projection	33	21	8	0.2	25	1	16
Alt Y % 50 Yr. Projection	55	18	12	0.3	11	2	5
Alt Z % 20 Yr. Projection	33	18	10	0.3	25	1	15
Alt Z % 50 Yr. Projection	53	18	12	0.4	13	2	6
Preferred Alt % 20 Yr. Projection	29	16	14	0.2	36	1	6
Preferred Alt % 50 Yr. Projection	55	16	14	0.4	10	2	10

Table 68. The 20-year and 50-year projections for Warm Moist potential vegetation type dominance types within Management Area 3 by alternative.

Dominance Type	PP	DF	LP	WL	GF/WRC	WP	AF/ES	DF/WL	GF	Seral Stage grass/shrub
Desired Range %	10–20%	2–5%	1–2%	5–15%	10–20%	25–40%	1–2%	5–10%	5–15%	1–5%
No Action % 20 Yr. Projection	5	10	2	6	10	12	1	1	51	3
No Action % 50 Yr. Projection	10	7	2	6	9	23	1	2	40	5
Alt W % 20 Yr. Projection	8	10	2	7	8	17	2	1	45	9
Alt W % 50 Yr. Projection	11	10	2	8	10	31	2	2	25	5
Alt X % 20 Yr. Projection	10	9	2	7	7	17	2	1	44	6
Alt X % 50 Yr. Projection	13	10	2	7	10	29	2	2	25	5

Dominance Type	PP	DF	LP	WL	GF/WRC	WP	AF/ES	DF/WL	GF	Seral Stage grass/shrub
Alt Y % 20 Yr. Projection	9	9	2	6	7	10	1	1	53	3
Alt Y % 50 Yr. Projection	13	10	2	9	10	26	2	2	25	5
Alt Z % 20 Yr. Projection	5	9	2	7	7	8	2	1	57	9
Alt Z % 50 Yr. Projection	7	8	2	7	10	14	2	2	47	8
Preferred Alt % 20 Yr. Projection	9	9	2	6	8	12	2	1	49	3
Preferred Alt % 50 Yr. Projection	14	10	2	9	10	26	2	2	25	5

Attainment of desired conditions for the primary seral species of whitebark pine, Western white pine, Western larch, and Ponderosa pine will require a restoration strategy that focuses not only on retaining these species where they occur but increasing species composition through artificial regeneration. This process requires time to produce results with an expected 70 to 100 years to achieve desired conditions under the proposed management strategies specific to each alternative.

The consequences of not achieving desired conditions for dominance types is the continued dominance of grand fir, Douglas fir, lodgepole pine, and subalpine fir or Engelmann spruce. These species are most susceptible to mortality from root diseases, insects, and fire. Ultimately, the forest will not be as resilient to disturbance events until seral species dominance can be reestablished.

Desired conditions for all management areas include an increase in seral species composition and a decrease in climax species composition. Each alternative is designed to accomplish this objective through a combination of silvicultural thinning treatments and the use of wildland fire. Figure 17 illustrates the trends in achieving dominance of Ponderosa pine, whitebark pine, Western larch, and Western white pine across all alternatives. Each alternative achieves similar results relative to improving dominance of seral species. In the short term, Alternative X achieves the greatest increase in Ponderosa pine dominance. Both Alternative W and X achieve similar results in increasing Western larch and whitebark pine. In the long-term, the Preferred Alternative achieves the greatest increase in dominance for Ponderosa pine and Western larch. Alternative W achieves the greatest increase in Western white pine dominance with Alternatives X, Y, and the Preferred Alternative achieving similar results. All alternatives achieve similar results for whitebark pine dominance in the long-term. The Preferred Alternative achieves the overall best results relative to desired conditions for seral dominance.

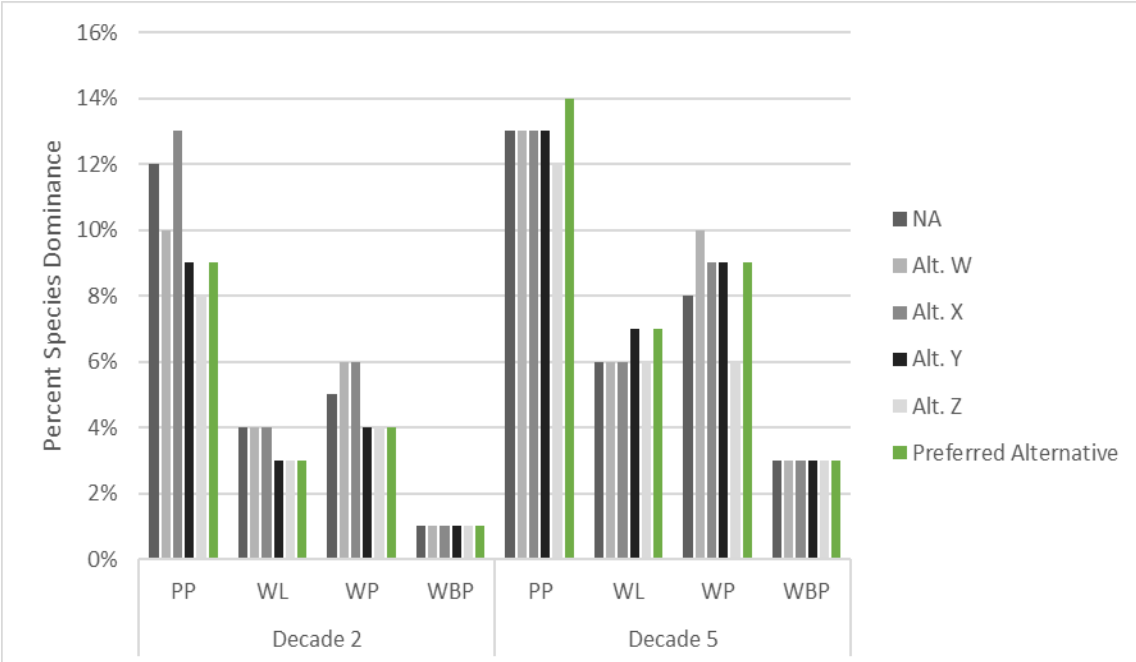


Figure 17. The 20-year and 50-year projects of seral species dominance by alternative.

PP=Ponderosa pine, WL=Western larch, WP=Western white pine, WBP=whitebark pine.
Data Source: NPC_Alts_Outputs_Summary.xlsx.

Size class distribution

Size class distribution is an important indicator of forest structure, age class distribution, and affects the volume per acre of timber harvest. The ability to use wildland fire as well as effects from wildland fire are impacted by size class distribution. Snag and downed woody debris recruitment are affected by size class. Long-term sustainability of forested ecosystems requires a balanced size class distribution to promote structural diversity and natural regeneration. The following section describes size class distribution resulting from modeled alternatives for each management area. The extent to which size classes reach desired conditions is a measure of the desirability of the alternative for vegetation management.

The following tables show the extent to which forest vegetation trends toward desired size class distribution in each alternative. The tables are projections for both 20-year short term and 50-year long-term comparative periods for each alternative from the present and show the effect each alternative has on size class distribution by management area.

Size Class within Management Area 1

Management Area 1 is not subject to active forest management. Changes in size class distribution are the result of natural disturbance processes. The differences between alternatives are largely the result of differences in proposed wilderness designations, which are allocated from areas designated under the Idaho Roadless Rule in Management Area 2.

All action alternatives (W, X, Y, Z, and Preferred Alternative) indicate similar trends within Management Area 1, as shown in the following tables. Given that size class distribution is influenced through natural disturbance processes only, it is unlikely that desired conditions for size class distribution can be met within Management Area 1. The seral grass and forb size class is well over the desired range in the short term for all alternatives. In recent decades, Management Area 1 has experienced numerous wildland fires which tend to promote retention of larger diameter classes. This trend is consistent across all alternatives. Within Management Area 1, the seral grass and forb size class is both created and maintained through wildland fire.

Table 69.The 20-year and 50-year projections for the Cold potential vegetation type group in Management Area 1 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–20%	15–30%	5–25%	5–15%	25–50%	0–5%
No Action % 20 Yr. Projection	43	12	5	13	23	4
No Action % 50 Yr. Projection	30	27	9	5	23	7
Alt W % 20 Yr. Projection	43	12	5	13	23	4
Alt W % 50 Yr. Projection	30	27	9	5	22	7
Alt X % 20 Yr. Projection	43	12	5	13	23	4
Alt X % 50 Yr. Projection	30	27	9	5	22	7
Alt Y % 20 Yr. Projection	43	12	4	14	23	4
Alt Y % 50 Yr. Projection	30	27	9	5	23	7
Alt Z % 20 Yr. Projection	43	11	5	14	24	4
Alt Z % 50 Yr. Projection	30	27	8	5	23	7
Preferred Alt % 20 Yr. Projection	43	11	5	14	24	4
Preferred Alt % 50 Yr. Projection	29	27	9	5	23	7

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Data Source: SIMPPLLE-QueryVegDC

Table 70. The 20-year and 50-year projections for the Cool Moist potential vegetation type group in Management Area 1 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–25%	15–30%	10–25%	10–20%	15–30%	5–10%
No Action % 20 Yr. Projection	38	12	7	14	25	4
No Action % 50 Yr. Projection	18	32	11	7	24	8
Alt W % 20 Yr. Projection	38	13	6	14	25	4
Alt W % 50 Yr. Projection	18	32	11	8	24	8

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Alt X % 20 Yr. Projection	38	13	7	14	25	4
Alt X % 50 Yr. Projection	18	31	12	8	24	8
Alt Y % 20 Yr. Projection	38	12	6	14	26	4
Alt Y % 50 Yr. Projection	18	32	11	7	24	8
Alt Z % 20 Yr. Projection	38	10	7	15	26	4
Alt Z % 50 Yr. Projection	18	33	10	7	25	8
Preferred Alt % 20 Yr. Projection	39	12	6	15	26	4
Preferred Alt % 50 Yr. Projection	18	33	11	6	24	8

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Table 71. The 20-year and 50-year projections for the Warm Dry potential vegetation type group in Management Area 1 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	2–10%	10–25%	10–20%	12–20%	20–35%	10–25%
No Action % 20 Yr. Projection	35	13	5	11	29	7
No Action % 50 Yr. Projection	18	29	12	6	25	10
Alt W % 20 Yr. Projection	26	14	5	10	27	7
Alt W % 50 Yr. Projection	19	30	14	6	22	9
Alt X % 20 Yr. Projection	35	15	5	11	27	7
Alt X % 50 Yr. Projection	19	29	14	6	22	9
Alt Y % 20 Yr. Projection	36	14	5	11	27	7
Alt Y % 50 Yr. Projection	19	31	13	6	22	9
Alt Z % 20 Yr. Projection	36	12	5	11	29	7
Alt Z % 50 Yr. Projection	19	30	12	6	24	10
Preferred Alt % 20 Yr. Projection	35	14	5	11	28	7
Preferred Alt % 50 Yr. Projection	18	31	13	6	22	9

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Table 72. The 20-year and 50-year projections for the Warm Moist potential vegetation type group in Management Area 1 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–20%	10–25%	10–20%	10–20%	20–30%	10–20%
No Action % 20 Yr. Projection	27	11	9	13	32	7
No Action % 50 Yr. Projection	18	21	13	11	26	11
Alt W % 20 Yr. Projection	27	13	11	13	29	7
Alt W % 50 Yr. Projection	17	21	13	15	25	10
Alt X % 20 Yr. Projection	27	13	12	13	29	7
Alt X % 50 Yr. Projection	17	21	13	15	24	10
Alt Y % 20 Yr. Projection	27	12	10	13	31	7

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Alt Y % 50 Yr. Projection	18	21	15	12	25	10
Alt Z % 20 Yr. Projection	27	11	9	13	32	7
Alt Z % 50 Yr. Projection	18	21	12	11	26	11
Preferred Alt % 20 Yr. Projection	27	12	11	13	31	7
Preferred Alt % 50 Yr. Projection	17	21	14	13	25	10

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Size Class within Management Area 2

Management area 2 is managed under the protocols identifies in the Idaho Roadless Rule. Active management of these lands is limited in both scope and scale. Only 1 percent of these lands are subject to mechanical vegetation management per year. Wildland fire is the primary management tool used to achieve desired conditions. The effects of the limited vegetation management approach are illustrated in the following tables. Similar trends are evident across all action alternatives.

Table 73. The 20-year and 50-year projections for the Cold potential vegetation type group in Management Area 2 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–25%	15–30%	10–25%	10–20%	15–30%	5–10%
No Action % 20 Yr. Projection	28	14	7	13	33	5
No Action % 50 Yr. Projection	20	20	12	9	29	10
Alt W % 20 Yr. Projection	28	15	6	14	33	5
Alt W % 50 Yr. Projection	20	21	11	9	29	9
Alt X % 20 Yr. Projection	28	14	7	13	32	5
Alt X % 50 Yr. Projection	20	21	12	9	29	9
Alt Y % 20 Yr. Projection	28	13	6	14	34	5
Alt Y % 50 Yr. Projection	20	21	11	8	30	9
Alt Z % 20 Yr. Projection	28	10	6	16	35	5
Alt Z % 50 Yr. Projection	20	22	9	8	31	9
Preferred Alt % 20 Yr. Projection	28	13	6	14	34	5
Preferred Alt % 50 Yr. Projection	20	22	11	8	30	10

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Table 74. The 20-year and 50-year projections for the Cool Moist potential vegetation type group in Management Area 2 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–25%	15–30%	10–25%	10–20%	15–30%	5–10%
No Action % 20 Yr. Projection	27	14	8	14	32	5
No Action % 50 Yr. Projection	12	26	13	10	29	10
Alt W % 20 Yr. Projection	26	15	7	14	32	4
Alt W % 50 Yr. Projection	12	26	13	10	29	10
Alt X % 20 Yr. Projection	26	14	9	14	32	4
Alt X % 50 Yr. Projection	12	26	13	10	29	10
Alt Y % 20 Yr. Projection	27	13	7	15	34	5

Size Class	Seral Stage grass/shrub	0–4.9" DBH	5–9.9" DBH	10–14.9" DBH	15–19.9" DBH	20"+ DBH[1]
Alt Y % 50 Yr. Projection	12	27	13	9	29	10
Alt Z % 20 Yr. Projection	27	9	8	16	35	4
Alt Z % 50 Yr. Projection	12	29	9	9	31	10
Preferred Alt % 20 Yr. Projection	27	13	7	15	34	5
Preferred Alt % 50 Yr. Projection	12	28	13	9	29	10

[1]The 20" + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Table 75. The 20-year and 50-year projections for the Warm Dry potential vegetation type group in Management Area 2 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9" DBH	5–9.9" DBH	10–14.9" DBH	15–19.9" DBH	20"+ DBH[1]
Desired Range %	5–25%	15–30%	10–25%	10–20%	15–30%	5–10%
No Action % 20 Yr. Projection	24	14	7	11	36	8
No Action % 50 Yr. Projection	12	23	13	9	30	12
Alt W % 20 Yr. Projection	25	15	7	11	35	7
Alt W % 50 Yr. Projection	12	24	16	9	28	11
Alt X % 20 Yr. Projection	24	16	8	11	34	7
Alt X % 50 Yr. Projection	12	24	16	9	28	11
Alt Y % 20 Yr. Projection	25	15	7	11	35	7
Alt Y % 50 Yr. Projection	12	27	14	8	28	11
Alt Z % 20 Yr. Projection	25	11	7	13	38	8
Alt Z % 50 Yr. Projection	12	26	11	8	31	12
Preferred Alt % 20 Yr. Projection	24	15	7	11	36	8
Preferred Alt % 50 Yr. Projection	12	26	14	9	28	11

[1]The 20" + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Table 76. The 20-year and 50-year projections for the Warm Moist potential vegetation type group in Management Area 2 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–25%	15–30%	10–25%	10–20%	15–30%	5–10%
No Action % 20 Yr. Projection	19	13	10	13	37	8
No Action % 50 Yr. Projection	13	17	14	13	30	12
Alt W % 20 Yr. Projection	19	14	12	13	35	7
Alt W % 50 Yr. Projection	12	17	14	16	29	11
Alt X % 20 Yr. Projection	19	14	13	13	34	7
Alt X % 50 Yr. Projection	12	17	14	16	28	11
Alt Y % 20 Yr. Projection	19	13	10	14	37	8
Alt Y % 50 Yr. Projection	13	18	15	13	29	12
Alt Z % 20 Yr. Projection	19	10	10	14	39	8
Alt Z % 50 Yr. Projection	13	18	12	13	31	12
Preferred Alt % 20 Yr. Projection	19	12	11	13	37	8
Preferred Alt % 50 Yr. Projection	12	18	15	15	29	12

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Attainment of desired conditions for seral grass and shrub size classes is subject to the same natural disturbance regimes as discussed for Management Area 1. The percentage of very large (20+” DBH) size classes is on the upper end of desired conditions. Decline of the large size class by the end of the projection period is primarily due to much of the large size class growing into the very-large size class. The medium size class is limited and below desired conditions at the beginning of the projection period resulting in very little recruitment into the large size class. Abundance of very large size classes results, in part, from limited active vegetation management, effect of wildfire favoring survival of large diameter trees, dominance of grand fir, and ingrowth from the large size class.

Size Class within Management Area 3

Management Area 3 is the land area subject to active forest management strategies and includes all lands suitable for timber production. The seral grass and forb stage is maintained and described separately from the seedling or sapling size class to reflect the desire to maintain a portion of the forest as transitional forage to meet desired conditions for elk habitat. The seral grass and shrub stage is maintained during the early stages of stand development and then progresses through size class development. At the management area level, the desired ranges for size class are very broad. This reflects the differences between desired ranges at the broad potential vegetation type level and are discussed in the next section.

All alternatives including the No Action Alternative indicate similar trends in achieving desired conditions for size class for Management Area 3. Differences between alternatives are largely due to differing amounts of total suitable acres available for treatment and the pace of achieving desire conditions. At the Management Area level, all alternatives indicate size class distributions on the low end of desirable ranges for the 0–4.9 inch diameter at breast height (DBH) and 15–19.9 inch DBH dimeter classes. All alternatives are within the desired range for the pole size (5–14.9 inch DBH) and very large size classes by the end of the projection period.

Size class distribution at the broad potential vegetation type group level is more refined than that of the management area level, as shown in the following tables. This refinement is necessary to account for differences in species compositions between potential vegetation type groups and as well as differences in growth rates and response to disturbance. At the broad potential vegetation type level, all size classes are within desired ranges except for the warm moist and warm dry groups. Within the warm moist and warm dry groups all size classes are within desired ranges except for the very large class (20 inch + DBH) which is generally below the desired range.

Table 77. The 20-year and 50-year projections for the Cold potential vegetation type group in Management Area 3 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH[1]
Desired Range %	5–15%	15–30%	10–25%	5–15%	25–50%	0–5%
No Action % 20 Yr. Projection	15	16	12	15	36	6
No Action % 50 Yr. Projection	16	14	16	15	29	10
Alt W % 20 Yr. Projection	16	21	16	13	29	5
Alt W % 50 Yr. Projection	15	16	21	20	22	7
Alt X % 20 Yr. Projection	15	22	18	13	28	5
Alt X % 50 Yr. Projection	14	16	20	20	22	7
Alt Y % 20 Yr. Projection	17	17	14	14	33	5
Alt Y % 50 Yr. Projection	15	18	22	15	23	7
Alt Z % 20 Yr. Projection	16	14	13	15	36	6
Alt Z % 50 Yr. Projection	15	17	16	14	28	10
Preferred Alt % 20 Yr. Projection	16	18	14	14	32	6
Preferred Alt % 50 Yr. Projection	14	19	21	18	22	7

[1]The 20” + inch DBH class contains stands with a plurality of very large diameter trees but also contains trees of small diameter classes.

Table 78. The 20-year and 50-year projections for the Cool Moist potential vegetation type group in Management Area 3 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH
Desired Range %	5–25%	15–30%	10–25%	10–20%	15–30%	5–10%
No Action % 20 Yr. Projection	16	16	13	15	35	5
No Action % 50 Yr. Projection	7	22	17	14	27	10
Alt W % 20 Yr. Projection	17	20	15	13	30	5
Alt W % 50 Yr. Projection	7	23	20	20	23	8
Alt X % 20 Yr. Projection	16	20	18	13	29	5
Alt X % 50 Yr. Projection	6	23	20	20	23	8
Alt Y % 20 Yr. Projection	17	16	13	15	33	5
Alt Y % 50 Yr. Projection	7	26	21	15	24	8
Alt Z % 20 Yr. Projection	17	13	13	16	36	6
Alt Z % 50 Yr. Projection	7	25	16	14	28	10
Preferred Alt % 20 Yr. Projection	18	17	13	14	32	5
Preferred Alt % 50 Yr. Projection	6	27	21	16	23	7

Table 79. The 20-year and 50-year projections for the Warm Dry potential vegetation type group in Management Area 3 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH
Desired Range %	1–10%	5–25%	10–20%	10–20%	20–35%	15–28%
No Action % 20 Yr. Projection	13	16	11	12	39	9
No Action % 50 Yr. Projection	7	19	18	14	30	13
Alt W % 20 Yr. Projection	15	20	15	10	32	8
Alt W % 50 Yr. Projection	7	21	24	18	21	9
Alt X % 20 Yr. Projection	13	22	16	10	31	8
Alt X % 50 Yr. Projection	6	21	23	19	22	10
Alt Y % 20 Yr. Projection	15	18	13	11	35	8
Alt Y % 50 Yr. Projection	7	24	23	14	22	10

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH
Alt Z % 20 Yr. Projection	15	15	12	11	38	9
Alt Z % 50 Yr. Projection	7	22	18	13	28	13
Preferred Alt % 20 Yr. Projection	13	20	13	11	35	8
Preferred Alt % 50 Yr. Projection	6	25	23	16	21	9

Table 80. The 20-year and 50-year projections for the Warm Moist potential vegetation type group in Management Area 3 by size class and alternative.

Size Class	Seral Stage grass/shrub	0–4.9” DBH	5–9.9” DBH	10–14.9” DBH	15–19.9” DBH	20”+ DBH
Desired Range %	1–5%	5–25%	10–20%	10–20%	20–35%	15–33%
No Action % 20 Yr. Projection	10	14	14	14	40	9
No Action % 50 Yr. Projection	10	13	17	17	30	13
Alt W % 20 Yr. Projection	11	18	18	12	33	8
Alt W % 50 Yr. Projection	8	14	20	24	24	10
Alt X % 20 Yr. Projection	10	19	20	12	32	7
Alt X % 50 Yr. Projection	8	14	19	24	24	10
Alt Y % 20 Yr. Projection	11	15	15	13	37	8
Alt Y % 50 Yr. Projection	9	15	22	18	25	10
Alt Z % 20 Yr. Projection	11	12	14	14	40	9
Alt Z % 50 Yr. Projection	9	15	17	17	29	13
Preferred Alt % 20 Yr. Projection	11	16	17	13	36	8
Preferred Alt % 50 Yr. Projection	8	16	21	21	24	10

Overall, the comparison between alternatives for size class distribution by potential vegetation type groups reveal modest variations. All alternatives indicate similar results for the grass or shrub, 0–4.9 inch diameter at breast height (DBH) class. For this class, percentages attained are all within the middle or on the upper end of the desired range for all management areas and potential vegetation type groups. The 10–14.9 inch DBH class is generally on the upper end of desired ranges for potential vegetation type groups across all alternatives. This reflects the effect of past timber harvest intensities and the projection of harvest intensities focused on reducing total stand density. Attainment of the 15–19.9 inch DBH class distribution is consistent between alternatives at the potential vegetation type group level and at the management area level. Differences in size class distribution between potential vegetation type groups is partly explained by the differences in species compositions and the rate at which large size class trees are growing into the very-large size class. The cold potential vegetation type group represents areas with shorter growing seasons than potential vegetation type groups at lower elevation zones. Slower growth rates result in a slower diameter progression. The cold potential vegetation type group is largely associated with Management Area 1 which is managed through natural processes only and not subject to thinning treatments which improve diameter growth. All alternatives indicate an increase of the very large (20 inch + DBH) class. At both the management area and potential vegetation type group scales the very large size class is within the lower bounds of the desired range.

The consequences of achieving diameter class distributions on the low end of the desired range is the potential delay in achieving harvest volume targets in the long term and delayed attainment of wildlife habitat conditions in the short term.

Canopy Cover Density

Canopy cover density is an important indicator of forest structure, forest resiliency, and disturbance regime. The ability to use prescribed fire, as well as the effects from wildland fire, are impacted by the percent and distribution of canopy cover. Long-term sustainability of forested ecosystems requires a mosaic of canopy cover densities at the landscape scale to promote heterogeneity in crown structure and to promote resilience to disturbance. Canopy cover density is a measure of area occupied by tree crowns in a horizontal plane across the landscape and is independent of size class. There are no specified desired conditions for canopy cover density. Canopy density is influenced by the site productivity of a given area, successional stage of the forest, climate regime, and disturbance history.

Trends for canopy cover density are consistent across all alternatives, as shown in the following tables. This suggests that natural disturbance patterns and frequencies are the largest driver of change for canopy cover density. The following table illustrates the extent to which forest vegetation trends toward the natural range of variation of canopy cover density classes. The table illustrates projections of 20–year short-term and 50–year long-term comparative periods from the present and shows the trend of canopy cover density by management area.

Table 81. Forestwide canopy cover density (existing condition) by broad potential vegetation type group.

Density Class	Canopy Cover Range	Cold	Cool Moist	Warm Dry	Warm Moist
Non-forested	<10%	28%	25%	24%	12%
Low to Medium	10–39.9%	30%	28%	27%	19%
Medium to High	40–59.9%	25%	29%	24%	21%
High	60%+	16%	18%	25%	48%

Data Source: R1 Summary Database, FIA Hybrid 2015 dataset

Table 82. Canopy cover density existing condition, 20-year and 50-year predictions, and natural range of variation by management area (MA).

Canopy Cover Density	Early Seral and Transitional (<10%)	Open Canopy (10–39%)	Closed Canopy (40% +)
NRV (average%)	16	49	35
MA 1 Existing Condition %	4	54	43
MA 1 - 20 Yr. Projection	19	34	47
MA 1 - 50 Yr. Projection	41	24	35
MA 2 Existing Condition %	3	44	53

Canopy Cover Density	Early Seral and Transitional (<10%)	Open Canopy (10–39%)	Closed Canopy (40% +)
MA 2 - 20 Yr. Projection	17	26	57
MA 2 - 50 Yr. Projection	26	24	50
MA 3 Existing Condition %	5	34	61
MA 3 - 20 Yr. Projection	21	31	48
MA 3 - 50 Yr. Projection	17	39	44

Data Source: SIMPPLLE model.

Summary of Density

Canopy cover density trends for each management area are consistent across all alternatives. The scales and frequency of natural disturbance events such as wildfire and insect outbreaks have a greater effect on canopy cover density in Management Areas 1 and 2 than for Management Area 3. Modeled vegetation management treatments in Management Area 3 result in a greater proportion of open canopy cover densities compared to Management Areas 1 and 2.

Within Management Area 1, the existing condition for early seral stage is below the natural range of variation average and both open and closed densities are above. This condition reflects large scale disturbance events occurring in previous decades which have regenerated into high density stands and maintained as low density stands through continued disturbance. Management Area 1 is largely composed of spruce or fir and lodgepole pine dominance types which tend to regenerate into dense stands which are thinned through insect and disease vectors and small-scale high severity fires. By the end of the 50-year projection period, projected disturbance events result in the early seral stage exceeding the natural range of variation average, the open density class is below average, and the closed density class approximates the average. This pattern suggests a cycle in which canopy cover density increases following a disturbance and subsequently reduced through disturbance events toward an open density condition until additional disturbance promotes early seral conditions again.

Management Area 2 exhibits a similar trend to Management Area 1. The existing condition for early seral stage is below the natural range of variation average, closed densities are above the average, and open density strands approximate the average. By the end of the 50-year projection period, projected disturbance events result in the early seral stage exceeding the natural range of variation average, the open density class is below average, and the closed density class is above the average. This pattern suggests that early seral conditions have been created through disturbance and progressed into dense closed canopy cover density stands. By the end of the projection period, disturbance events have not reduced stands densities toward open canopy densities. Forest succession is dominated by natural events within Management Area 2 where vegetation management treatments are minimal. Management Area 2 is characterized as having both high severity and mixed severity fire regimes and dominance types which maintain closed canopy cover densities.

Management Area 3 exhibits trends below the natural range of variation average for early seral canopy cover density. By the end of the 50-year projection period, early seral density is only slightly above the average. Open canopy densities are below average at the beginning of the projection and trend toward the average by the end of the projection. Similarly, the closed canopy density is above average at the beginning of the projection and trend toward the average. Management Area 3 experiences disturbance events through both natural processes such as wildland fire, insect, and disease outbreaks as well as through vegetation management treatments. It is the emphasis of vegetation management practices which regulate canopy cover densities toward the natural range of variation averages.

Effects Common to Action Alternatives

All action alternatives contain Land Management Plan components for vegetation composition, structure, and pattern (Table 83). The Land Management Plan, which guides the action alternatives, would include the quantitative desired conditions presented in the affected environment section of this report, and as such terrestrial vegetation would be managed to be consistent with the natural range of variation and resilient to disturbance, with consideration for climate change vulnerabilities and adaptation options based on the best available science for the Nez Perce-Clearwater (Halofsky, Peterson, et al. 2018a, b). Consideration of other resource concerns may override attainment of desired conditions for vegetation. The components in the Land Management Plan that would guide management of terrestrial vegetation are summarized in the following table. This table is not all inclusive of plan components, which may have an impact on attainment of desired condition for terrestrial vegetation.

Table 83. Summary of plan components.

Plan Component	Summary of expected effects
FW-STD-ARINF-07	This plan component deals with construction and reconstruction of roads in the Conservation Watershed Network. This constraint may affect the ability to achieve desired conditions and limit economic viability of proposed projects.
FW-STD-RMZ-01	This plan component removes land from the timber production base, makes allowance for vegetation treatments within the outer zone of the riparian management zone to achieve aquatic restoration desired conditions, limits the use of non-mechanical treatments and prohibits the use of mechanical treatments.
FW-DC-EM-05	This energy and minerals plan component allows for the utilization of activity generated biomass which can be allocated to PWSQ attainment.
FW-STD-WL-01	This plan component limits the amount of lynx habitat available for treatment to reach dominant types and size class desired conditions; sets a limit on timber outputs that can be produced. Creates constraints to respond to insect and disease outbreaks.
FW-DC-WL-01-03, Wildlife	These plan components describe wildlife habitat niches relative to natural range of variation. This plan component may affect the spatial extent of vegetation management projects.
FW-DC-WL-04	This plan component deals with management of fisher habitats. Management options to respond to epidemic insect and disease outbreaks may be constrained. May affect ability to achieve desired conditions for dominance types, size class, and patch size.
FW-GDL-WLMU-03	This plan component deals with big game winter range and may affect mechanical operating seasons.
Suitability	Defines the land base suitable for timber production and affects the sustained yield limit. Effect attainment of dominance types; affects availability of firewood.
FW-DC-TBR-03	This plan component allows for the salvage of dead trees if trees are in excess of what is needed for wildlife objectives. Affects availability of firewood, affects project feasibility, ability to achieve dominance types and acres suitable for artificial regeneration.
FW-STD-TBR-04	This plan component allows for lower regeneration stocking than desired for long-term sustained yields and dominance type retention to achieve other resource objectives. This may affect forest density objectives, maintenance of dominance types and long-term sustained yield.

Plan Component	Summary of expected effects
FW-DC-FOR-03	This plan component defines desired ranges for species composition within the warm dry potential vegetation type group. This component applies to all management areas.
FW-DC-FOR-04, 07, 10 MA1-DC-FOR-09 MA2-DC-FOR-09 MA3-DC-FOR-07	These plan components define within-stand characteristics for each broad potential vegetation type group. Within-stand characteristics describe desired conditions for canopy layers (single story vs. multi story) and recruitment of legacy tree and large snags at the forestwide and management area level.
FW-DC-FOR-05, 08, 11 and 12	These plan components define the desired size class distribution forestwide for each management area and potential vegetation type group. These plan components also define the desired condition for the recruitment of large legacy trees as part of the desirable size class distribution.
FW-DC-FOR-03, 06, 09, 13	These plan components define the desired species composition forestwide for each management area and potential vegetation type group scales. Species composition is described as the percentage of desired dominance types for each potential vegetation type group.
MA3-DC-FOR-11 MA3-GDL-FOR-06 and 07 MA2-GDL-FOR-05 MA3-GDL-FOR-05	These plan components define the minimum number of snags by size class and minimum live tree retention required per unit area. Effects to attainment of forest vegetation objectives are not expected.
FW-DC-FOR-02, MA1-DC-FOR 01-04, MA2-DC-FOR-01-04, MA3-DC-FOR-(01,03,05,08)	These plan components define stand density requirements needed to achieve desired conditions for vigor, maintenance of early seral species dominance, and forest resiliency. Effects of this component allow for the attainment of desired conditions.
MA1-DC-FOR-05-08, MA2-DC-FOR-05-08, MA3-DC-FOR-(02,04,06,09)	These plan components define the landscape pattern, average patch size, and distribution of patches for the action alternatives. The desired effect is to increase the extent to which patches are consistent with historic processes.
FW-DC-FOR-01	This plan component established a minimum target of aspen restoration. The effects will be to increase composition of aspen on the landscape.
MA2-GDL-FOR-01 MA3-GDL-FOR-01	These plan components define the minimum amount of coarse down woody debris remaining post treatment to promote long-term soil productivity and habitat structure. The effect of this plan component will improve, maintain long-term soil productivity.
MA3-STD-FOR-01	This plan component constrains harvest within stands currently meeting old growth characteristics for defined old growth types unless such management will convert a non-resilient old growth type into a resilient type. Effects of this plan component are likely to maintain or slightly increase old growth retention acres across the Nez Perce-Clearwater.
MA2-DC-FOR-10 MA3-DC-FOR-10 MA2-GDL-FOR-02 – 04 MA3-GDL-FOR-02 - 04	These plan components provide a management and recruitment strategy for old growth forest cover types.
MA2-DC-RWILD-01-04, Recommended Wilderness	The desired condition plan components will likely limit attainment of forestwide and Management Area 2 vegetation desired conditions, remove lands where harvest may occur to achieve other resource objectives including salvage of timber and constrain options to manage insect and disease outbreaks.
MA2-GDL-E&SWSR-03,	These plan components describe the limitations to vegetation management resulting from this designation. The effect of this

Plan Component	Summary of expected effects
Eligible & Suitable Wild Scenic River	designation will be to limit attainment of desired conditions for riparian vegetation as well as maintenance of old growth forest types.
FW-DC-TE-1-6, Terrestrial Landscape	These plan components describe the desired condition of uncommon plant assemblages, ecotones, and riparian vegetation at the landscape scale.
FW-DC-GS-1-8, Meadows and Grasslands	These plan components describe the desired condition of non-forested vegetation at the landscape scale.
FW-GDL-GRZ-01, 02, 03 FW-OBJ-GS-01	These plan components provide for protection and improvement of native grasslands and meadows.
FW-DC-FIRE-01-03 FW-GDL-FIRE-01	These plan components describe the desired fire regimes, fuels profiles, and mitigation measures needed to achieve desired conditions. Achieving desired conditions for fire regimes is analogous to achieving desired conditions for vegetation.
FW-DC-INV-01 FW-GDL-INV-01, Invasive species	These plan components detail the desired conditions and management strategy of invasive weeds and plants. These plan components effect both forested and non-forested vegetation communities.
FW-DC-CARB-01, Carbon storage and sequestration	These plan components describe the nexus of the carbon cycle in the forested setting. Vegetation management will have a net positive effect on carbon sequestration at the ecoregion level.
FW-DC-SOIL-01-03 FW-STD-SOIL-01-03 FW-GDL-SOIL-01 AND 02 MA2 AND MA3-GDL-SOIL-01-03, Soils Resource	These plan components detail the desired conditions to maintain and improve soil productivity. These plan components promote the idea of mitigating soil disturbance from past disturbance events along with mitigation for proposed activities. These components may reduce economic viability of harvest operations. Vegetation management which allows for natural fire regimes which reduces uncharacteristic fire effects will promote long-term soil productivity.
FW-DC-WTR-02	This plan component describes connectivity of habitats between watersheds. This is the most significant constraint on attainment of vegetation desired conditions due to the proximity of many stream segments across the landscape.
FW-STD-WTR-04	This plan standard describes the instream habitat conditions for managed watersheds. Effects of management activities may be conflated with variations within reference conditions.
FW-STD-RMZ-01, Riparian Management Zone	This plan component constrains silviculture treatments within defined riparian management zone. The plan component may limit the effectiveness of vegetation treatments to achieve desired conditions for dominance types, old growth types, and size class distribution.
FW-STD-RMZ-04	This plan component constrains the cutting of personal use firewood within 150 feet of stream edge.
FW-DC-WLMU-04 and 06, Wildlife Multiple Use	These plan components describe the need to manage wildlife habitat within the natural range of variation. These plan components are not likely to have effects on achieving desired conditions for vegetation.
MA2-OBJ-WLMU-01-02, MA3-DC-WLMU-01, Wildlife Multiple Use	These plan components describe a minimum percentage of each management area that should be treated to achieve desired conditions for high quality elk forage. These high-quality forage areas are maintained through open stand conditions. They may affect achievement of desired conditions for dominance type, successional stage, and size class distribution, as well as long-term PTSQ, due to delay of target stand development on suitable timber production acres.
MA2-DC-IRA-01, Idaho Roadless Rule	These plan components comply with designation of lands under the Idaho Roadless Rule. The component is unlikely to allow for achievement of desired conditions for forest vegetation. The current

Plan Component	Summary of expected effects
	forest conditions are not functioning under the natural range of variation and can be expected to continue to experience uncharacteristic wildfire events and insect outbreaks.

Effects that Vary by Alternative

Ecosystem processes: projected wildfire

Wildfires are expected to have the most substantial influence on vegetation in the future. The expected acres of wildfire are generated by SIMPPLLE based on assumptions for fire suppression, future climate (warm and dry), vegetation conditions, and projected vegetation treatments (Figure 18). The differences in alternatives are a result of different land allocations, such as lands suitable for timber production, which influence the amount and type of vegetation management that is projected to occur. These differences resulted in only subtle variation in projected wildfire acres across the alternatives.

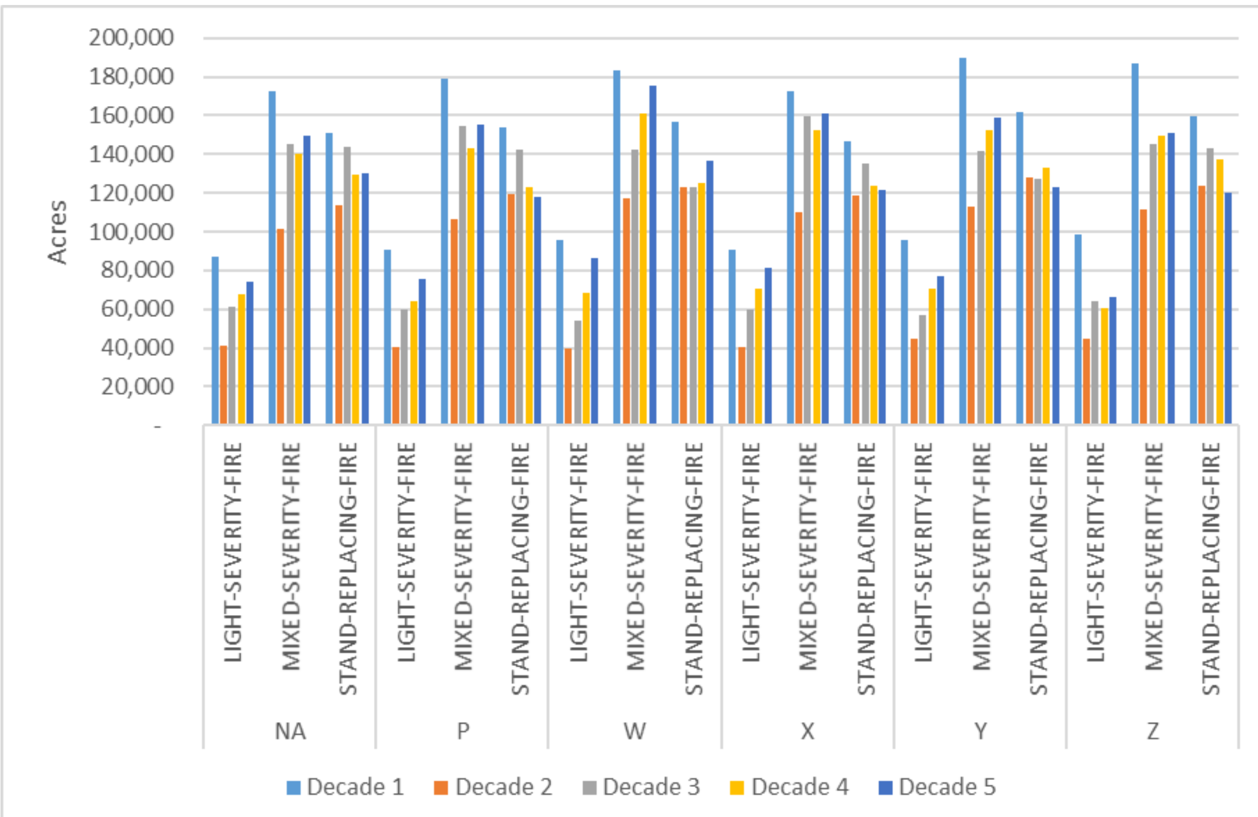


Figure 18. Projected average acres affected by future wildfire per decade, by alternative.

Data Source: SIMPPLLE

Though our best understanding of how fire behaves and its effects on vegetation were used to inform the model, there is an inherent degree of uncertainty. We cannot predict with high accuracy where and when fires will occur. There is a high degree of variation, spatially and temporally, in the amount and location of fire. The average wildfire acres displayed in the figure below do not imply an "even flow" of acres burned over time. The acres burned vary by decade between the simulations. As shown in Appendix B, the estimated mean levels of wildfire activity are below the natural range of variation for low severity fires and at the low end but within the natural range of variation for mixed severity and stand replacing fires at the forestwide landscape scale. As discussed in previous sections, different fire regimes give rise to different vegetations patterns and patch sizes, forest densities, species compositions, and size class distributions of species across the landscape. The resulting mosaic of forest conditions promotes forest resiliency and diversity.

Ecosystem processes: projected insect and disease activity and hazard ratings

Insects and disease will also play a substantial role in vegetation change over the next five decades. The amount of insect and disease disturbance is closely tied to the abundance of the host species, vegetative succession of forests into susceptible conditions (that is, larger trees and higher densities), and warmer climates. Figure 19 shows modeled estimates of future insect activity; all alternatives show nearly identical trends. Mountain pine beetle is projected to have the largest impact compared to other insect agents. The sharp increase in beetle activity from decade 1 to decade 2 is the result of populations of lodgepole pine growing into susceptible size and stand density classes. As lodgepole pine populations decline toward the natural range of variation, so does the number of acres with high beetle hazard ratings. Data is not available to generate a beetle hazard rating estimate for whitebark pine. It is reasonable to conclude that in areas where lodgepole pine and whitebark pine populations overlap or are in close proximity, whitebark pine are more likely to be affected by mountain pine beetle.

As shown in Appendix B, the estimated mean levels of Douglas fir beetle are within the natural range of variation. Mountain pine beetle would also generally be within its natural range of variation, except on cold broad potential vegetation types where the model predicts infestations above the historic amount. This indicates continued impacts to whitebark pine and lodgepole pine from this insect.

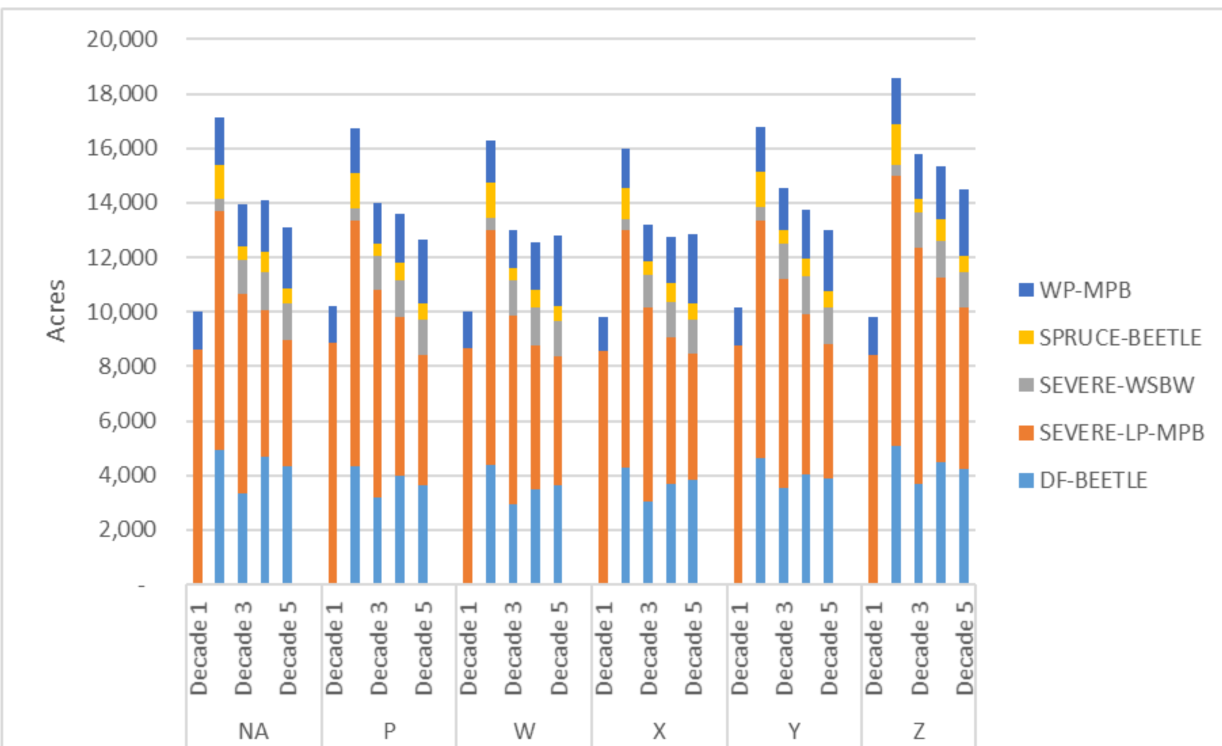


Figure 19. Projected average acres affected by insects per decade by alternative.

WP-MPB=Western white pine-mountain pine beetle. WSBW=Western spruce budworm. LP-MPB=lodgepole pine-mountain pine beetle. DF=Douglas fir beetle.

Data Source: SIMPPLLE model

The modeling suggests that in all alternatives, the hazard to bark beetles will decrease over time at the forestwide scale; this partly reflects a gradual decline in composition of host species. It is also likely a function of the anticipated distribution of density and diameter classes across the forest which promotes variability in stand structure for host species.

Figure 20 illustrates the projected impact of root disease at the forestwide scale. As discussed in previous sections, root disease is the second largest disturbance agent affecting forested vegetation compared to wildland fire. The trend across all alternatives toward increasing light and high hazard root disease ratings reflects the continued prevalence of host species at the landscape scale. Increases from decade to decade reflect both expansion of existing root disease pockets and development of new root disease pockets resulting from the continued dominance of host species. Douglas fir and grand fir composition remains above the natural range of variation for all projected decades.

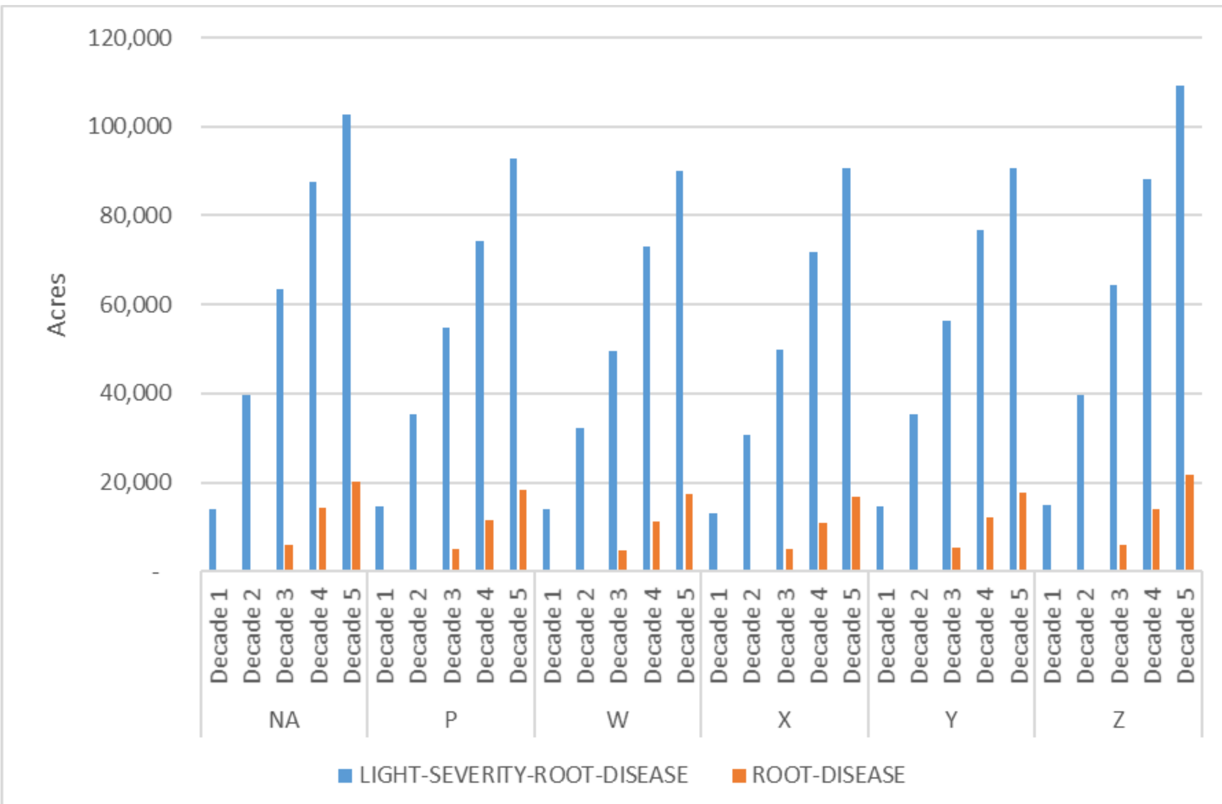


Figure 20. Acres with light and high severity hazard of root disease by alternative.

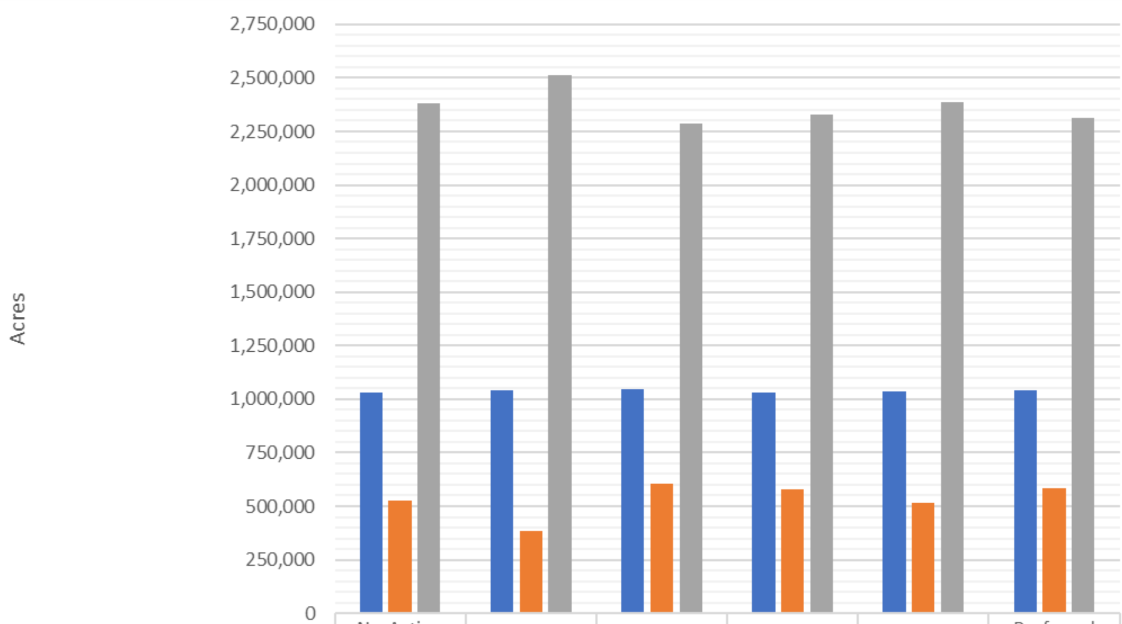
Note that high severity root disease is labeled only ‘root-disease’ in the graph.
Data Source: SIMPPLLE model

Effects from Other Resources

Timber Harvest

Timber harvest is one of the tools available to change vegetation for purposes of maintaining or moving towards desired vegetation conditions. Land Management Plan direction guiding timber harvest is provided in all alternatives. The PRISM model was used to generate the best solution for applying future timber harvest to move towards desired conditions while considering resource constraints and management guidance for each alternative. Refer to the Timber section and Appendix B for more information. The acres influenced by timber harvest are a relatively small proportion of disturbance compared to natural disturbance processes such as wildfire.

The suitability analysis is summarized in Figure 21, and detailed in Appendix B. This analysis reveals only modest differences between alternatives. Alternative X has the most land determined to be suitable for timber production, while the No Action Alternative contains the least by a factor of approximately 1 percent. These are lands where harvest would be used to the greatest extent, although all alternatives include lands that are unsuitable for timber production where harvest can occur for other purposes (timber harvest allowed). Alternative X contains the largest number of unsuitable acres where timber harvest is allowed. These lands are within the roadless area associated with Management Area 2. Alternative W contains the most unsuitable lands and Alternative X the least. This reflects the difference between existing wilderness designations associated with Alternative X and the combination of existing designated wilderness and recommended wilderness associated with Alternative W. Timber suitability for the Preferred Alternative falls approximately half-way between Alternative W and X. The difference between all alternatives in terms of timber suitability is less than 1.5 percent.



	No-Action Alternative	Alt. W	Alt. X	Alt. Y	Alt. Z	Preferred Alternative
Suitable Lands	1,028,480	1,041,522	1,043,959	1,029,983	1,037,058	1,042,520
Unsuitable Lands Harvest Allowed	528,577	382,688	606,971	578,690	517,246	586,014
Unsuitable Lands	2,381,999	2,514,846	2,288,127	2,330,384	2,384,752	2,310,523

Figure 21. Total acres by timber harvest suitability class and alternative.

Data Source: TimberSuitability20200923.xlsx.

Figure 22 displays the projected acres of timber harvest by management area on lands both suitable and unsuitable for timber production. Estimates are based on the PRISM analysis assuming a reasonably foreseeable budget and displayed for both short-term (2 decades) and long-term (5 decades) for each alternative. The No Action Alternative treats the fewest acres compared to the action alternatives. Alternative W treats the most acres through the third decade. Timber harvest within Management Area 2 is confined to acres suitable for timber harvest.

Figure 23 illustrates the total acres treated within each potential vegetation type group for both short and long-term projections. The warm moist potential vegetation type group has the largest amount of harvest which coincides with also having the most acres of all potential vegetation type groups.

All alternatives would treat more of the landscape with even-aged regeneration harvest than with other types of harvest (intermediate or uneven-aged systems). This proportion remains static over time but with varying amounts of prescribed burning. Prescribed burning is the primary tool used to achieve desired conditions in Management Area 2. These trends are based on the model finding the optimum solution to move the landscape towards desired conditions. Even-aged regeneration harvests are likely driven by the desired condition to alter species composition (most notably, the desired condition to increase dominance types for seral species) whereas other types of harvest may be more related to altering forest structures (most notably, the desired condition to increase large size classes).

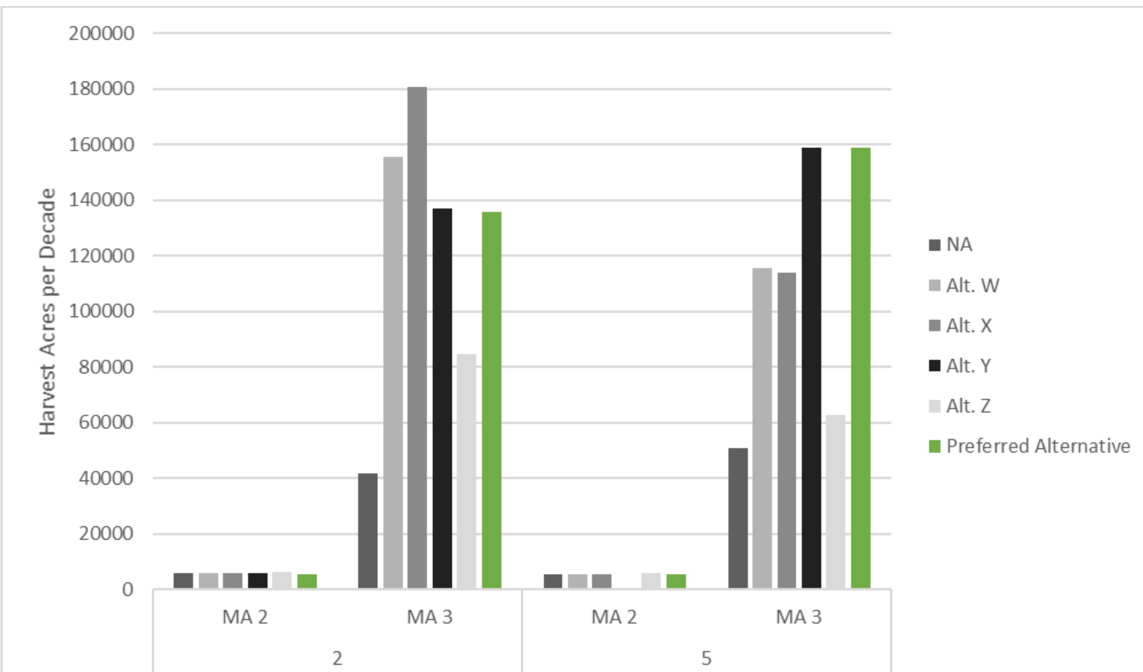


Figure 22. 20-year and 50-year predicted total acres harvested by management area and alternative under a reasonably foreseeable budget. Y-axis labeled in decades.

Data Source: Treatment_Tables_Graphs.xlsx.

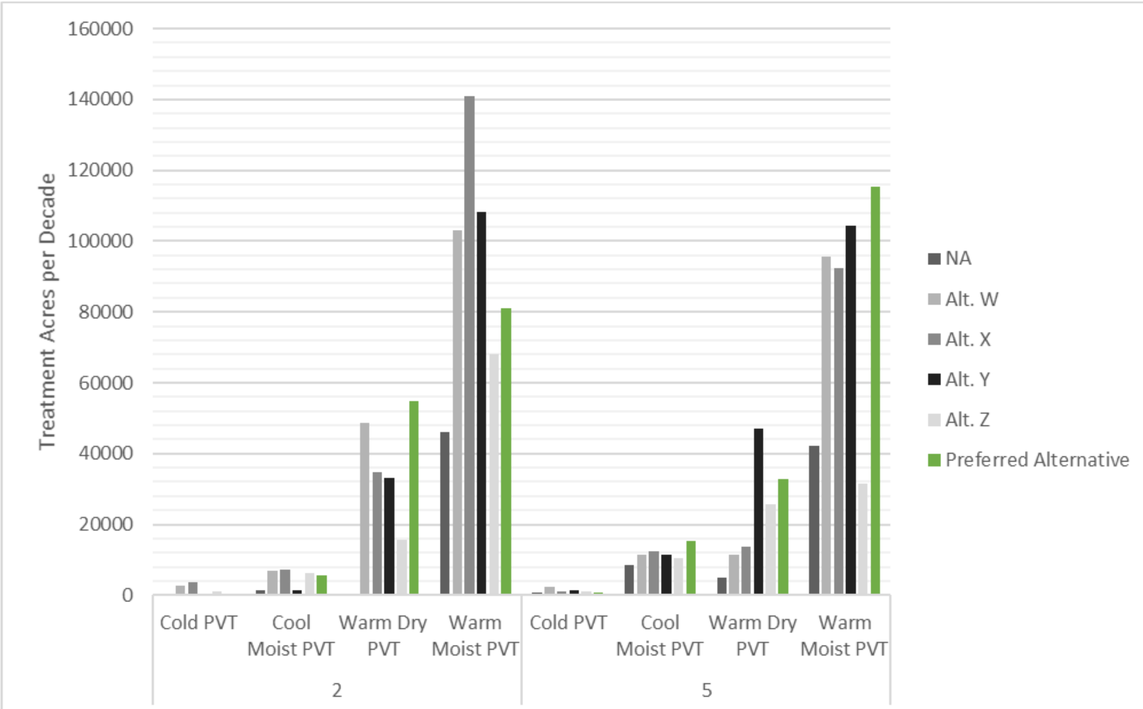


Figure 23. 20-year and 50-year predicted total acres harvested by potential vegetation type and alterative. Y-axis labeled in decades.

Data Source: Treatment_Tables_Graphs.xlsx.

As noted in the Timber section, across all action alternatives, the PRISM model generally selected warm moist forests for harvest treatment to best meet the desired conditions as defined by dominance type, density class, and size class distributions. The warm dry potential vegetation type group was also selected by the model to achieve desired conditions for Ponderosa pine. Alternatives W, X, Y, and the Preferred Alternative would generally do more to move warm moist forests toward more open densities and seral species dominance than Alternative Z and the No Action Alternative.

As shown in the Landscape Resiliency vegetation pattern section above, average patch sizes are projected to increase over time, specifically in the cool moist broad potential vegetation type. This may result in average patch sizes that trend toward the natural range of variation and desired condition. The Land Management Plan includes standards for maximum even-aged harvest openings based on the natural range of variation, for all alternatives. For all broad potential vegetation type groups, the maximum forestwide average patch size is 207 acres, which is consistent with the desired condition ranges as well as the broad-scale average patch size projected through time. This maximum patch size desired condition represents the average patch size under natural range of variation conditions. As such, it approximates the mean projected patch size but is aligned with the natural range of variation. This average patch size represents all forest disturbances resulting in an opening classified as either seedling or sapling size class or transitional forest. Therefore, to the extent that timber harvest affects the landscape, larger patch sizes may promote early successional stages and help to maintain stable dominance type communities. Patch size was not a variable included in the desired conditions for timber modeling (PRISM) but would be a consideration during implementation of the plan under any alternative. The No Action Alternative would result in a maximum opening size of 40 acres for all potential vegetation types (with exceptions as provided by law).

Regeneration harvest would alter forest size class, primarily resulting in seedling or sapling forests. Reforestation (planting or natural regeneration) would occur in these stands and can be used to achieve desired conditions for species composition. Other harvests include intermediate treatments or thinning. These treatments primarily reduce tree density but may also increase size class (when smaller trees are removed) and can change forest composition. Uneven-aged harvest tends to maintain or increase the shade tolerant tree species as compared to shade intolerant species, because of the small openings and denser forest canopy conditions but can also be used to promote uneven-aged stands of intolerant species such as Ponderosa pine. The projected harvest acres and subsequent vegetation changes produced by the PRISM model are incorporated into the SIMPPLLE model, and therefore their influence on the indicators for terrestrial vegetation are reflected in the results shown in this report.

Salvage Harvest

Under any alternative, salvage harvest may occur in burned areas or those infested with insects or disease, removing a portion of the dead trees for their economic value. The potential for this activity is not modeled. In practice, the term salvage is technically only applied as an intermediate harvest; in the case of stand replacing disturbance the cutting of dead trees is termed as a clearcut, seed tree, or shelterwood harvest as appropriate. However, the term "salvage" is used here more broadly to indicate any post-disturbance harvesting. Most land within the Nez Perce-Clearwater is in wilderness, recommended wilderness, or inventoried roadless areas where harvest, including salvage, would be prohibited or greatly limited and natural disturbances would be predominant, including wildfire that creates abundant burned forest conditions. Salvage would most commonly occur in lands suitable for timber production. Relative to terrestrial vegetation, the impacts of salvage would generally be consistent with a "green" harvest in terms of trees removed and reforestation, because the full suite of plan components that guide timber harvest would apply. The ecological effects of post-fire logging are influenced by various combinations and intensities of the fire itself and management activities that affect (1) ground disturbance by equipment and road use; (2) number of living and dead trees and their spatial pattern following harvest; (3) postharvest fuel treatment; and (4) in some cases, grass seeding and placement of various structures and materials to mitigate the effects of fire and logging (Peterson, Agee, et al. 2009). Post-fire harvest may fit into an effective restoration strategy if management pathways for attaining desired combinations of species, forest structure, and ecological functions are specified.

Fire and Fuels Management

Fire and fuels management provide tools to help achieve vegetation desired conditions and therefore generally result in positive impacts to terrestrial vegetation. Wildland fire can be the only feasible management option in landscapes where mechanical treatments are not allowed or are infeasible, such as Management Area 1 and Management Area 2. The objectives for fuel reduction are usually complementary to other desired vegetation conditions, especially related to forest resiliency. Plan components that allow for wildland fire and other fuel reduction activities exist in all alternatives. Management direction for the action alternatives emphasizes and provides greater flexibility in the use of wildland fire to improve vegetative conditions. The revised plan components are designed to recognize the natural role of fire on the landscape and its importance in shaping the ecosystem, while also protecting values at risk.

The PRISM model was used to generate the best solution for applying future prescribed fire to move towards desired conditions while considering resource constraints and management guidance for each alternative. These treatments were only applied in forested lands because that is the focus of PRISM modeling. In actual practice, additional prescribed burning in non-forested vegetation types would also occur. In the model, prescribed burning treatments were applied both as maintenance treatments within harvested stands, as well as stand-alone prescriptions. Figure 24 displays the average acres of projected prescribed burning by alternative for short term and long-term comparative periods. These projections are for comparison purposes only; the ability to achieve burning on the ground is highly uncertain and dependent upon many factors including weather windows. The PRISM model projects that under all alternatives; prescribed fire is utilized to a greater extent within Management Area 2 and 3 than in Management Area 1.

Within the PRISM modeling exercise, the number of acres treated with only prescribed fire is directly proportional to the number of acres treated through timber harvest only. As timber harvest increases, the number of wildland fire acres decreases. However, in terms of total acres treated, prescribed fire will remain the dominant treatment method at the landscape scale. At the project scale, timber harvest and prescribed fire are used in combination to achieve desired conditions. Attainment of desired conditions for dominance type, size class, and density require periodic removal or reduction in the number of late seral species components as well as stand densities. The tool used to accomplish desired conditions is largely a function of management area constraints and the management intensity required to achieve vegetation management objectives. Figure 25 presents the number of acres treated by prescribed fire by potential vegetation type group.

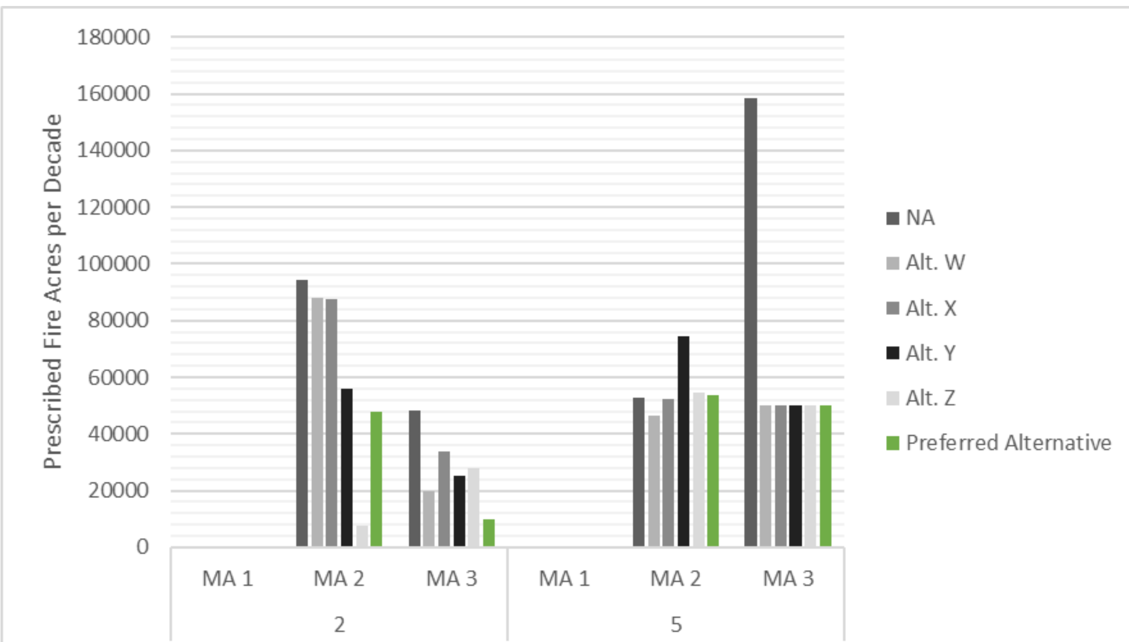


Figure 24. The 20-year and 50-year projected total prescribed burning acres by management area and alterative, under a reasonably foreseeable budget. The Y axis is labeled in decades.

Data Source: Treatment_Tables_Graphs.xlsx

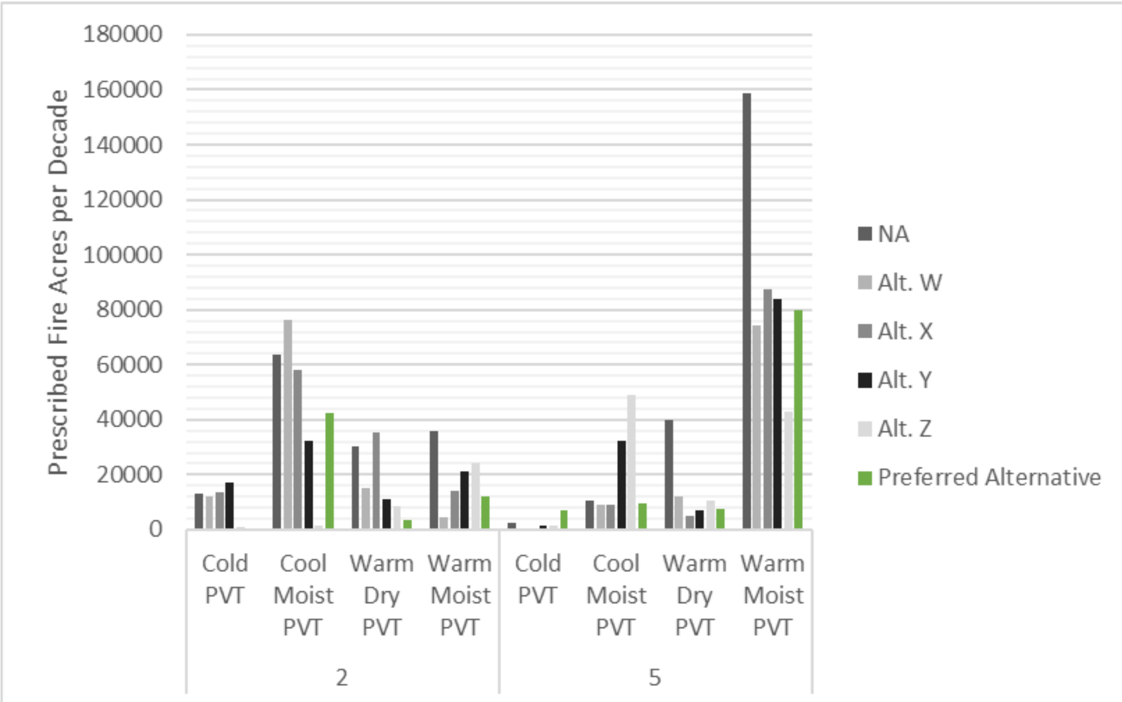


Figure 25. The 20-year and 50-year projected total prescribed burning in broad potential vegetation types by alterative, under a reasonably foreseeable budget. The Y axis is labeled in decades.

Data Source: Treatment_Tables_Graphs.xlsx

All alternatives apply greater amounts of prescribed fire to the warm moist potential vegetation type group than any other group. This is in response to the need to convert young stands dominated by grand fir into stands dominated by seral dominance types.

The effects from prescribed fire depend greatly on the vegetation type. For example, low severity underburning would be generally applied in the warm dry and, to a lesser extent, in the warm moist broad potential vegetation groups, where early successional fire-resistant species occur. The results would be more open forests with more fire tolerant species composition, and larger size classes as the smaller trees are killed by fire. Moderate to high severity burns would be applied in the warm moist, cool moist, and cold broad potential vegetation groups; in these areas, the result may be creation of seedling or sapling size classes, reduced densities, altered species composition, or increased size class. In non-forested vegetation types, fire would generally serve to maintain the dominance of grass and shrubs by killing small conifer encroachment, while possibly promoting and maintaining large, scattered trees in savanna areas. It would also stimulate the growth and vigor of many fire-adapted plants, while others would be killed in the short term.

In lands within the wildland urban interface and near communities, there would likely be a continued emphasis on fire suppression, although the action alternatives would allow for managing wildland fire on all areas when appropriate. Although both prescribed fire and other fuels treatments may occur across the landscape to achieve desired conditions, in the wildland urban interface in particular, it is likely that mechanical treatment methods would be needed in conjunction with prescribed fire to reduce hazardous fuels and create conditions conducive to more safe and effective suppression efforts. To achieve desired fuel conditions, there may be areas where forest conditions are created and maintained over the long term at lower densities, that is, very open and park-like conditions. This would be consistent with the natural disturbance regime found on many sites, such as in the warm dry potential vegetation group. However, in cases where cool moist forest types are found in the wildland urban interface the site-specific conditions could be more open than what would occur under natural disturbance regimes. This effect is common to all alternatives.

Recreation Opportunity Settings

Recreation opportunity settings are defined for all alternatives. The array of recreation opportunity Spectrum settings varies by each action alternative and influence both the potential access and type of vegetation treatments that can occur, particularly timber harvest as described in the Timber section. Alternative Z is most limiting to harvest in this regard, as it includes the most primitive and semi-primitive non-motorized settings. Alternative X is the least limiting, as it includes the most semi-primitive motorized and roaded natural settings, which are compatible with timber harvest and lands suitable for timber production.

Scenery

Under all alternatives, plan components associated with scenery may affect terrestrial vegetation through their influence on allowable vegetation treatments that could help move vegetation towards desired conditions. The magnitude and type of vegetation treatment (particularly timber harvest) in areas with higher scenic values may be limited. Effects to scenery are typically localized and would be determined in project-level analysis; in some landscapes, scenery plan components may align perfectly with terrestrial vegetation desired conditions, while in other landscapes these components may inhibit or delay achievement of desired vegetation conditions. However, because both vegetation and scenery objectives emphasize retaining or mimicking conditions that are consistent with natural processes, at the broad scale plan components related to scenery and visual quality would not likely preclude the achievement of desired conditions for terrestrial vegetation. The No Action Alternative uses visual quality objectives to define scenery management, whereas the action alternatives utilize scenic integrity objectives. Scenic integrity objectives offer greater flexibility and recognition of natural disturbance regimes and vegetation conditions. Alternative Z is most potentially limiting to vegetation management activities, as it has the most numerous high and very high scenic integrity objectives because of having the most recommended wilderness and primitive recreation opportunities. Alternative Y is the least limiting. Refer to the Timber section.

General Wildlife Management

Wildlife plan components under all alternatives would influence terrestrial vegetation management. In the existing forest plans, many of these elements are blended into management area guidance, and some complement terrestrial vegetation desired conditions as described in previous tables. For the most part, plan components for wildlife under the action alternatives are complementary to those of terrestrial vegetation. By design, the desired conditions for vegetation would benefit and provide for the wildlife habitat conditions that support the full suite of native species. This is the coarse-filter approach to providing ecological integrity.

Elk Management

Under all alternatives, the management of elk habitat is commensurate with managing for vegetation desired conditions. Management of elk habitat is focused on four components, including improved nutrition, distance from open motorized access, habitat use in context of elk use of slopes, and vegetation interspersion. Plan components do not vary by alternative or management area. The potential influences of elk management plan components cannot be explicitly modeled and quantified with PRISM or SIMPPLLE models but can be inferred from vegetation management plan components and modeled vegetation response to management.

Elk management plan components focused on improved nutrition are not likely to restrict timber harvest. Plan components influence the selection of treatment locations and the distribution of treatments focused on areas with the highest potential to produce high quality forage for elk. Management guidelines focused on access management are driven more specifically by forest level travel management decisions than road systems developed for timber harvest units. Most roads utilized for timber harvest unit access are temporary roads, which may or may not be accessible to the public. Elk management guidelines may influence the construction of new road segments proposed for timber access relative to location and closure status.

Given the scale of analysis for ecosystem restoration projects, elk management components focused on topographic position of elk habitats are not likely to influence decisions related to location of timber harvest units. Forestwide vegetation plan components are focused on moving vegetation towards desired conditions across all broad potential vegetation type groups located on all topographic positions. Arrangement of harvest units on the landscape are intended to reflect landscape forest patterns and variation in patch size resulting from the natural fire regime. Elk management components focused on vegetation interspersion are compatible with vegetation management components.

Canada Lynx Management

All alternatives would incorporate the Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007e), which would influence vegetation management and how desired conditions are applied in potential lynx habitat (roughly 20% of the Nez Perce-Clearwater). Refer to Appendix H of the Land Management Plan for the lynx plan components. Although the management direction applies to mapped occupied lynx habitat, the guidance should be considered on all mapped habitat on the national forest, including habitat that is currently considered unoccupied. Occupied lynx habitat was identified in the 2006 Amended Canada Lynx Conservation Agreement by the United States Forest Service and United States Fish and Wildlife Service, and currently includes only Management Area 1. However, because the guidance should be considered on all lands, and there is potential for occupied habitat to change, lynx management direction is applied and analyzed across the entire Nez Perce-Clearwater for forest planning purposes.

Several of the objectives of the lynx direction complement the terrestrial vegetation plan components by describing a desired condition to manage vegetation to approximate natural succession and disturbance processes (#1) and provide a mosaic of habitat conditions through time (#2). Further, objective #4 specifically points to the opportunity to utilize vegetation management to promote the development of desirable habitat characteristics.

Several standards and guidelines may potentially impact the management of terrestrial vegetation (VEG-S1, S2, S5, and S6). These standards include an exemption for fuel reduction treatments within the wildland urban interface, and exceptions to these standards may also occur for pre-commercial thinning to benefit other resources. The acres affected for S1, S2, S5, and S6 cumulatively must occur on no more than 6 percent of mapped lynx habitat. The number of acres that may be treated in the wildland urban interface by exemption or pre-commercially thinned by exception are determined in consultation between the Forest Service and the United States Fish and Wildlife Service; maximum acres that may be affected are defined for the Nez Perce and Clearwater National Forests separately as part of an Incidental Take Statement. Treatments that are conducted under the exemptions and exceptions are monitored. To date, over the 10 years since the adoption of the final lynx direction, the exemption or exceptions have been applied to less than 22 acres of mapped occupied habitat across the Nez Perce-Clearwater, which represents a small percentage of the allowable threshold.

The limitations of the lynx management direction were incorporated into the PRISM model, and therefore their influence is incorporated into the results displayed in this report. The effects tied to each standard individually are assessed in the following subsections.

Northern Rockies Lynx Management Direction Standard VEG-S1 and S2

Standards VEG S1 and S2 would potentially limit the amount of regeneration harvest that may occur. Standard VEG S1 requires that if more than 30 percent of the lynx habitat in a lynx analysis unit is currently in a stand initiation structural stage that does not yet provide hare habitat during winter, no additional habitat may be regenerated by vegetation management. Standard VEG S2 requires that timber management shall not regenerate more than 15 percent of lynx habitat on National Forest System lands in a lynx analysis unit in a 10-year period. These standards may limit potential vegetation treatments in some areas where seedling or sapling forests are abundant, particularly after a stand replacing disturbance. However, in those instances it is likely that the desired vegetation conditions would be consistent with not creating additional regenerating forest patches. Therefore, these standards should be complementary or at least not preclude the potential future achievement of terrestrial vegetation desired conditions.

Northern Rockies Lynx Management Direction Standard VEG-S5

Standard VEG S5 does not allow pre-commercial thinning that reduces snowshoe hare habitat in seedling or sapling size stands except in very limited situations. In addition to the exemption or exceptions allowed in the wildland urban interface previously described, other exceptions are provided for pre-commercial thinning within 200 feet of administrative buildings (#1); thinning for research studies or genetic tests (#2); thinning associated with aspen (#4); or whitebark pine restoration (#6). Finally, an additional exception (#3) is provided to allow for thinning based on new information that is peer reviewed and accepted at the regional level; however, this analysis and documentation does not yet exist.

This standard may reduce the effectiveness of achieving desired vegetation conditions across portions of the forest, as shown in the following tables. Although dense forests may be desired in some stands, in many others, pre-commercial thinning can be used to trend forests towards desired composition, densities, size classes, and improved resilience over time, especially in lands suitable for timber production. Early thinning can be more cost effective at achieving these goals than waiting until the trees are larger and more difficult to process. The following tables provide an illustration of the magnitude of the effect of standard VEG S5 on potential pre-commercial thinning opportunities.

Table 84. Seedling/sapling forests in potential lynx habitat in Management Area 1.

Option	Lynx Habitat (acres)	Seedling/Sapling Size Class	% Total Acres
No Action Alternative	617,798	90,429	14.6%
Alternative W	617,798	90,429	14.6%
Alternative X	617,798	90,429	14.6%
Alternative Y	617,798	90,429	14.6%
Alternative Z	617,798	90,429	14.6%
Preferred Alternative	617,798	90,429	14.6%

Table 85. Seedling/sapling forests in potential lynx habitat (both occupied and unoccupied) in Management Area 2.

Option	Lynx Habitat (acres)	Seedling/Sapling Size Class	% Total Acres
No Action Alternative	622,823	97,863	15.7%
Alternative W	622,228	97,863	15.7%
Alternative X	621,497	97,863	15.7%

Option	Lynx Habitat (acres)	Seedling/Sapling Size Class	% Total Acres
Alternative Y	622,672	97,863	15.7%
Alternative Z	625,947	97,863	15.6%
Preferred Alternative	622,239	97,863	15.7%

Table 86. Seedling/sapling forests in potential lynx habitat (both occupied and unoccupied) in lands suitable for timber production within Management Area 3.

Option	Lynx Habitat (acres)	Seedling/Sapling Size Class	% Total Acres
No Action Alternative	247,479	91,752	37.1%
Alternative W	248,074	91,752	37.0%
Alternative X	248,805	91,752	36.9%
Alternative Y	247,630	91,752	37.0%
Alternative Z	244,355	91,752	37.5%
Preferred Alternative	248,063	91,752	36.9%

The majority of lynx habitat is located within Management Areas 1 and 2 for all alternatives. Acres of lynx habitat within Management Area 3 have the highest percentage of acres in the smaller diameter classes.

The proportion of the lands suitable for timber production in a seedling or sapling size class within potential lynx habitat represent lands where pre-commercial thinning would most commonly be desired, and conversely that action would be delayed by lynx management direction. Pre-commercial thinning could not occur until the stands no longer provide habitat for snowshoe hare, that is, after the trees self-prune and no longer include green limbs that touch the snow surface in the winter. Hand thinning is generally most feasible and cost-effective when the trees in the stand are small, and therefore delaying treatment may render the action infeasible, and the opportunity to improve stand growth and quality could be foregone in some areas. The number of acres in this condition is consistent across all alternatives. Such areas that still provide snowshoe hare habitat could only be pre-commercially thinned if exception #3 can be met in the future through new peer-reviewed written documentation.

Pre-commercial thinning would not be feasible or needed in all of these young stands, depending on the site specific existing and desired conditions, nor would current or anticipated budget levels support thinning all these acres.

Northern Rockies Lynx Management Direction Standard VEG-S6
Except for the exemption for fuels treatments in the wildland urban interface (as described above), standard VEG S6 does not allow vegetation management that reduces winter snowshoe hare habitat in mature multi-story forests. This habitat condition most commonly develops on the cool moist and cold broad potential vegetation types in common with lynx habitats. Other exceptions are provided for treatments within 200 feet of administrative buildings, dwellings, outbuildings, recreation sites, and special use permits including ski areas (#1); treatments for research studies or genetic tests (#2); or for incidental removal during salvage harvest (#3). VEG S6 also notes that timber harvest could be used to create openings to improve hare habitat in stands with poorly developed understories.

Mature multi-storied hare habitat is common and currently comprises not less than 30 percent of the potential lynx habitat area across the Nez Perce-Clearwater. This amount will fluctuate over time as the condition is removed by disturbance and develops in other stands. Under all alternatives, the SIMPPLLE model predicts the amount of multistory habitat to increase for the first few decades (to nearly 40 percent of the potential lynx habitat area forestwide) and then decrease again to about 30 percent of the potential lynx habitat area forestwide by decade 5. Therefore, this standard is likely to be more limiting in the future than in the current condition, with any alternative.

Adhering to VEG S6 would result in harvest and prescribed fire treatments rarely being feasible in multi-story mature forests in potential lynx habitat due to the likely damage to understory trees. This limitation would limit vegetation management to the greatest extent in potential lynx habitat outside of the wildland urban interface, which represents roughly 34 percent of the Nez Perce-Clearwater in all alternatives. Much of this area is in inventoried roadless, recommended wilderness, or designated wilderness areas where the only vegetation treatments that could occur would be prescribed fire.

VEG S6 would potentially reduce or delay the ability to achieve desired vegetation conditions in some areas, such as increasing the abundance and resilience of whitebark pine. The inability to apply vegetation management in whitebark pine forests where fire exclusion has allowed spruce or fir canopy layers to develop would result in foregoing some whitebark pine restoration opportunities; refer also to the At-Risk Plant Species section. In addition, achieving resiliency through management in other stands by promoting early seral species (such as Western white pine) or more open tree canopies would not occur in mature multi-storied stands that intersect lynx habitat.

Mature multi-story hare habitat is likely to be susceptible to high severity fire as well as to damage and mortality from Western spruce budworm, bark beetles, and other agents. Therefore, vegetation management to promote the development of future mature multi-storied hare habitat, as allowed in VEG S6, may be warranted in some areas. This guidance would influence the types of prescriptions selected in some projects (that is, selecting uneven-aged management to promote the development of spruce or fir multi-storied stands, rather than another vegetation treatment that would promote other structures or species).

At the broad scale, the promotion of mature multi-storied forest is an important piece of the desired vegetation mosaic. VEG S6 would not necessarily preclude a trend towards other terrestrial vegetation desired conditions, in large part because vegetation treatments are predicted to influence a relatively minor proportion of the landscape. Still, this standard may have some impact on the potential to achieve specific desired conditions related to lodgepole pine and whitebark pine forests. The vegetation modeling included parameters that did not allow timber harvest or prescribed fire within existing mature multi-storied stands in potential lynx habitat. While this condition currently represents only about 20 percent of the forests on the cool moist and cold broad potential vegetation types, the amount is predicted to increase over time. The model also predicted a decrease in the lodgepole pine cover type and a fairly static trend for whitebark pine, along with increases in spruce or fir on the cool moist and cold broad potential vegetation types. Therefore, VEG S6 may become increasingly limiting in the future and represent some tradeoffs with the potential to achieve other desired conditions through active management.

Under any alternative, the achievement of desired vegetation conditions and lynx habitat would require integration of the full suite of desired conditions for a given landscape, and appropriately assigning vegetation management in time and space.

Fisher Management

Fisher habitat management applies to Alternative Z and the Preferred Alternative only. Fisher habitat generally follows distribution of warm moist potential vegetation type (even though fishers sometimes use other potential vegetation types). Fisher habitat is composed of large patches of tall forest (trees ≥ 25 m tall, see glossary) arranged in complex, highly connected patterns at landscape scale (20–40 sq mi). Patches of tall forest cover an extent of approximately 50 percent across warm moist potential vegetation type group forestwide (consistent with desired conditions in warm moist potential vegetation type section, Table 68). At the home range scale (8 sq mi), fishers benefit from variety in successional stages resulting from patchy mosaic of stand heights that occur in patterns that reflects natural disturbance (see Warm Moist potential vegetation type). The shapes, sizes, distribution, density, and height of forest patches vary by topography, slope, aspect, and topographic position (for example, ridge, mid-slope, toe slope, valley bottom) to provide variety in fisher habitat (for example, seasonal habitats, denning, foraging). Some stands of tall forests, distributed across the warm moist potential vegetation type, provide a high prevalence of large trees and snags (20 inch + DBH), abundant coarse woody debris, and multiple canopy layers (denning and resting habitat). Desired condition is based upon best available science (Sauder and Rachlow 2014, Sauder 2014), however it may be adjusted in the future by new science that produces improved understanding of fisher habitat. Table 87 illustrates the number of acres within Management Area 3 that are classified as potential fisher habitat. Approximately 65 percent of the Management Area 3 is classified as potential fisher habitat.

Table 87. Comparison of Management Area 3 fisher habitat acres under Alternative Z and the Preferred Alternative.

Option	Fisher Habitat Total Acres	Fisher Habitat Total MA3 Acres	% MA3 with Potential Fisher Habitat
Alternative Z	1,233,180	806,261	65
Preferred Alternative	1,240,340	806,261	65

Limitations of the fisher management direction were incorporated into the PRISM model, and therefore their influence is incorporated into the results displayed in this section.

Plan component FW-DC-WL-04, may reduce the effectiveness of achieving desired vegetation conditions within the warm moist potential vegetation type group associated with Management Area 3. Although large patches of mature forests may be desired in some stands, in many others multi-canopy stands composed of younger age classes can be used to trend forests towards desired composition, densities, size classes, and improved resilience over time, especially in lands suitable for timber production. This may be particularly important for converting late successional cover types such as grand fir toward an early successional stage composed of seral species. However, promoting Western redcedar dominance types is an example of achieving both desired conditions for terrestrial vegetation and maintain fisher habitat.

Watershed and Conservation Watershed Management

Watershed plan components exist for all alternatives but are more specific in the action alternatives than in the No Action Alternative. One way that watershed plan components would influence terrestrial vegetation is through their constraint on potential timber harvest; refer to the Timber section (FW-STD-TBR-03), Conservation Watershed Networks and the Water Resources sections. Watershed plan components may also either limit or encourage other forms of vegetation management, such as prescribed fire and tree planting, to maintain the appropriate level and types of vegetation cover that reduce erosion potential as well as the risk of uncharacteristic fire effects. These components are not built on the concepts of the natural range of variation and, therefore, would not complement or may preclude the achievement of the terrestrial vegetation desired conditions as described in this report. The management direction found in the action alternatives recognizes more flexibility in potential scenarios related to vegetation and natural disturbances than the No Action Alternative.

Soils Management

Under all alternatives, plan components related to soils would generally benefit terrestrial vegetation by ensuring that soil productivity is maintained in the long-term. Standards and guidelines related to soils may limit vegetation management activities, such as timber harvest and prescribed fire, by restricting activities, timing, or conditions that may be detrimental to soils. The action alternatives provide greater specificity in the standards and guides for soils than the No Action Alternative, particularly with respect to allowable detrimental disturbance and post-treatment ground cover and coarse woody debris requirements.

Aquatic Habitat and Riparian Management

Measures to protect aquatic habitat and riparian areas apply under all alternatives near streams, water bodies, and wetlands, as well as upland segments between streams. Riparian management zones are defined differently depending on the alternative, as described in the Water Resources, Aquatic Ecosystems and Fisheries, and Soil Resources sections. Plan components would limit and guide the type, amount, and location of vegetation treatments that have the potential to impact riparian resources, as well as requiring retention of trees and other forest components. Refer to the Timber section. As with conservation watershed network plan components, desired conditions for aquatic habitat and riparian areas are not based on a natural range of variation analysis. Many plan components have been developed to ensure a variety of forest activities are designed to protect, enhance, or restore riparian and aquatic resources to promote recovery of endangered fisheries.

Riparian management zones are narrow, linear features on the landscape that help provide for wildlife habitat connectivity, late successional forest features, and refugia for seed sources; therefore, plan components that encourage the retention of these features would generally complement terrestrial vegetation desired conditions. All action alternatives recognize that vegetation treatments, including prescribed fire, within riparian management zones may be beneficial and needed to achieve desired conditions and provides direction to increase efficiency and flexibility for managing in certain areas within riparian management zones, as determined through site-specific analysis. Though vegetation treatments in riparian management zones are not prohibited in the existing Forest Plan, the No Action Alternative does not provide clear direction or flexibility, and thus could be more limiting on the ability to trend forest towards desired conditions.

Recommended Wilderness Area Management

The alternatives vary in the quantity and location of recommended wilderness areas, ranging from none in Alternative X, to 856,932 acres in Alternative W. The extent to which recommended wilderness impacts forestwide management strategies vary greatly between alternatives. Alternative W has the largest percentage of land (51 percent) allocated to both wilderness and recommended wilderness, while Alternative X has the lowest at 29 percent. The Preferred Alternative has 35 percent of land area designated as either wilderness or recommended wilderness. Recommended wilderness areas are currently designated as roadless areas under the Idaho Roadless Rule. Within these areas, all action alternatives would have the same level of ability to achieve desired vegetation conditions within recommended wilderness areas using vegetation treatments. All have Land Management Plan direction that allow restoration activities to occur if the ecological and social characteristics that provide the basis for wilderness recommendation are maintained and protected. Anticipated vegetation treatment activities would largely be associated with restoration of Western white pine in the warm moist broad potential vegetation type groups and whitebark pine forest communities occurring in high elevation ecosystems. There may be other treatments occurring to achieve restoration objectives outlined in the plan components. The most likely treatment would be prescribed burning (planned ignition), in some cases followed by limited planting of conifer seedlings. Objectives would include restoration of desired forest structure and compositions, and to restore desired landscape patterns.

Future wilderness designation from recommended wilderness areas is not likely over the life of the land management plan. However, new wilderness designations would result in reduced flexibility and options for vegetation management to achieve desired conditions compared to the existing land use designation. Desired conditions for recommended wilderness would be achieved through wildland fire and natural disturbance processes only. The opportunity to maintain and restore whitebark pine would be very limited.

Suitable Wild and Scenic Rivers

The action alternatives vary in the quantity and location of suitable wild and scenic rivers, ranging from none in Alternative X to 166,176 acres in Alternative Z and 183,808 acres under the No Action alternative. For the No Action Alternative, the existing identified wild and scenic rivers are eligible for designation. Wild and scenic river suitability, as well as designation, are distinguished by three separate categories: wild, scenic, and recreational. For suitable wild river corridors, cutting of trees and other vegetation is not allowed within the corridor except when needed to maintain a primitive recreation experience, to protect users, or to protect outstandingly remarkable values. Wildland fire may be used to restore or maintain habitat for threatened, endangered, or sensitive species or to restore the natural range of variation. For suitable scenic and recreational river corridors, a range of vegetation management treatments are allowed within the corridor if these practices are designed to protect users, or protect, restore, or enhance the river environment and its outstandingly remarkable values.

Eligible and suitable wild and scenic river corridors are mainly located in Management Area 2 and would be managed under the vegetation management restrictions associated with such designations. Within these areas, desired conditions for vegetation would be obtained primarily through natural disturbance processes. Scenic and recreational river corridors across the action alternatives would have the same level of ability to achieve desired vegetation conditions using vegetation treatments. Scenic and recreation river corridors have Land Management Plan direction that allow restoration activities to occur if the ecological and social characteristics that provide the basis for scenic and recreational recommendation are maintained and protected. Anticipated vegetation treatment activities would largely be associated with the restoration of highly departed vegetation conditions or in response to disturbance events which have compromised the integrity of management objectives. There may be other treatments occurring to achieve restoration objectives outlined in the plan components. The most likely treatment would be prescribed burning (planned ignition), in some cases, followed by limited planting of conifer seedlings. Objectives would include restoration of desired forest structure and compositions and to restore desired landscape patterns.

Future wild and scenic river designation areas could be anticipated. Determination of suitability for wild and scenic river designation would likely result in reduced flexibility and options for vegetation management to achieve desired conditions.

Cumulative Effects

The effects that past activities have had on all of the components of forest vegetation (for example, forest composition and structure, landscape pattern, etc.) were discussed in the Affected Environment section and are reflected in the current condition of the forest vegetation. Therefore, unless otherwise noted, past activities are not carried forward into the following cumulative effects analysis. In addition, the Measurement Indicators section above that discusses consequences to vegetation from Land Management

Plan components associated with other resource programs is a form of cumulative effects analysis. Present and foreseeable future activities that could affect forest vegetation are summarized below.

Changing human populations

Human populations are projected to increase adjacent to the plan area which will likely result in additional stressors to the ecological systems of the Nez Perce-Clearwater. Increasing population levels, both locally and nationally, increase demands and pressures on public lands. Refer to the Social and Economics sections. As related to forest and vegetation conditions, these changes may lead to increased demands for commercial and non-commercial forest products, elevated importance of public lands in providing for habitat needs of wildlife species, and changing societal desires related to the mix of uses public lands are expected to provide.

Management of Adjacent Lands

Portions of the Nez Perce-Clearwater adjoin other national forests, each having its own forest plan. The Nez Perce-Clearwater is also intermixed with lands of other ownerships, including private lands, other federal lands, and state lands. Some management areas contain inholdings of such lands, while others are more contiguous in terms of ownership.

Harvesting or conversion of forests on adjacent lands would affect vegetation conditions at the landscape level, changing forest composition and structures. Idaho Forest Practices regulations apply to all harvest activities regardless of ownership; therefore, basic resource protections would be consistent. However, harvest practices on other lands would not necessarily be conducted to meet the same desired conditions as those outlined in the Nez Perce-Clearwater Land Management Plan. Forest pattern (patch sizes, shapes) would potentially be affected by treatments on non-National Forest Service (NFS) lands immediately adjacent to NFS lands. Forest conditions on adjacent lands may influence pattern, extent, or intensity of natural disturbances within forests on NFS lands, for example fuel conditions and fire hazard or potential spread of insect and pathogen populations. Forest conditions on NFS lands will be important for their contribution to maintaining desired biodiversity at the broad landscape scale.

Adjacent lands are subject to land management under their own resource management plans. The cumulative effects of these plans in conjunction with the Nez Perce-Clearwater Land Management Plan are summarized in Table 88. Summaries of applicable terrestrial vegetation are provided for each land management plan.

Table 88. Summary of cumulative effects to terrestrial vegetation from other resource management plans.

Resource plan	Description and Summary of effects
Adjacent National Forest Plans	The forest plans (or land management plans) for National Forest System lands adjacent to the Nez Perce-Clearwater include the Idaho Panhandle, Payette, Wallowa-Whitman, Bitterroot, and Lolo National Forests. All plans deal with terrestrial vegetation. Management of vegetation is consistent across all national forests due to law, regulation, and policy. The cumulative effect would be that the management of vegetation would be generally complementary.
Idaho Forest Practices Act (1974) and State of Idaho Forest Practices Water Quality Management Plan (1988)	This act and associated management plans guide forest management on state endowment lands. It includes many concepts that are complementary to plan components for the Nez Perce-Clearwater, for example promoting forest resilience, providing wildlife habitat, and reducing hazardous fuels. While specific desired conditions are not stated in the same terms as the Nez Perce-Clearwater, it is likely that some elements such as increasing

Resource plan	Description and Summary of effects
	large trees, early seral species, and open forests would be similar. State forest lands may be actively managed to a greater degree than national forest system lands and would likely contribute to achievement of desired vegetation conditions across the landscape.
Nez Perce Tribe Forestry and Fire Management Plan (https://nezperceforestryandfire.com/forestry/)	The Nez Perce Tribe manages some 770,000 acres of tribal trust lands in north and central Idaho; a portion of which is adjacent to the Nez Perce-Clearwater. The Nez Perce Forest Management Plan provides for economically, socially, and environmentally sustainable forest management of tribal lands. The Nez Perce Tribe forest management strategy is complementary to the Land Management Plan components.
U.S. Army Corps of Engineers, Walla Walla District, Dworshak Five Year Vegetation Management Plan (2015-2020) (U.S. Army Corps of Engineers 2015)	The U.S. Army Corps of Engineers manages approximately 29,318 acres of forest land surrounding Dworshak Reservoir and another 1,760 acres of flowage easement located on the Nez Perce-Clearwater. The Corps management plan includes vegetation in accordance with ecosystem management principles to improve forest health and elk habitat, while maintaining protection of important resources and adhering to federal land management regulations. This ecosystem management approach is complementary to vegetation management proposed in the Nez Perce-Clearwater forest plan.
Idaho State Parks and Recreation Strategic Plan (Idaho Department of Parks and Recreation 2018)	These plans guide the management of state parks, some of which lie nearby or adjacent to national forest system lands. Terrestrial vegetation is a component of these parks, although not always the primary feature. Specific vegetation conditions would not necessarily contribute to the desired conditions as described for the Nez Perce-Clearwater.
Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b)	This plan describes a variety of vegetation conditions related to habitat for specific wildlife species. This plan would likely result in the preservation of these habitats on state lands, specifically wildlife management areas. This plan would interact with the Idaho Statewide Forest Resource Strategy (above). The vegetation conditions described would be complementary to the conditions being managed for with the Nez Perce-Clearwater Land Management Plan.
County wildfire protection plans	Some county wildfire protection plans map and define the wildland urban interface. The Nez Perce-Clearwater notes that these areas may be a focus for hazardous fuels reduction, and other plan components (such as Northern Rockies Lynx Management Direction) have guidance specific to these areas. Managing for open forests and fire adapted species may be particularly emphasized in these areas. Overall, the effect of the county plans would be to influence where treatments occur to contribute to desired vegetation conditions.
Private Industrial Forest Management Companies	Private industrial forest management companies have land holdings adjacent to lands administered by the Nez Perce-Clearwater. Private industrial lands are generally managed to produce the highest economic return on investment. At the landscape scale these lands typically represent forest communities which are maintained in early successional stages and are managed to minimize insect and disease occurrence. While these lands are not typically managed for multiple ecosystem services, they are managed for long-term sustained yield of forest products. As such, management of these lands is not contradictory to plan components of the Nez Perce-Clearwater Land Management Plan.

Effects to Resource from Other Resources

Climate Change

Refer to the Climate Change and Forest Carbon Section and Appendix G – Climate Change and Carbon for a broader discussion of climate change and potential effects to forested ecosystems.

Livestock Grazing

In all alternatives, livestock grazing would occur on portions of the Nez Perce-Clearwater within designated livestock grazing allotments. Plan components would enable grazing activities to complement terrestrial vegetation management. While grazing and trampling from livestock can damage native plants and tree seedlings and saplings, plan components are in place that would ensure that grazing is managed to promote sustainable and vigorous native plant communities. Further, components are in place that would ensure that grazing does not adversely impact the regeneration of forests, or re-seeding of non-forested areas with desirable native vegetation. Plan components would strive for desired conditions for grasslands, meadows, and riparian areas.

Air Quality

The consequences to terrestrial vegetation from air quality related Land Management Plan direction are the same for all alternatives. All alternatives have direction to meet air quality standards established by federal and state agencies and meet the requirements of state implementation plans and smoke management plans. The direction limits how much can be burned and when and where it can occur. The costs of conducting prescribed fires increases because of burning regulations and inflation over time, which affect how much is burned. The ability to implement the vegetation treatments that would occur because of the alternatives is dependent upon prescribed burning as well as using natural, unplanned ignitions to meet resource objectives. Therefore, to the extent that air quality regulations may become more stringent in regard to the quantity and timing of smoke emissions, there could be limitations to conducting prescribed burning.

Mining and Mineral Extraction

Mining undergoes site-specific National Environmental Protection Agency analysis to determine effects and required mitigation, and effects to vegetation from mining is determined at the project level. Generally, the impacts to terrestrial vegetation from mineral extraction on the forest are localized and insignificant at the forestwide scale Refer to the Energy and Minerals section (Chapter 3.5.2) for a broader discussion of effects.

Summary of Consequences

This forestlands analysis is designed to evaluate the effectiveness of Land Management Plan components to achieve or move toward desired conditions developed for forest vegetation. Desired conditions for forested vegetation are informed by the natural range of variation for specific forest metrics. Desired conditions for forest vegetation were developed through an interdisciplinary process to account for multiple resource needs, concerns, and objectives. This process is intended to purposely interweave desired conditions for vegetation with desired conditions for wildlife habitat.

Selected measurement indicators are used to compare the effectiveness of each alternative to achieve or move toward six key ecosystem characteristics. This relationship is illustrated in Table 89 which is reproduced here for ease of comparison. No weighting criteria is applied to the rankings. Each ecosystem characteristic is given equal weight in the analysis to promote objectivity and to simplify comparisons.

Table 89. Ecosystem characteristics, measurement indicators, and measures.

Ecosystem Characteristic	Measurement Indicator	Measure
Vegetation composition	Dominance types	Percent of area
Size class distribution	NTG classes (based on basal area weighted diameter)	Percent of area
Forest density	Classes based on canopy cover density	Percent of area
Landscape resilience	Resilience indicators	Insect and disease hazard ratings
Landscape resilience	Resilience indicators	Projected wildland fire
Landscape resilience	Resilience indicators	Landscape pattern/patch size
Rare/Unique habitat elements	Aspen prevalence	Percent of area
Old growth	Resilient old growth	Percent of area

No single alternative achieves the highest level of desired condition containment for all measurement indicators (Table 90). Overall, the Preferred Alternative achieves the highest level of attainment of desired conditions. Alternatives W, X, Y, and the Preferred Alternative are generally very close in overall performance. The No Action Alternative and Alternative Z clearly performed below the other action alternatives. This comparative analysis validates the selection of the Preferred Alternative as an effective strategy for attainment of vegetation desired conditions.

Table 90. Forestlands summary of consequences by alternative.

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Dominance Types	Low	High	High	Moderate	Low	Moderate
Size Class Distribution	Low	Low	Moderate	Low	Moderate	High
Forest Density	Low	Moderate	Moderate	High	Low	High
Landscape Resilience	Moderate	High	Low	Low	Moderate	Moderate
Rare/Unique habitats	Moderate	Moderate	High	Moderate	Low	Low
Old Growth	High	Low	Low	Moderate	High	Moderate

Data Source: Summary Ranking.xlsx.

Conclusion

The following key points summarize the conclusions for terrestrial vegetation:

Broadly, desired conditions are characterized by increases in the very large forest size classes, reduction in closed canopy forest densities within Management Area 3 and vigorous non-forested plant communities and increasing early-seral shade intolerant species as compared to the existing condition while maintaining the full range of biodiversity on the landscape. These conditions are consistent with the modeled natural range of variation and most likely to be resilient in the future.

Expected trends for terrestrial vegetation forestwide show little to no variance across alternatives, due to the limited scope and impact of vegetation management treatments at the landscape scale. Effects of vegetation treatments are masked by the effects of natural disturbances.

Total acres of prescribed burning required to achieve desired conditions are attainable based on reasonably foreseeable budgets.

Modeling of future conditions predicts increases in Ponderosa pine, Western white pine, Western larch and whitebark pine along with decreases in grand fir and Douglas fir across all broad potential vegetation types on most landscapes; reductions in lodgepole pine and increase in spruce or fir on cool moist and cold potential vegetation types are predicted.

Modeling of future conditions predicts increases in the seedling or sapling, medium and very large size classes, and reductions in the large size class. The total area composed of grass or forb stage is also reduced in Management Area 3 as forest succession proceeds.

Modeling of future conditions predicts increases in the low to medium density class along with reductions in the high-density class within Management Area 3, as well as reductions in single-storied forests and increases in multi-storied forests. The opposite trend is predicted to occur within Management Areas 1 and 2.

Modeling of future conditions indicates a trend toward increased patch size and average area weighted mean patch size, thus increasing the percentage of early successional forests, and reducing the effects of fragmentation.

A variety of plan components will ensure non-forested areas, particularly riparian areas, meadows, and grasslands, are managed for protection and enhancement of associated plant communities.

3.2.2 At-Risk Plant Species

This section presents potential impacts on at-risk plant species from plan components and from management actions from other resource programs. Species reviewed are federally listed or species that are formally proposed or candidates for listing; Nez Perce-Clearwater service species of conservation concern are listed under direction of the 2012 Planning Rule or are on the present U.S. Forest Service Northern Region Forester's sensitive species list. The Nez Perce-Clearwater has a legal requirement to maintain or improve habitat conditions for species federally listed under the Endangered Species Act by the U.S. Fish and Wildlife Service. Management actions that disturb habitats, disrupt soil surfaces, or otherwise contribute to impacts on at-risk species within a particular portion of the Nez Perce-Clearwater could affect the capacity of that landscape to support the species. The Nez Perce-Clearwater is required to identify and mitigate potential effects to these species from land-disturbing actions to comply with the Endangered Species Act and agency policies.

Rare plants contribute to the diversity of plant communities based on the suitability and capability of the landscape to contribute to overall multiple use objectives of the National Forest Management Act. They also contribute to recreational opportunities for rare plant enthusiasts and scientific researchers for the multiple use of resources and benefits to people.

Rare plant species occur throughout the Nez Perce-Clearwater, but sites of high representation and general floral diversity occur in areas of coastal disjunction in the low elevations of the larger Clearwater Basin tributaries, larger grassland complexes, and arid non-forest habitats that form islands in the general mesic forest types. The flora of the Salmon River axis and high Bitterroots are less known due to reduced access and little past project level analysis.

Relevant Laws, Regulations, and Policy

Federal Laws

Endangered Species Act. Requires federal agencies to protect and recover threatened and endangered species.

The National Forest Management Act of 1976 states it is the policy of U.S. Congress that plans shall provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area to meet the overall multiple-use objectives.

Agency Regulations

36 CFR 219.9 states that the responsible official will evaluate whether the plan components provide the ecological conditions necessary to contribute to the recovery of federally listed species, conserve proposed and candidate species, and maintain a viable population of species of conservation concern in the plan area. Evaluation would consider components that provide for ecosystem integrity and diversity and species-specific components.

Policy

The Forest Service Manual (FSM) contains legal authorities, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff in more than one unit to plan and execute assigned programs and activities.

Forest Service Handbooks (FSH) are the principal source of specialized guidance and instruction for carrying out the direction issued in the Forest Service Manual.

FSH 1909.12.5. The directives provide specific information regarding implementation of the 2012 Planning Rule, including identifying at-risk species and guidance for development of plan components for at-risk species and to provide ecological sustainability. The directives state that plan components developed for ecosystem integrity are expected to provide conditions that will maintain the persistence or contribute to the recovery of native species within the plan area. They also state that if components for ecosystem diversity are not adequate to do that for at-risk species, then species-specific plan components should be developed.

FSM 2670.5. Defines sensitive species as those plant and animal species identified by the Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers, density, or habitat capability that reduce a species' existing distribution. Under the 2012 Planning Rule, species of concern will replace sensitive species, but sensitive species must be included in planning analysis as such until the new Land Management Plan is enacted.

FSM 2670.22. Directs management for sensitive species to ensure that species do not become threatened or endangered because of Forest Service actions and to maintain viable populations of all native species.

Methodology

Spatial Scale

The geographic scope of the analysis for effects to rare plants is the lands administered by the Nez Perce-Clearwater. This area represents the National Forest System lands where changes may occur to rare plants or habitats from activities that result from the various alternatives. Rare plant species included in the analysis are those that are either listed under the Endangered Species Act, are species of concern, or are on the U.S. Forest Service Northern Region Forester's sensitive species list. The range of a species may extend beyond the Nez Perce-Clearwater; however, the lands administered by the Nez Perce-Clearwater represent the area where changes may occur to these species or their habitats from activities that might be allowed under the alternatives.

Temporal Scale

The temporal scope of the analysis is the anticipated life of the plan.

Past, Present, and Future Activities used in the Analysis

Due to the highly diverse habitats at-risk plant species occupy, the list of activities that may cause threats and stressors to affect plants is extensive and varies by species guild. Generally, timber management, hydrologic changes, grazing, and indirect effects of weed invasion and treatment are often the most important to one or more guilds. A review of the effects of various activities, as well as general and specific plan components, are reviewed in this report. These effects are largely responsible for creating the existing condition for these species and will continue to be the primary agents affecting them into the future. Additional or increasing effects will occur as growing human populations increase forest uses and demands for resources. Climate change will also act to alter forest vegetation and potentially the response of ecosystems and species dependent upon them to activities. Also, potential changes in species status may occur, such as the recent listing of whitebark pine and the delisting of water howellia.

Methods and Assumptions

The indicators were measured by a review of threats and stressors discussed at the species guild level. In this analysis, at risk plant species are grouped into guilds based upon the habitats they occur in. The effects included known factors, potential factors and effects associated with other resource areas and plan components. The number of species and occurrences of species is quantified through general land use categories that are loosely based upon management area designation. These are altered slightly to create general disturbance categories with similar relative threats for alternative comparison.

The first category for comparison is the undeveloped and most protected areas that consist of designated Wilderness Areas, recommended Wilderness Areas, National Historic Landmarks, Research Natural Areas and designated Wild and Scenic Rivers. This area is similar to Management Area 1, but with the addition of recommended wilderness and Research Natural Areas.

The second category is the less protected Inventoried Roadless Areas and suitable Wild and Scenic River in Management Area 2, minus recommended wilderness or research natural areas, which were added to the most protected category because of similarity of effects. Management of these areas may occur subject to appropriate resource measures and regulations that are consistent with these designations.

The third category for comparison is Management Area 3, which has a multiple-use emphasis and includes all lands suitable for timber production.

A summary discussion comparing these measures across the alternatives is provided with effects determinations for species reviewed.

Measurement Indicators

The indicator for analysis is the potential for adverse effects on rare plant species from ground-disturbing activities or other applicable threats or stressors. A quantitative indicator compares the number of at-risk species and occurrences of those species in general threat categories across the alternatives.

Affected Environment

Existing Condition

Table 91 summarizes the status of 51 species reviewed in this analysis. There are three federally listed species; 41 plant species on the U.S. Forest Service Northern Region sensitive species list and 30 species of conservation concern. The latter two groups share several species in common. The analysis also uses habitat guilds that allow for efficient discussion of species occurring in similar habitats. Status changes during the forest planning process include the removal of water howellia from threatened status (U.S. Department of the Interior 2021b) and change of whitebark pine from candidate (and consequent removal from the Sensitive Species list) to proposed for listing (U.S. Department of the Interior 2020b) and finally listing as threatened effective in January 2023 (U.S. Department of the Interior 2021b).

Federally Listed At-Risk Plant Species

Species federally listed as threatened or endangered, proposed, and candidate are listed by the U.S. Fish and Wildlife Service. Under provisions of the Endangered Species Act of 1973, federal agencies are directed to conserve endangered and threatened species and to ensure that actions authorized, funded, or carried out by these agencies are not likely to jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of their critical habitats. These species are automatically considered "at-risk" species under the 2012 Planning Rule.

Two federally listed species, Spalding's catchfly and whitebark pine are known to occur on the Nez Perce-Clearwater National Forest. One additional threatened plant species, Macfarlane's four o'clock, is included in project level analysis for some parts of the Nez Perce-Clearwater following direction from the U.S. Fish and Wildlife Service that is based upon species distribution and occurrence of nearby habitats; however, despite the presence of populations very close to the Forest boundary, the species has not been found on lands administered by the Forest.

Table 91. Federally listed U.S. Forest Service Northern Region sensitive species and species of conservation concern in the plan area

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
Asplenium trichomanes Maidenhair spleenwort		G5/S1	●	●	Moist, rocky, cliff crevices, and outcrops; humid mesic forests on the Nez Perce-Clearwater.	Rocky
Astragalus paysonii Payson's milkvetch		G3/S3	●		Openings, gaps and transitional habitats in early-mid-seral mixed conifer forests; generally, in areas of grand fir potential vegetation.	Transitional
Blechnum spicant Deerfern		G5/S3	●	●	Shaded understory of mid-to-late-seral western redcedar. Often associated with riparian areas.	Mesic Forest
Botrychium crenulatum Crenulate moonwort		G4/S1	●		Shaded moist sites; generally, under mature western redcedar or meadows.	Mesic Forest
Botrychium lanceolatum var. lanceolatum Lance-leaf moonwort		G5T4/S3	●	●	Shaded moist sites, generally under mature western redcedar or meadows.	Mesic Forest
Botrychium lineare Linear-leaf moonwort		G3/SH	●		Shaded moist sites under aspen or various conifers; dry to moist meadows.	Mesic Forests Meadows
Botrychium minganense Mingan moonwort		G5/S3	●	●	Shaded moist sites, generally, under mature western redcedar, but occasionally other conifers or meadows.	Mesic Forest

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
Botrychium montanum Mountain moonwort		G3/S2	●	●	Shaded, moist sites; generally, under mature western redcedar.	Mesic Forest
Botrychium pinnatum Northern moonwort		G5/S2	●	●	Dry to moist meadows and transitional habitats. Sometimes shaded under moist conifers.	Mesic Forest Meadows
Botrychium simplex Least moonwort		G5/S2	●	●	Dry to moist meadows and transitional habitats. Sometimes shaded moist.	Mesic Forest Meadows
Buxbaumia aphylla Leafless bug-on-a-stick		G5/S1	●		Moist, acidic soils in upper montane to alpine zones. Often mountain parklands.	Grassland Subalpine Forest
Buxbaumia viridis Green bug-on-a-stick		G4G5/S3	●		On large decaying logs or ash soils in moist, late successional grand fir or western redcedar forests. Some affinity for shaded riparian areas.	Mesic Forests
Calochortus nitidus Broadfruit mariposa		G3/S3	●	●	Intact bluebunch/Idaho fescue grasslands or open pine with good seasonal moisture and soil development over basalt	Grasslands
Cardamine constancei Constance's bittercress		G3S3	●		Breaklands and stream terraces, in warm, humid environments of low-elevation canyons; partial shade or transitional habitats.	Mesic Forests Transitional
Carex buxbaumii Buxbaum's sedge		G5/S3	●		Fens, seeps and areas of moisture collection on saturated organic soils associated with broad,	Wetland Meadow

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
					upland meadow complexes.	
Carex leptalea Bristle-stalked sedge		G5/S2	●		Fens and seeps on saturated organic soils in meadows and riparian habitats.	Wetland
Carex sychnocephala Many headed sedge		G5/S1	●		Muddy lakeshores and riverbanks between high and low water lines.	Wetland
Cirsium brevifolium Palouse thistle		G3/S2		●	Variety of canyon grassland and prairie communities. Also, in open forests and savannas.	Grasslands
Cladonia andereggii Anderegg's cladonia		G1/S1	●		With aquatic bryophytes in deep shade by streams and seeps in western hemlock and western redcedar forests.	Mesic Forest
Cornus nuttallii Pacific dogwood		G5/S1	●	●	Openings and gaps in low elevation, warm, western redcedar forests. Also, in shrub-dominated fire disclimax communities.	Mesic Forest Transitional
Crepis bakeri ssp. *idahoensis* Idaho hawksbeard		G4T2/S2		●	Outcrops and thin soils in grasslands and open dry forests.	Grasslands Rocky
Cypripedium fasciculatum Clustered lady's-slipper		G4/S3	●	●	Partial to low shade of warm forests in a mid-late successional stage. Mostly in western redcedar, but also in grand fir, Douglas-fir and western hemlock forests.	Mesic Forest

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
Dasynotus daubenmirei Daubenmire's dasynotus		G3/S3	●	●	Early to mid-seral and transitional habitats in moist fir and cedar forests.	Transitional
Douglasia idahoensis Idaho douglasia		G3/S3	●	●	Unstable, decomposing granitic substrates on northerly aspects and ridgelines in open subalpine fir and whitebark pine.	Subalpine
Dryopteris cristata Crested shield-fern		G5/S2		●	Perennially moist to wet organic soils at the forest margins of fens and shrub swamps.	Wetland
Epipactis gigantea Giant helleborine		G4/S3	●	●	Minerotrophic seeps and springs along low elevation rivers.	Grasslands Wetlands
Erythranthe alsinoides (*Mimulus alsinoides*) Chickweed monkeyflower		G5/S1	●	●	Shady, moist places, especially moss mats on cliffs and outcrops in low, inland maritime forests.	Mesic Forest Rocky
Erythranthe ampliata (*Mimulus ampliatus*) Spacious monkeyflower		G1/S1	●	●	Seeps, springs and seasonally saturated soils in grasslands, and dry forest openings.	Grasslands Rocky
Erythranthe hymenophylla (*Mimulus hymenophyllus*) Thin sepal monkeyflower		G2/S1	●		Sheltered wet outcrops and cliffs in canyon grasslands.	Rocky
Grindelia howellii Howell's gumweed		G3/S1		●	Seasonally moist outcrops and thin soils in grasslands and	Grasslands Rocky

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
					glades within generally mesic forests.	
Hierochloe odorata (*Anthoxanthum hirtum*) Sweetgrass		G5/S1		●	Cool montane meadows.	Meadows
Hookeria lucens Light moss		G5/S1	●		Saturated soils in humid coniferous forest, occasionally submerged, generally close to water courses.	Mesic Forest
Lomatium salmoniflorum Salmon-flowered desert-parsley		G3/S2	●	●	Basalt outcrops and scree within a variety of grass/shrub/conifer habitats in low, warm canyons.	Rocky
Mirabilis macfarlanei Macfarlane's four-o'clock	T	G2/S2			Sandy to rocky soils over talus in low elevation, dry bunchgrass habitats in an early-mid-seral stage of succession.	Grassland
*Parathelypteris nevadens*is (*Thelypteris nevadensis*) Sierra wood-fern		G4/S1	●	●	Along streams and seeps in humid, hyper-maritime western redcedar forests.	Mesic Forest
Pentagramma triangularis ssp. *triangularis* Gold-back fern		G5T5/S1	●	●	Seasonally moist rocky outcrops and slopes within low elevation grasslands or forests.	Rocky
Petasites frigidus var. *palmatus* Sweet coltsfoot		G5T5/S1	●	●	Meadows, swamps, riparian areas, and moist woods in humid western redcedar. In coastal disjunct communities on Nez Perce-Clearwater.	Mesic Forest

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
Pilophorus acicularis Nail lichen		G4/S2		●	Rocky surfaces in lower elevation, moist forests.	Rocky
Pinus albicaulis Whitebark pine	T	G3G4/S3			Dry subalpine forest.	Subalpine Forest
Polypodium glycyrrhiza Licorice fern		G5/S1	●	●	Low elevations, moss-covered substrates in warm and humid, western redcedar habitats.	Mesic Forest
Pyrrocoma hirta var. *sonchifolia* Sticky goldenweed		G4G5T3/S1	●	●	Moist meadows, prairies, open pine wetlands, and stream banks; generally, on basalt substrates.	Meadow
Rhizomnium nudum Naked-stem rhizomnium		G4G5/S1	●		Moist substrates at low to moderate elevation in humid, mesic forests. Often riparian.	Mesic Forest
Sandbergia perplexa (*Halimolobos perplexa* var. *perplexa*) Puzzling halimolobos		G4T3/S3	●		Canyon grasslands and open Ponderosa pine, especially with rock outcrops.	Grasslands
Sedum valens Salmon River sedum		G1G2/S1S2		●	On granite outcrops and talus in sheltered, partially shaded positions.	Rocky
Silene spaldingii Spalding's catchfly	T	G2/S1			Intact Idaho Fescue/Junegrass grasslands and prairies with well-developed soils; occasionally into open pine savannas.	Grassland
Sphagnum mendocinum		G4G5/S1	●		Headwater sphagnum wetlands or fen	Wetland

Species	Federal Status	Global/State Status	RFSS Status	SCC Status	Habitat	Guild
Mendocino sphagnum					meadows in the montane-subalpine zone.	
Synthyris platycarpa Evergreen kittentail		G3/S3	●		Cool, moist mixed forests of the Grand Fir Mosaic. Often in edge or transitional habitats; sometimes western redcedar and old growth forests.	Transitional
Triantha occidentalis ssp. *brevistyla* Short style toefieldia		G5T5/S1	●		Wet meadows, streambanks, and peatlands. Generally, between high and low waterline along low elevation, rivers on Nez Perce-Clearwater.	Wetland
Trifolium douglasii Douglas clover		G2/S2	●	●	Moist meadows, prairies, open pine wetlands, and stream banks; generally, on basalt substrates.	Meadow
Trifolium plumosum ssp. *amplifolium* Plumed clover		G4T2/S2	●	●	Dry meadows, open forest, and transitional habitats, often over basalt	Grasslands
Waldsteinia idahoensis Idaho barren strawberry		G3/S3	●		Transitional habitats and open forests of moist/cool grand fir, subalpine fir and western redcedar forest habitats.	Transitional

T=Federally listed as Threatened. RFSS=Regional Forester Sensitive Species. SCC= Species of Conservation Concern.

Macfarlane's Four o'clock (*Mirabilis macfarlanei*)

MacFarlane's four o'clock is a long-lived, deep-rooted perennial forb in the family Nyctaginaceae. It was federally listed as endangered by the U.S. Fish and Wildlife Service in 1979 (44 Federal Register [FR] 61912) (U.S. Department of the Interior 1979) and down listed to threatened in March 1996 (61 FR 10693) (U.S. Department of the Interior 1996). A revised recovery plan for MacFarlane's four-o'clock was completed in 2000 (U.S. Department of the Interior 2000c). The objective of the recovery program is to delist and remove *Mirabilis macfarlanei* from threatened status by protecting and maintaining reproducing, self-sustaining populations in each of three distinct geographic areas along the Snake, Salmon, and Imnaha river canyons.

Habitat

Per the species account for Macfarlane's four-o'clock produced by Natureserve (2021), habitats supporting MacFarlane's four o'clock are characterized by bunchgrass communities in sandy or rocky soils, typically located on steep slopes with southwestern to western aspects MacFarlane's four o'clock occurs in river canyon habitats in sandy to rocky soils. Talus rock often underlies the soils, and several sites are unstable and prone to erosion. The climate is characterized by warm and dry conditions and most precipitation occurs during winter and spring rains. Plants are most commonly found on steep slopes with southwest to western aspects, although they may be found at any aspect or slope position. MacFarlane's four o'clock typically occurs in bunchgrass communities dominated by bluebunch wheatgrass (*Pseudoroegnaria spicata*). Other native graminoid associates include sand dropseed (*Sporobolus cryptandrus*), red threeawn (*Aristida longiseta*), Sandberg bluegrass (*Poa secunda*), needle and thread (Hesperostipa comata), annual fescue (*Festuca* spp.), and Idaho fescue (*Festuca idahoensis*). Common native shrub and tree associates include gray rabbitbrush (*Chrysothamnus nauseosus*), netleaf hackberry (*Celtis reticulata*), smooth sumac (*Rhus glabra*), and spiny greasebush (*Glossopetalon nevadense*).

Occurrence

MacFarlane's four o'clock is narrowly endemic to portions of the Snake, Salmon, and Imnaha river canyons in northeastern Oregon and adjacent west-central Idaho. The species global range is approximately 46 by 29 kilometers. In the U.S. Forest Service Northern Region, the species has not been found on National Forest System land; however, occurrences are close to potentially suitable habitat on the Nez Perce-Clearwater. On the Nez Perce-Clearwater, apparently suitable habitat occurs in the Rapid River and White Bird Creek basins, as well as along the main Salmon River; however, most of these closely adjacent areas appear to be outside the currently known small range for the species.

Threats

The Heritage Program Network has ranked this species as G2 or Imperiled. Such species are at high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors (Young et al. 2015). In Idaho, the Natural Heritage Program has ranked the species as S2 or Imperiled. Such species are at high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

Non-native plant species and uncharacteristically large or frequent wildfires are likely the greatest threats to MacFarlane's four o'clock (U.S. Department of the Interior 2000c). The deep, thick roots of MacFarlane's four o'clock can probably survive most fires, especially because wildfires generally occur later in the summer when the plant is dormant. However, the subsequent increases in non-native plant species associated with these fires may compete for resources. Herbicide and pesticide spraying, landslides and flood damage, and road and trail construction and maintenance are also threats to MacFarlane's four o'clock, especially to one occurrence adjacent to a major highway. Livestock grazing and trampling may indirectly affect MacFarlane's four o'clock through soil erosion, soil compaction, nonnative plant species introduction and seed establishment, and forage selection and avoidance that could alter community composition. Insect damage and disease, wildlife grazing and trampling, recreation such as hiking, off-highway vehicle use, plant collecting, mining, pollinator competition with other species, and inbreeding depression are additional threats that may potentially occur or have been documented (U.S. Department of the Interior 2000c, Kaye 1995).

Trends

This species reproduces sexually by seed and asexually through long spreading rhizomes (U.S. Department of the Interior 2000c). Individuals may comprise several hundred stems ranging up to approximately nine square meters, making it difficult to ascertain changes in the number of plants at a given site (Kaye 1995, Callihan and Lass 1988). In one demographic study, Kaye (1995) found that the number of plants remained relatively stable over a five-year time period at occurrences in the Hells Canyon area. Clonal spread may contribute more to population stability compared to seedling recruitment (Barnes et al. 1997, Kaye 1995), although both are important to long-term genetic stability (U.S. Department of the Interior 2000c). Some studies have found low rates of seedling recruitment (Kaye 1995, Kaye et al. 1990), while others have found that seedling recruitment is a rare event (Barnes et al. 1997, U.S. Department of the Interior 2000c, Johnson 1995, Barnes and Wolf 1994). While existing plants appear to be equipped for longevity, the general habitat degradation that is common at many sites may hinder the establishment of new recruitment, which could hinder species viability in the long term.

Spalding's Catchfly

Spalding's catchfly is a perennial herb in the family Caryophyllaceae. It was listed as threatened under the Endangered Species Act by the U.S. Fish and Wildlife Service in 2001 (U.S. Department of the Interior 2001). While the U.S. Fish and Wildlife Service intends to identify critical habitat for this species, critical habitat designation was precluded at the time of listing due to a lack of funding. The recovery plan for Spalding's catchfly was completed in 2007 (U.S. Department of the Interior 2007) and outlines the recovery strategy, recovery goals, objectives, and delisting criteria. The objective of the recovery program is to recover Spalding's catchfly by protecting and maintaining reproducing, self-sustaining populations in each of the five distinct physiographic regions where it resides, with the ultimate goal of delisting the species.

Habitat

In general, Spalding's catchfly is found in open, vernally moist, mesic grassland communities or sagebrush-steppe communities. The bunchgrass grasslands where Spalding's catchfly primarily occurs are characterized by either Idaho fescue or Idaho fescue with bluebunch wheatgrass except in Montana where the dominant bunchgrass is rough fescue. A Junegrass component is also a good indicator of suitable habitat. The plant is found at elevations ranging from 1,200 to 5,300 feet (U.S. Department of the Interior 2007), usually in deep, productive loess or loamy soils. Plants are generally found on northwest to northeast facing slopes or swales or other landscape features where soil moisture is relatively higher (Hill and Gray 2004). Soils in the Idaho, Oregon, and Washington tristate area are loess wind-dispersed and influenced by ash from volcanic eruptions (Tisdale 1986, Johnson and Simon 1987) Soils in Montana are more glacially influenced (Schassberger 1988). These mesic sites are highly productive, with total plant cover and forage dry weight sometimes three times greater than drier, more shallowly soiled bluebunch wheatgrass communities (Johnson and Simon 1987). Spalding's catchfly is found on a wide range of slopes from flat areas to slopes as great as seventy percent. Most occurrences are found on grades ranging from 20 percent to 40 percent slope (Hill and Gray 2004), although this may be an artifact of where intact habitat has not been converted to other uses.

On the Nez Perce-Clearwater, the species occurs in the canyon grasslands Physiographic Province. Of the five provinces in which the species occurs, this is the most intact; largely because the canyon walls are steep and do not lend themselves to agricultural or urban developments. On the Nez Perce-Clearwater, the typical elevations and aspects do not generally support grasslands. At these higher elevations of 4,000 to 5,000 feet in the canyon grasslands, the northern slopes are inhabited by tree species and Spalding's catchfly is found on gentle southern slopes where the appropriate bunchgrass communities reside. Because of inaccessibility and steep topography, the Canyon Grasslands are the most under surveyed area for Spalding's catchfly and also represent the area where large populations of Spalding's catchfly may be most easily conserved because they are more removed from human influence.

Occurrence

According to the U.S. Fish and Wildlife Service five-year review results, Spalding's catchfly is currently known from 139 populations across its range in Montana, Idaho, Oregon, Washington, and British Columbia, with 49 being in Idaho (U.S. Department of the Interior 2020a), where it's limited to canyon grasslands with a few on the Palouse Prairie of the west central portion of the state. Populations are often small and isolated with relatively few holding the majority of the range wide population. There are three occurrences on lands administered by the Nez Perce-Clearwater. A range wide study by Lesica (2016) found the occurrences on the Nez Perce-Clearwater to be genetically unique from all other occurrences.

Threats

Listing documents for Spalding's catchfly catalogs seven management activities that potentially threaten habitat or populations. They are grazing, recreation, fire use, exotic species, pollinator impacts, herbicide and pesticide use, and habitat conversion.

Spalding's catchfly is impacted by habitat loss due to human development, habitat degradation associated with adverse grazing and trampling by domestic livestock and wildlife, and invasions of aggressive nonnative plants. In addition, a loss of genetic fitness, defined as the loss of genetic variability and effects of inbreeding, is a problem for many small, fragmented populations where genetic exchange is limited. Other impacts include changes in fire frequency and seasonality, prolonged drought, insect damage and disease, off-road vehicle use, and herbicide spraying and drift. In Idaho, Hill and Gray (2005) found that rodent activity appeared to be related to the mortality of Spalding's catchfly plants. In Montana, Lesica (1999) found that fire did not appear to affect recruits or adults in some years, but Hill and Gray (2005) observed that it may indirectly affect Spalding's catchfly by increasing introduced weed species. Other observations seem to indicate some disturbances, such as grazing or fire, may be important to the long-term persistence of this species in northwest Montana as a result of reduced competition with the larger, litter-producing native bunchgrasses, primarily rough fescue, with which it co-occurs (Lesica 1997). However, bunchgrasses in Idaho do not produce as much litter so this mechanism may not apply.

At the three occurrences on the Nez Perce-Clearwater, grazing occurs, but, although some effects have been noted, this use generally does not appear to be a major impact due to the managed livestock movements in relation to population locations, fencing, and low stocking levels in the allotments involved. Wildlife grazing and rodent activity have been observed but at very low levels. The greatest threat to the species on the unit appears to be weeds and general habitat degradation.

Trends

Populations of Spalding's catchfly have been extirpated in some portions of its range ad are stable in others, depending on the particular threat to each population(U.S. Department of the Interior 2007). Due to species biology and life history, populations may vary in number from year to year. Periodic dormancy, likely due to species biology and climatic conditions, is common and can result in fluctuating population counts over time. As directed by the recovery plan, range wide monitoring of the species' key conservation areas will measure trends that will guide management of the species status. Monitoring methods concerning timing and frequency of measurement are designed to account for the annual variations in population counts.

Whitebark Pine (*Pinus albicaulis*)

On July 19, 2011, the U.S. Fish and Wildlife Service published in the Federal Register (U.S. Department of the Interior 2011b) its 12-month status review finding on a petition to list whitebark pine (*Pinus albicaulis*) under the Endangered Species Act. After a review of all available scientific and commercial information, the U.S. Fish and Wildlife Service concluded that listing the species as threatened or endangered is warranted but precluded by higher priority actions. This made the species a candidate for federal listing as threatened or endangered. Following this action, the U.S. Forest Service Northern Region added whitebark pine to its sensitive species list in 2011. On December 2, 2020, the Fish and Wildlife Service published a proposed rule to list the whitebark pine as a threatened species under the Act. Following this designation, the species was included with federally listed species as part of a biological assessment and no longer treated as a sensitive species by the Forest Service. On December 15, 2022, the Service listed the whitebark pine (*Pinus albicaulis*) as threatened under the Endangered Species Act (U.S. Department of the Interior 2022b). This listing rule went into effect on January 17, 2023.

Habitat

Whitebark pine forests occur in two high mountain biophysical settings. Most common are upper subalpine sites where whitebark pine is the major seral species that is always replaced by the shade-tolerant subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), or mountain hemlock (*Tsuga mertensiana*), depending on geographic region (Arno and Weaver 1990). These sites support upright, closed-canopy forests and occur on favorable positions in the upper subalpine transitioning to timberline down to above or overlapping with the elevational limit of lodgepole pine (Pfister 1977, Arno and Hoff 1990). On the Nez Perce-Clearwater, most whitebark pine probably occurs in this situation.

On sites where whitebark pine is the only tree species able to successfully dominate, high elevation settings are found at particularly harsh sites in the upper subalpine and at treeline on relatively dry, cold slopes where trees often occur in elfin forests, clusters, groves or tree islands (Arno and Hoff 1990, Arno 1986, Steele et al. 1983). Other species, such subalpine fir, Engelmann spruce, and lodgepole pine (Pinus contorta), can occur on these sites, but they occur as scattered individuals with truncated growth forms and they never dominate a stand (Arno and Hoff 1990, Cooper et al. 1991, Pfister 1977). Whitebark pine can also exist as krummholz in the alpine treeline ecotone (Arno and Hoff 1990)and as a minor seral in lower subalpine sites (Cooper et al. 1991, Pfister 1977).

Occurrence

The distribution of whitebark pine includes coastal and Rocky Mountain ranges that are connected by scattered populations in northeastern Washington and southeastern British Columbia. Occurrences are found in scattered areas of the warm, dry Great Basin but whitebark pine typically occurs on cold, windy high-elevation or high-latitude sites in western North America. As a result, many stands are geographically isolated (Arno and Hoff 1989, Keane and Parsons 2010). Extensive forests form in the Northern Rocky Mountains of the United States and it is also abundant on the eastern slope of the Cascades and Coastal Ranges; however, whitebark pine assumes a patchier distribution at the northern end of its distribution in the Canadian Rockies and Coast Ranges of British Columbia (Arno and Hoff 1990). More than 90 percent of whitebark pine forests exist on public lands, including those managed by the Forest Service and the National Park Service in the United States and by provincial and federal agencies in Canada (Keane et al. 2012).

On the Nez Perce-Clearwater, substantial whitebark pine forests occur in the high Bitterroots in the eastern portion of the unit, in the Gospel Hump Wilderness, the west boundary of the Slate Creek basin, and in the Seven Devils to the southwest. Other occurrences are in the Selway Crags, the Williams Range, and on the highest points west of the Selway River. Outside of these locations scattered whitebark pine are found in low numbers on only a few of the highest summits.

Threats

There are three primary factors contributing to the decline of whitebark pine, including insect outbreaks, fire management, and introduced disease. There have been several major mountain pine beetle (*Dendroctonus ponderosae*) outbreaks that have killed many cone-bearing whitebark pine trees over 20 centimeters in diameter at breast height (Waring and Six 2005, Arno 1986). Climate change is also expected to play a role in the species decline.

The effects of an extensive and successful fire-exclusion management policy since the 1930s have also reduced the area burned in whitebark pine forests, resulting in a decrease of suitable conditions for whitebark pine regeneration (Keane and Arno 1993, Kendall and Keane 2001). Whitebark pine benefits from fire because it is better adapted to surviving and regenerating after fire than associated shade-tolerant trees (Arno and Hoff 1990). Whitebark pine is slow growing in both height and diameter and it rarely grows faster than most of its competitors except on the most severe sites (Arno and Hoff 1990). It is often eventually replaced, in the absence of fire, mainly by the shade-tolerant subalpine fir but also by Engelmann spruce and mountain hemlock. Lodgepole pine can out-compete whitebark pine during early successional stages in some subalpine forests (Arno et al. 1993, Day 1967, Mattson and Reinhart 1990). Decades of fire suppression have limited the benefits of fire and favored other species.

Finally, the introduction of the exotic fungus white pine blister rust to the western United States circa 1910 has killed many five-needle pine trees, and whitebark pine is one of the most susceptible to the disease (Keane and Arno 1993, Kendall and Keane 2001, Hoff et al. 1980, Murray et al. 1995). The cumulative effects of these three agents have resulted in a rapid decrease in mature whitebark pine over recent decades, especially in the more mesic parts of its range (Keane and Arno 1993).

Predicted changes in the Northern Rocky Mountains due to climate change could further exacerbate whitebark pine decline by increasing the frequency and duration of beetle epidemics, blister rust infections, and severe wildfires (Running 2006, Logan and Powell 2001, Blaustein and Dobson 2006). However, changes in fire regimens may actually favor regeneration of whitebark pine due to its fire adaptations. In addition, such changes may reduce competition with other species. Overall, whitebark pine is not expected to do well under future climates, primarily because of the current threats and severely declined populations, its confinement to upper subalpine environments, and its lack of ability to regenerate because of nutcracker consumption of seed in areas of low whitebark pine populations (Halofsky, Peterson, et al. 2018a, b).

Trends

A severe and steep downward trend has been occurring in the whitebark pine population and health over the past few decades, especially in the Northern Rocky Mountains (Keane et al. 2012). This decline is expected to continue into the foreseeable future, although the rate may lessen simply because there are fewer live trees left to be impacted by disease or other threats. Mortality data collected in multiple studies throughout the range of whitebark pine strongly illustrates this substantial and pervasive decline throughout almost the entire range of the species (Committee on the Status of Endangered Wildlife in Canada 2010).

In Canada, based on current mortality rates, it is anticipated that whitebark pine will decline by 57 percent by 2100 (Committee on the Status of Endangered Wildlife in Canada 2010). The value for this anticipated decline is likely an underestimate, as it assumes current mortality rates remain constant into the foreseeable future while past trends have shown that mortality rates have been increasing over the last several decades. The range of mortality rates for whitebark pine in the United States are similar to those in Canada, which suggests that the anticipated rates of decline will be similar.

The Pacific Decadal Oscillation effects are determined by Northern Pacific surface water temperatures and influence climatic trends across the Northern Rockies and Great Plains. Over the last century, in Montana and Northern Idaho, it is evident that the Pacific Decadal Oscillation influencing the western regional climate including the U.S. Forest Service Northern Region area has also influenced disturbances such as fire and mountain pine beetle and contributed to the ongoing whitebark pine decline. Given that the probability of continuing disturbance is high as climate projections predict a warming trend, the mortality of seed-producing whitebark pine may also be high.

There is substantial concern over the ability of whitebark pine to sustain itself throughout its range through natural regeneration. Some natural selection for resistance to blister rust is likely occurring (Hoff et al. 2001) but recovery will be slow as the species is slow growing and needs 60 to 80 years to produce sizable cone crops. The regeneration of the species is further hindered by evidence suggesting that stands with low basal area of live whitebark pine will not reliably attract nutcrackers to support seed dispersal (McKinney et al. 2009). Reduced populations also face risks of inbreeding depression that may result in slow growth and less hardy trees that often exhibit lethal genes.

The extensive studies of whitebark decline, along with decades of experience and observation, substantiates the past and ongoing severe decline of the species throughout its range, including the planning area and the expectation that this decline will continue for some time into the future. There is an urgent need to focus on conservation and restoration efforts for this keystone species across the extent of its range (Keane et al. 2012).

Projects are being implemented across the National Forests of U.S. Forest Service Northern Region and plan components in revised plans seek to slow or reverse the declining trend of this species.

Species of Conservation Concern

Under the 2012 Planning Rule, in addition to federally listed species, plant species at-risk on the Nez Perce-Clearwater includes species of conservation concern designated by the Regional Forester of the U.S. Forest Service Northern Region where best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area (36 CFR §219.9; Forest Service Handbook [FSH] 1909.12 Ch. 10, Part 12.52).

The process for identifying these species and the designated species of conservation concern for the Forest are outlined on the U.S. Forest Service Northern Region species of conservation concern (https://www.fs.usda.gov/detail/r1/landmanagement/planning/?cid=fseprd500402). State conservation rankings, along with the other criteria in FSH 1909.12 Chapter 10 Section 12.52 and Chapter 20 Section 21.22, were used to develop the Regional Forester's at-risk plant species for the Forest. Using data from Nature Serve, the Idaho Natural Heritage Program, the current Regional Forester sensitive species list, along with input from other agencies and knowledgeable individuals, 92 potential species of concern for the Forest were compiled for initial assessment. Of these, seven were determined not to be documented on the Nez Perce-Clearwater, leaving 85 for closer evaluation. Thirty species were determined by the Regional Forester to currently be plant species of conservation concern on the Forest.

The final plant species of conservation concern list will replace the sensitive plant species list for the Nez Forest under the action alternatives. The identification of species of conservation concern is dynamic and may change over time, as has the Regional Forester sensitive species list.

Habitat Guilds

Plant species are grouped in guilds for purposes of analysis based on broad similarity of the habitats they occupy. Each guild may contain a varied collection of specific habitats and the potential response to a species to threats. Associated conservation strategies for species in the guild would generally be very similar, allowing for more efficient analysis and identification of relevant information pertaining to the species. Threats and stressors are included in this affected environment discussion because they have shaped the present existing condition for these species. Some species may occur in more than one guild. Rare plants on the Nez Perce-Clearwater are grouped in the following guilds.

Grasslands Guild

This habitat grouping contains 11 species evaluated in this environmental impact statement. Two are currently designated as threatened by the U.S. Fish and Wildlife Service; six are on the Regional Forester sensitive species list; and seven will be species of conservation concern under the 2012 Planning Rule.

Habitats included in this guild are primarily canyon grasslands that include both warm and cool bunchgrass communities. Due to similarity in community composition, it also includes open pine savannas and areas of potential pine encroachment of drier forest communities. In cooler situations with gentler terrain and moisture retention, prairies may form. In lower-elevation, drained, rocky soils xeric species may dominate and may include significant shrub components of mountain mahogany, green bush, rabbit-brush, or sage. Montane grasslands may be the result of snow and moisture displacement from winter winds that limit tree growth. These higher-elevation habitats are grouped with the grassland guild but are well separated and support different plant communities. Despite these habitats being fairly unique, none of the components of such higher-elevation grassland plant communities were determined to be at-risk species.

Invasive species represent the primary threat to grassland communities. These habitats are naturally open, relatively warm and dry, and generally with abundant open soils. These factors combine to give such sites a high risk of weed infestation. Currently, weeds displace desirable native species in grassland habitats over a substantial area of the Nez Perce-Clearwater. Grazing by both livestock and wildlife can help maintain grasslands in some instances but both can result in localized harm, alteration of habitats, and soil disturbances readily invaded by weeds. Recreational activities can also degrade these habitats through soil damage and user created trails through sensitive areas. Decades of fire suppression has encouraged the encroachment of trees into grasslands and species conversion has promoted a decline of open pine savannas that are often adjacent to grasslands.

The seven species of conservation concern species in this guild are: broadfruit mariposa, Palouse thistle, Idaho hawksbeard, giant helleborine, Howell’s gumweed, spacious monkeyflower, and plumed clover. The federally listed species in this guild are Spalding’s catchfly and Macfarlane’s four-o’clock; the latter is not known or expected to occur on Forest lands; however due to proximity is required to be addressed in project analysis.

Meadows Guild

This group contains seven species evaluated in this environmental impact statement. Six of these are sensitive species, while five will be species of conservation concern under the 2012 Planning Rule.

This small group includes seasonally moist meadows that are dominated by moist sedge communities that have a broad transition to meadow grasses and forb communities. On the wet end, meadows merge into marshes and sedge flats that support wet or saturated soils most of the year. These sites may be quite moist in spring but are generally quite dry by mid-summer. Due to the broad extremes in moisture content through the growing season, these habitats support an unusually high diversity of plant species. These habitats are limited in area and generally found around the fringe of wetlands or occupy swales in or near the drier forest types.

Any changes to hydrologic function of these habitats may threaten these environments, whether from natural or human-caused sources. Specific activities that could provide a threat to these habitats include soil and vegetation disturbances, such as road construction and maintenance; ditching; livestock use; manipulation of adjacent vegetation either through timber harvest, conversion or fire disturbances or exclusion that change hydrologic regimes; invasive species and the treatments of these species; recreational uses, particularly trampling by foot or vehicle use; and succession of some vegetative communities or encroachment of adjacent vegetation. Climate change may alter stream flows, timing of snowmelt, and other hydrologic factors.

The five species of conservation concern species in this guild are: sweetgrass, least moonwort, northern moonwort, sticky goldenweed, and Douglas clover.

Mesic Forests Guild

There are 19 species evaluated under this group in this environmental impact statement. All 19 are sensitive species and 12 will be designated as species of conservation concern under the 2012 Planning Rule.

This is a broad group that mostly includes mid-to-late successional grand fir, western redcedar, and western hemlock forest communities. There may be cool or relatively warm environments, with the latter hosting a well-developed local, inland maritime climate that supports several coastal disjunct species as well as endemic species.

Species of this habitat guild are favored by mid-to-late seral conditions in the moister forest types. Threats to such habitats are any activity that appreciable alters the light or moisture regimes sufficient to render such sites unsuitable to support representative species. The most common events would be some forms of timber harvest or wildfire. In the long-term, climate change could potentially alter moisture regimes sufficiently to change the forest community. In the shorter term, drought or prolonged periods of increased warmth could change fire regimes. Invasive weeds are generally not a threat in enclosed moist forest, but some species can release and displace native species after opening of the crown by fire, harvest, or wind events.

The 12 species of conservation concern species in this guild include deerfern, lance-leaf moonwort, Mingan moonwort, mountain moonwort, northern moonwort, least moonwort, Pacific dogwood, clustered lady’s-slipper, chickweed monkey-flower, sweet coltsfoot, licorice fern, and Sierra woodfern.

Rocky Habitats Guild

The environmental impact statement evaluates ten species in this grouping; currently six are on the sensitive list, while nine will be species of conservation concern under the 2012 Planning Rule.

Plants of this guild are grouped due to their affinity for rocky surfaces rather than the general vegetative zone or type. Sites may be talus, scree, bedrock, or outcrops that may be moist or dry and might occur in grasslands or forests under a variety of light regimes. Such habitats typically occupy the fringe of other habitats, particularly dry grasslands or forests, but may also be common in wet forests, especially on the northern parts of the Nez Perce-Clearwater. Limited soil development and seasonally dry growing conditions often results in low herbaceous cover. Bryophyte and lichens often dominate some rocky sites.

Threats to these habitats include the mining of rock from outcrops and quarries and road construction. Also, some of these habitats are open and dry and are susceptible to weed invasion and treatment of these weeds may harm non-target species. Land management of any kind that could change the light or moisture regimes of such sites also pose a potential threat. Climate change may also impact these ecological factors and prolonged drought may promote desiccation and vegetative changes.

The nine species of conservation concern species in this guild include maidenhair spleenwort, Idaho hawksbeard, Howell’s gumweed, Salmon-flowered desert parsley, chickweed monkeyflower, spacious monkeyflower, gold-back fern, nail lichen, and Salmon River sedum.

Subalpine Forests Guild

There are three species identified in this habitat guild. All three are sensitive plant species, with one, whitebark pine, now listed as threatened. Under the 2012 Planning Rule there will be one species, Idaho douglasia, listed as a species of conservation concern and the threatened whitebark pine is retained.

This is a broad category that includes cool subalpine forests that may be closed or open and are dominated by subalpine fir and whitebark pine. Such forests may form open parklands that may include montane grasslands, rocky habitats, or higher elevation barrens.

Due to the often-remote locations, these habitats generally have relatively few human threats or stressors, although recreational uses such as trails, camping, and wheeled vehicle use may occur in small areas. Changes in fire patterns and severity and associated effects on vegetation may be a stressor in some environments. Such changes may be related to climate change or fire exclusion or suppression. Increased temperatures and prolonged summer drought conditions may increase the risk of desiccation. Motorized winter recreation can be a threat where this use occurs in whitebark pine habitat. Where trees are accessible, snowmobiles may run over the leader or upper portions of the tree that protrude above the snow and cause physical damage.

Transitional Habitats Guild

This analysis includes six species in this group. All six are sensitive specie; two of which will be a species of conservation concern under the 2012 Planning Rule.

This guild contains species that frequent sites that are transitional ecologically such as occurs with canopy gaps, shrublands, edges, or ruderal and disturbed sites. Most inhabited areas have a site potential of forested habitats, and the species may have low occurrence in mature forest. These species are grouped separately because they are best represented and set apart from general forest species by a high affinity for early-seral conditions often related to management.

These habitats are generally created or maintained through natural or man-made disturbance. Common activities promoting transitional habitats are timber harvests, creation of road corridors, wild and prescribed fire, and recreational development or uses. While these activities may harm individuals that prefer such open or edge habitats, the disturbance is generally necessary to maintain or enhance conditions that these species prefer and are generally most prolific under. Weeds that also prefer such conditions may compete with these species in some settings and non-target mortality from treatment of such weeds may also be a threat. Probably the most significant threat to these habitats would be the progression of succession, brought about through fire suppression and declines in vegetation management.

The species of conservation concern species in this guild include Pacific dogwood and Dasynotus.

Wetlands Guild

This habitat guild includes eight plant species analyzed in this environmental impact statement. One is listed as threatened by the U.S. Fish and Wildlife Service. Six are sensitive species; two of which are identified as a species of conservation concern.

This broad guild includes species found in wet sedge meadows, fens, aquatic habitats, and the immediate riparian and shrub swamps. The majority of the species in these communities are obligate wetland species and the sites remain wet most or all of the year. Fen habitats are always groundwater-dependent with accumulating organic matter (Chadde et al. 1998). These wetlands form where high water tables and permanent saturation slows rates of decomposition and where soils are formed from accumulating partially decayed organic matter. They are fed by precipitation, surface water, and ground water and may be mineral rich (alkaline) or poor (acidic) depending upon the surrounding geology. They are dominated by grasses, sedges, and mosses but frequently have a high diversity of other species. These habitats are uncommon. Other habitats in this guild are associated with ponds and river margins where standing water is generally present. Such sites may be riparian, marshes, or swamps with a shrub or tree component that may be seasonally flooded. Vegetation here is generally emergent and rooted in mineral soil.

Threats and stressors to these environments would be similar to those of the meadow habitat guild. However, while those moist habitats transition into relatively dry sites throughout the season, wetlands remain wet all or most of the year and may be more impacted by hydrologic alterations, such as floods or severe drought. While weed infestations are possible, they are less of a problem on the Nez Perce-Clearwater where few aquatic invasive species are found.

The species of conservation concern species in this guild include crested shield-fern and giant helleborine.

Environmental Consequences

The effects analysis includes summaries of management direction for the alternatives, as well as general effects common to the alternatives. The alternative comparison focuses on the number of species with status. For the botany analysis, Forest is divided into three categories based upon general grouping of potential effects. These categories are described in the discussion of the No Action Alternative below. The number of species and occurrences in each category are provided for each alternative. The list of species found in each category is generally long and similar across the alternatives, so they are not provided in this analysis. Federally listed species are included in discussion of the category where they occur.

Effects Common to All Alternatives

The Affected Environment includes the discussion of the species habitat groupings or guilds discussed in this analysis. The general threats and stressors to these guilds are included in that section because these natural or man-made influences have contributed to the status and existing condition of these elements. The effects of these disturbance agents are accounted for in the following discussion. In the effect's discussion, guilds are mentioned when pertinent. The comparison across alternatives focuses on a quantitative presentation of the number of species and occurrences present in general threat categories that are somewhat based upon management areas.

Sensitive or at-risk plant species occupying habitats that are often disturbed, such as roadsides, suitable timberlands, and high recreation use areas, would be prone to removal of suitable habitat, as well as direct removal of individuals, although some sensitive or at-risk plant species can respond favorably to these disturbances. Various surface-disturbing activities, including mineral exploration, development, and the associated roads, rights-of-way, and corridors, can directly affect habitats for sensitive or at-risk plant species. Recreational use, collection of plants, fire, as well as improper livestock grazing, could remove or trample vegetation and disturb soil, resulting in adverse impacts to sensitive or at-risk plant species.

Surface-disturbing activities also can indirectly affect sensitive or at-risk plant species by contributing to soil erosion and transporting invasive species into at-risk plant species habitats. The spread of invasive species could adversely affect sensitive or at-risk plants due to the limited population size and distribution of these rare plants. Surface disturbance also can result in habitat fragmentation, which can isolate populations of sensitive or at-risk plant species. Populations of sensitive or at-risk plant species often have a patchy distribution across the landscape and eliminating one or more populations can prevent gene flow among populations if residual populations are too far apart for sufficient cross-pollination. Habitat fragmentation would be a long-term impact to sensitive or at-risk plant species. Utilizing plan components and mitigating projects to minimize surface disturbing and disruptive activities minimizes adverse impacts from surface disturbance across all alternatives.

Habitats that are less subjected to land management activities, such as inaccessible areas, rugged terrain, rocky habitats, and wetlands, are more likely to be intact. There are fewer management threats to these species and the anticipated adverse impacts from surface-disturbing activities are minimal. The main threats to these areas include invasive species and climate change or in some guilds the increase uncontrolled wildfire that result in the loss of forest in a later stage of succession. In the past, roads were built along waterways and through wetlands. There are protections for these habitats in all alternatives, yet some roads are still on the landscape in those areas and may still be affecting those habitats. Management actions that restrict surface disturbance on unstable slopes would result in beneficial impacts to the species involved.

As these habitats are altered, species adapted to restricted habitats or specific microclimates would have lower survival rates than the more common native species with wider amplitude of habitats. Threats to these habitats include direct disturbance, such as from logging equipment, road building, road maintenance, grazing, and fire suppression activities; habitat alteration, such as canopy removal, edge effects from roads, herbicide, and fire exclusion; climate change; and invasive species.

Climate controls many ecosystem processes including species distribution and abundance, regeneration, vegetation productivity and growth, and disturbance, all of which could affect at-risk species on the Nez Perce-Clearwater National Forest. While there is some uncertainty regarding the scale, rate, and direction of future climatic conditions, the majority of published science suggests that warming trends may strongly influence the frequency, intensity, and size of disturbances, such as fire and extensive insect outbreaks, in coming decades. Changes in disturbance prompted by climate change are likely as important as incremental changes in temperature and precipitation for affecting ecosystem productivity and species composition. Recent research indicates that these risks may be particularly acute for forests of the Northern Rockies. Conservative future climate scenario models predict that the effects of warming trends result in a lengthened growing season, decreased number of days with snow on the ground, earlier peak snow occurrence, and increased water stress for all sites in the study which represent the temperature and precipitation spectrum in the forests of the Rocky Mountain region (Boisvenue and Running 2010). Mountain ecosystems are likely to shift upslope, reducing habitat for many subalpine and alpine tundra species. Mountain treeline is predicted to rise by roughly 350 feet for every degree Fahrenheit of warming (U.S. Environmental Protection Agency 1997).

All habitat guilds for at-risk species are expected to be impacted by warming trends. Aquatic, wetland-riparian, grasslands, and shrublands may increase the rate of desiccation due to increased and prolonged summer temperatures and drought conditions, although, due to uncertainty, the opposite could be true, and all guilds could see an increase in precipitation along with increased temperatures. Habitat in the subalpine habitat guild for at-risk plant species may decrease as a result of climate change and an upward shift of lower alpine habitats. Increased fire severity or frequency may also affect all habitats in all guilds, especially those found outside of rocky and aquatic areas, and this may affect the associated at-risk plant species either favorably or detrimentally depending on the habitat requirements for each species.

Increases in the severity of disturbances, combined with projected warming trends, may limit habitat for at-risk species. Rare and uncommon species, disjunct populations, and species at the edge of their known range are expected to experience a number of barriers when adjusting to warming trends because of the combination of a small number of occurrences, narrow elevation ranges, and requirements of specific soils types. Some at-risk species with potential habitat within the project area are known to occur on restricted and/or limited areas on the Nez Perce-Clearwater. Plants confined to outcrops of special soils are generally expected to have a far lower chance of successful migration to new suitable sites and far greater risks of extinction in the face of climate change than plants that are soil generalists (Harrison et al. 2009). Because of the uncertainty in scale, direction, and rate of climate change, management of at-risk plant species on the Nez Perce-Clearwater focuses on maintaining viable populations throughout the species known range on the Nez Perce-Clearwater to ensure persistence.

Effects of the No Action Alternative

Management Direction under the No Action Alternative

The 1987 Clearwater and Nez Perce Forest Plans provide management guidance to natural resource managers within the framework of Congressional intent (36 CFR 217). Page II-2 of the Clearwater Forest Plan provides general management direction that directs management to "manage habitat to contribute to recovery of each threatened and endangered species occurring on the Forest." Amendment 3 of the Nez Perce Forest Plan Page II-1 directs management to "provide habitat to contribute to the recovery of threatened and endangered plant and animal species in accordance with approved recovery plans. Provide habitat to ensure the viability of those species identified as sensitive." The current forest plans do not contain specific standards or guidelines related to any federally listed or sensitive plant species.

Neither of the 1987 plans indicates the presence of any federally listed plant species occurring on either forest at that time. Since that time, plants listed as federally threatened or as a proposed for listing have been determined to be present on the combined Nez Perce-Clearwater National Forest. In addition, one species federally listed as threatened occurs very near the Forest boundary and must be addressed in project analysis as directed by the U.S. Fish and Wildlife Service. The combination of the Forest Service manual policy for Regional Forester's sensitive plant species and the existing two plans provide protections that are similar to revised plan components in that the plans and direction would ensure that at-risk species persist on the Forest. However, the existing plans have fewer opportunities for restoration and less of a focus on native vegetation improvements than provided by the new plan components; therefore, under the No Action Alternative, the possibilities for improving habitat conditions for at-risk plant species are reduced.

Effects of the No Action Alternative

Population viability is expected to remain stable for all sensitive species on the Forest with current management policies and direction of the 1987 forest plans. Habitat quality has the potential to improve; however, there are fewer plan components promoting restoration. The No Action Alternative is expected to maintain similar habitat quality for sensitive plant species in all habitat guilds. Threats would remain similar to current conditions for sensitive plants. While the No Action Alternative will retain management areas of the existing plans, the management areas of the action alternatives, altered to similar threat categories for the botany resource analysis, are used as the basis of comparison for all alternatives.

Undeveloped and most protected areas are provided by designated Wilderness Areas, recommended Wilderness Areas, National Historic Landmarks, designated Wild and Scenic Rivers, and Research Natural Areas. This area is Management Area 1 but with the addition of recommended wilderness and Research Natural Areas. Less protected roadless areas include suitable Wild and Scenic Rivers and designated Inventoried Roadless Areas that are not recommended wilderness. This category is Management Area 2 without the recommended wilderness or research natural areas, which are more protected. Management of these areas may occur subject to appropriate resource measures and regulations that are consistent with these designations. The third area includes areas for timber production and multiple uses. This category is the same as Management Area 3 with no changes other than the removal of research natural areas. Generally, the emphasis on timber production in these areas increases threats from habitat manipulation for most rare plant species. These three disturbance groupings are summarized in the following table. The analysis quantifies all known occurrences for each species that are within these relative categories to provide a general comparison of protection and effects.

Table 92. Protection categories for botanical analysis

Most Protected	Less Protected	Timber Production
Designated Wilderness Recommended Wilderness National Historic Landmarks Research Natural Areas Designated Wild and Scenic Rivers	Designated Roadless Areas (with the removal of recommended wilderness and proposed research natural areas) Suitable Wild and Scenic Rivers	Management Area 3 (with the removal of research natural areas)

The most protected areas include approximately 1,449,984 acres, or 37 percent, of the national forest under the No Action Alternative. The federally listed Spalding's catchfly occurs at one location in these more protected areas that is subjected to light grazing and potential weed infestations. Whitebark pine occurs in all montane protected areas. Within this area, 30 reviewed plant species with 165 known occurrences are found. The No Action Alternative still considers Regional Forester's sensitive plant species. Of the 30 plant species reviewed, 28 are currently included on the sensitive species list. Two species are not sensitive species and would not be included as a species of any status under this alternative; however, they would be designated as a species of concern under the other alternatives. Under this alternative there are 12 sensitive species consisting of 67 occurrences in this category that will not carry forward as a species of conservation concern under the other alternatives.

Due to reduced ground disturbance and weed spread vector potential, these more protected areas include more quality habitat in all habitat guilds. The No Action Alternative offers less of the most protected category than Alternative W, Alternative Z, Alternative Y, and the preferred alternative but more than Alternative X. While alternatives with higher acreage in protected areas would host fewer management activities to affect rare plants, they are subject to unmanaged threats such as fires and have fewer opportunities for the documentation of occurrence and protection through plan components.

The less protected areas comprise approximately 1,279,389 acres, or 32 percent, of the Nez Perce-Clearwater under the No Action Alternative. Whitebark pine occurs in all montane areas. Within this area 26 reviewed plant species with 182 known occurrences are found. The No Action Alternative still considers Regional Forester's sensitive plant species. Of the 26 plant species reviewed, 25 are currently included on the sensitive species list. One species is not a sensitive species and would not be included as a species of any status under this alternative. It would be designated as a species of concern under the other alternatives. Under this alternative, there are 10 sensitive species consisting of 95 occurrences in this area category that will not carry forward as a species of conservation concern under the other alternatives.

Due to reduced ground disturbance and weed spread vector potentially offered by more restricted management, these areas include quality habitat in all habitat guilds. The No Action Alternative offers less roadless area in this category than Alternative X but more than the preferred alternative, Alternative Y, Alternative Z, and Alternative W, in that order. While alternatives with higher acreage in roadless areas of Management Area 2 would allow fewer, more restricted activities that may affect species of concern, there is also a more limited opportunity to respond to threats such as fire and provide less access to manage weeds. There is also a reduced opportunity for documentation of occurrence and protection through plan components.

There are 1,209,427 acres, or 31 percent, of the Forest proposed as suitable for timber production under this alternative. This category is the same as Management Area 3. The federally listed Spalding's catchfly occurs at two locations in this management area that is subjected to light grazing and potential weed infestations. It is unlikely to be affected by timber harvest. Whitebark pine may occur in montane areas that reach suitable elevations, though such areas probably represent only a trace occurrence. Within this management area 35 reviewed plant species with 335 known occurrences are found. The No Action Alternative still considers Regional Forester's sensitive plant species. Of the 35 plant species reviewed in Management Area 3 in this alternative, 29 are currently included on the sensitive species list. Six species are not currently sensitive species and would not be included as a species of any status under this alternative, but these species would be designated as a species of concern under the other alternatives. Under this alternative, there are 11 sensitive species consisting of 142 occurrences in this management area that will not carry forward as a species of conservation concern under the other alternatives.

Due to increased vegetation management in Management Area 3, there is an increased potential for effects to rare plant species through mechanical harm, habitat alteration, and increased dispersal and infestation of invasive species. These threats would be greatest in the moist forest habitat grouping but could affect all guilds. The amount of ground with this designation is very similar under all alternatives, with the No Action Alternative being slightly less than the action alternatives. While occurrences on these grounds are generally subjected to the highest level of management threat, they are also subjected to increased levels of restoration that could provide species benefit. The at-risk plant species would be protected by policy and Land Management Plan components during management activities to prevent trends towards listing.

Effects Common to Action Alternatives

Management Direction under Alternatives W, X, Y, Z, and the Preferred Alternative

All action alternatives contain Land Management Plan components that explicitly state the desired conditions for vegetation conditions, livestock grazing, timber harvest, and other resource areas that may involve at-risk species habitats. The components that are likely to have an effect on at-risk plant species habitat guilds are summarized primarily under the resource specific discussions below.

Plan components that are most relevant to at-risk plants are the same for each action alternative. The management direction recognizes the need to maintain or improve occurrences and habitats of at-risk plants. Vegetation components of the revised plan describes the desired conditions and objectives for at-risk plants or habitats, some of which have species-specific components. Management strategies include evaluation of areas proposed for management activities for the presence of occupied or suitable habitat for at-risk species, focusing on increasing known information for these and other botanical elements, and monitoring known occurrences of such species. The specific direction for project level evaluation of species of conservation concern has not yet been finalized by the agency. Federally listed species are evaluated through a biological assessment in consultation with the U.S. Fish and Wildlife Service.

Effects Common to Alternatives W, X, Y, Z, and the Preferred Alternative

As a result of the action alternative plan components, at-risk plant populations in all habitat guilds are expected to be maintained and the associated habitats will continue supporting at-risk plant species with opportunities to restore sites if conditions warrant. Regional Forester's Sensitive Plant Species that are not currently on the proposed species of conservation concern list would no longer be specifically protected once the new plan is implemented. The dropped Regional Forester's Sensitive Plant Species generally occur in habitats with either infrequent project activity or in sensitive habitats protected by Land Management Plan components. If new pertinent information becomes available indicating a potential threat to persistence on the Nez Perce-Clearwater these species would be reconsidered, and the species of conservation concern list may be adjusted.

Populations of plant species of conservation concern are expected to persist in the plan area because the plan components regarding them will maintain and restore habitat for these species. Through proposed plan components habitat quality would improve for whitebark pine under the action alternatives at a faster rate than the No Action Alternative, though both provide benefits and support long term persistence on the Forest. The action alternatives include additional opportunities for restoration activities; however, the No Action Alternative and action alternatives result in similar outcomes for at-risk plants. Habitat quality is expected to improve under the action alternatives at a slightly faster rate for most at-risk plant species than the No Action Alternative due to an increase in restoration projects.

Meeting or moving toward proper functioning conditions across all alternatives improves habitat for at-risk plant species. Effects to at-risk plant species across all habitat guilds would be similar across the action alternatives, with slight differences attributed to acres of management area designation.

Effects that Vary by Action Alternative

Effects of Alternative W

Undeveloped and more protected areas in Alternative W comprise about 2,072,380 acres, or 53 percent, of the Nez Perce-Clearwater. The federally listed Spalding's catchfly occurs at one location in this area that is subjected to light grazing and potential weed infestations. Whitebark pine occurs in all montane protected areas. There are 116 known occurrences of 18 at-risk plant species within the footprint of this protected area.

Due to reduced ground disturbance and weed spread vector potential, these more protected areas include more quality habitat in all habitat guilds. Alternative W offers more protected area than all other alternatives. While alternatives with higher acreage in protected areas would host fewer management activities to affect rare plants, they are subject to unmanaged threats such as fires and have fewer opportunities for the documentation of occurrence and protection through plan components.

Less protected roadless areas contain approximately 627,769 acres, or 16 percent, of the Nez Perce-Clearwater under Alternative W. Whitebark pine occurs in all montane areas. There are 50 occurrences containing 11 at-risk plant species in this management area.

Due to reduced ground disturbance and weed spread vector potential offered by more restricted management, these areas include more quality habitat in all habitat guilds. Alternative W offers less protected area in this category than all other alternatives. While alternatives with higher acreage in non-wilderness recommended roadless areas would allow fewer, more restricted activities that may affect species of concern, they provide a more limited opportunity to respond to threats such as fire and provide less access to manage weeds. There is also a reduced opportunity for documentation of occurrence and protection through plan components.

There are 1,238,907 acres of the Nez Perce-Clearwater, or about 31 percent, proposed as suitable for timber production under this alternative. The federally listed Spalding's catchfly occurs at two locations in this management area that is subjected to light grazing and potential weed infestations. It is unlikely to be affected by timber harvest. Whitebark pine potentially occurs where sufficient elevations are found. The emphasis on timber production in these areas increases threats from habitat fragmentation to 26 species of conservation concern representing 201 occurrences from potential management related activity.

Due to increased vegetation management of these grounds, there is an increased potential for effects to rare plant species through mechanical harm, habitat alteration, and increased dispersal and infestation of invasive species. These threats would be greatest in the moist forest habitat grouping but could affect all guilds. The amount of ground with this designation is virtually the same under all alternatives, with the Preferred Alternative being slightly less than Alternative X and slightly more than Alternative W, Alternative Z, Alternative Y and the No Action Alternative, in that order. While occurrences on these grounds are generally subjected to the highest level of management threat, they are also subjected to increased levels of restoration that could provide species benefit. Such restoration would maintain a more natural and diverse component of vegetation types. In addition, increased levels of survey work and improved access would lead to an increase in documentation of occurrences. The at-risk plant species would be protected by policy and Land Management Plan components during management activities which will allow for their persistence in the plan area.

Effects of Alternative X

Undeveloped and more protected areas comprise about 1,253,640 acres, or 32 percent, of the Nez Perce-Clearwater. The federally listed Spalding's catchfly occurs at one location in this area that is subjected to light grazing and potential weed infestations. Whitebark pine occurs in all montane protected areas. There are 116 known occurrences containing 18 at-risk plant species in this protected area footprint.

Due to reduced ground disturbance and weed spread vector potential, these more protected areas include quality habitat in all habitat guilds. Alternative X offers less of the more protected area than all other alternatives. While ground in protected areas would host fewer management activities to affect rare plants, they are subject to unmanaged threats such as fires and have fewer opportunities for the documentation of occurrence and protection through plan components.

Less protected roadless areas comprise about 1,441,086 acres, or 37 percent, of the Nez Perce-Clearwater under Alternative X. Whitebark pine occurs in all montane areas. There are 50 occurrences containing 11 plant at-risk species in this management area.

Due to reduced ground disturbance and weed spread vector potential offered by more restricted management, these areas include quality habitat in all habitat guilds. Alternative X offers more protected area in this category than all other alternatives, being followed in order by the No Action Alternative, the Preferred Alternative, Alternative Y, Alternative Z, and Alternative W. While alternatives with higher acreage in this area would allow fewer, more restricted activities that may affect species of concern, they provide a more limited opportunity to respond to threats such as fire and provide less access to manage weeds. There is also a reduced opportunity for documentation of occurrence and protection through plan components.

There are 1,243,856 acres, or 32 percent, of the Nez Perce-Clearwater proposed as suitable for timber production under this alternative. The federally listed Spalding's catchfly occurs at two locations in this management area that is subjected to light grazing and potential weed infestations. It is unlikely to be affected by timber harvest. Whitebark pine potentially occurs where sufficient elevations are found. The emphasis on timber production in these areas increases threats from habitat fragmentation to 26 species of conservation concern representing 201 occurrences from potential management related activity.

Due to increased vegetation management of these grounds there is an increased potential for effects to rare plant species through mechanical harm, habitat alteration, and increased dispersal and infestation of invasive species. These threats would be greatest in the moist forest habitat grouping but could affect all guilds. The amount of ground with this designation is virtually the same under all alternatives, with Alternative X having slightly more acres than the other alternatives followed in order by the Preferred Alternative, Alternative W, Alternative Z, Alternative Y, and the No Action Alternative. While occurrences on these grounds are generally subjected to the highest level of management threat, they are also subjected to increased levels of restoration that could provide species benefit. Such restoration would maintain a more natural and diverse component of vegetation types. In addition, increased levels of survey work and improved access would lead to an increase in documentation of occurrences. The at-risk plant species would be protected by policy and Land Management Plan components during management activities which will allow for their persistence in the plan area.

Effects of Alternative Y

Undeveloped and more protected areas comprise about 1,557,603 acres, or 40 percent, of the Nez Perce-Clearwater. The federally listed Spalding's catchfly occurs at one location in this area that is subjected to light grazing and potential weed infestations. Whitebark pine occurs in all montane protected areas. There are 116 known occurrences containing 18 at-risk plant species in this protected area footprint.

Due to reduced ground disturbance and weed spread vector potential, these more protected areas include quality habitat in all habitat guilds. Alternative Y offers less protected area than Alternative W, and Alternative Z but more than the Preferred Alternative, the No Action Alternative, and Alternative X. While alternatives with higher acreage in protected areas would host fewer management activities to affect rare plants, they are subject to unmanaged threats such as fires and have fewer opportunities for the documentation of occurrence and protection through plan components.

Less protected, non-recommended wilderness, roadless areas comprise of about 1,161,501 acres, or 29 percent, of the Nez Perce-Clearwater under Alternative Y. Whitebark pine occurs in all montane areas. There are 50 occurrences containing 11 plant at-risk species in this management area.

Due to reduced ground disturbance and weed spread vector potential offered by more restricted management, these areas include habitat in all habitat guilds. Alternative Y offers less protected area in this management area than Alternative X, the No Action Alternative, and the Preferred Alternative but more than Alternative Z or Alternative W. While alternatives with higher acreage in roadless areas of this category would allow fewer, more restricted activities that may affect species of concern, they provide a more limited opportunity to respond to threats such as fire and provide less access to manage weeds. There is also a reduced opportunity for documentation of occurrence and protection through plan components.

There are 1,219,952 acres, or 31 percent, of the Nez Perce-Clearwater proposed as suitable for timber production under this alternative. The federally listed Spalding's catchfly occurs at two locations in this management area that is subjected to light grazing and potential weed infestations. It is unlikely to be affected by timber harvest. Whitebark pine potentially occurs where sufficient elevations are found. The emphasis on timber production in these areas increases threats from habitat fragmentation to 26 species of conservation concern representing 201 occurrences from potential management related activity.

Due to increased vegetation management of these grounds, there is an increased potential for effects to rare plant species through mechanical harm, habitat alteration, and increased dispersal and infestation of invasive species. These threats would be greatest in the moist forest habitat grouping but could affect all guilds. The amount of ground with this designation is virtually the same under all alternatives, with Alternative Y having slightly less acreage than Alternative X, the Preferred Alternative, Alternative W, and Alternative Z but slightly more than the No Action Alternative. While occurrences on these grounds are generally subjected to the highest level of management threat, they are also subjected to increased levels of restoration that could provide species benefit. Such restoration would maintain a more natural and diverse component of vegetation types. Such restoration would maintain a more natural and diverse component of vegetation types. In addition, increased levels of survey work and improved access would lead to an increase in documentation of occurrences. The at-risk plant species would be protected by policy and Land Management Plan components during management activities which will allow for their persistence in the plan area.

Effects of Alternative Z

Undeveloped and more protected areas comprise 1,815,279 acres, or 46 percent, of the Nez Perce-Clearwater. The federally listed Spalding's catchfly occurs at one location in this area that is subjected to light grazing and potential weed infestations. Whitebark pine occurs in all montane protected areas. There are 116 known occurrences containing 18 species of conservation concern plant species in this protected area footprint.

Due to reduced ground disturbance and weed spread vector potential, these more protected areas include quality habitat in all habitat guilds. Alternative Z offers less protected area than Alternative W but more than Alternative Y, the Preferred Alternative, the No Action Alternative, and Alternative X. While alternatives with higher acreage in protected areas would host fewer management activities to affect rare plants, they are subject to unmanaged threats such as fires and have fewer opportunities for the documentation of occurrence and protection through plan components.

Less protected, non-recommended wilderness, roadless areas comprise about 890,597 acres, or 23 percent, of the Nez Perce-Clearwater under Alternative Z. Whitebark pine occurs in all montane areas. There are 50 occurrences containing 11 plant at-risk species in this management area.

Due to reduced ground disturbance and weed spread vector potential offered by more restricted management, these areas include quality habitat in all habitat guilds. Alternative Z offers less protected area in this management area than Alternative X, the No Action Alternative, the Preferred Alternative, and Alternative Y, but more than Alternative W. While alternatives with higher acreage in roadless areas in this category would allow fewer, more restricted activities that may affect species of concern, they provide a more limited opportunity to respond to threats such as fire and provide less access to manage weeds. There is also a reduced opportunity for documentation of occurrence and protection through plan components.

There are just over 1,233,180 acres, or 31 percent, of the Nez Perce-Clearwater proposed as suitable for timber production under this alternative. The federally listed Spalding's catchfly occurs at two locations in this area that is subjected to light grazing and potential weed infestations. It is unlikely to be affected by timber harvest. Whitebark pine potentially occurs where sufficient elevations are found. The emphasis on timber production in these areas increases threats from habitat fragmentation to 26 species of conservation concern representing 201 occurrences from potential management related activity.

Due to increased vegetation management of these grounds, there is an increased potential for effects to rare plant species through mechanical harm, habitat alteration, and increased dispersal and infestation of invasive species. These threats would be greatest in the moist forest habitat grouping but could affect all guilds. The amount of ground with this designation is virtually the same under all alternatives, with Alternative Z havening slightly fewer acres than Alternative X, the Preferred Alternative, and Alternative W but slightly more acres than Alternative Y and the No Action Alternative. While occurrences on these grounds are generally subjected to the highest level of management threat, they are also subjected to increased levels of restoration that could provide species benefit. Such restoration would maintain a more natural and diverse component of vegetation types. In addition, increased levels of survey work and improved access would lead to an increase in documentation of occurrences. The at-risk plant species would be protected by policy and Land Management Plan components during management activities which will allow for their persistence in the plan area.

Effects of the Preferred Alternative

Undeveloped and more protected areas in Alternative P comprise about 1,511,006 acres, or 38 percent, of the Nez Perce-Clearwater. The federally listed Spalding's catchfly occurs at one location in this area that is subjected to light grazing and potential weed infestations. Whitebark pine occurs in all montane protected areas. There are 96 known occurrences and 18 at-risk plant species within the footprint of this protected area.

Due to reduced ground disturbance and weed spread vector potential, these more protected areas include more quality habitat in all habitat guilds. The Preferred Alternative offers more protected area than the No Action Alternative and Alternative X but less protected area than Alternative W, Alternative Z, and Alternative Y. While alternatives with higher acreage in protected areas would host fewer management activities to affect rare plants, they are subject to unmanaged threats such as fires and have fewer opportunities for the documentation of occurrence and protection through plan components.

Less protected roadless areas contain approximately 1,187,710 acres, or 30 percent of the Nez Perce-Clearwater under Alternative P. Whitebark pine occurs in all montane areas. There are 14 species of conservation concern that total 47 occurrences in this management area.

Due to reduced ground disturbance and weed spread vector potential offered by more restricted management, these areas include more quality habitat in all habitat guilds. The Preferred Alternative offers less protected area in this category than Alternative W, Alternative Z, and Alternative Y but more than the No Action Alternative and Alternative X. While alternatives with higher acreage in non-wilderness recommended roadless areas would allow fewer, more restricted activities that may affect species of concern, they provide a more limited opportunity to respond to threats such as fire and provide less access to manage weeds. There is also a reduced opportunity for documentation of occurrence and protection through plan components.

There are 1,240,340 acres of the Nez Perce-Clearwater, or about 31 percent, proposed as suitable for timber production under this alternative. The federally listed Spalding's catchfly occurs at two locations in this area that are subjected to light grazing and potential weed infestations. It is unlikely to be affected by timber harvest. Whitebark pine does not occur as developed stands on timber production ground; however, where elevations are sufficient, scattered individuals may form trace occurrences within other forest types. The emphasis on timber production in these areas increases threats to 24 species of conservation concern representing 195 occurrences from potential management related activity.

Due to increased vegetation management of these grounds, there is an increased potential for effects to rare plant species through mechanical harm, habitat alteration, and increased dispersal and infestation of invasive species. These threats would be greatest in the moist forest habitat grouping but could affect all guilds. The amount of ground with this designation is very similar under all alternatives, with the Preferred Alternative being slightly less than Alternative X and slightly more than Alternative W, Alternative Z, Alternative Y, and the No Action Alternative, in that order. While occurrences on these grounds are generally subjected to the highest level of management threat, they are also subjected to increased levels of restoration that could provide species benefit. Such restoration would maintain a more natural and diverse component of vegetation types. In addition, increased levels of survey work and improved access would lead to an increase in documentation of occurrences. The at-risk plant species would be protected by policy and Land Management Plan components during management activities which will allow for their persistence in the plan area.

Cumulative Effects

The cumulative effects area includes lands within the proclaimed boundaries of the Nez Perce-Clearwater. Actions on adjacent nonfederal lands have a possibility to affect catchfly populations on National Forest System lands but likely only for those populations nearest the Nez Perce-Clearwater boundaries. It is not possible to state what actions are likely to occur on adjacent private lands, but it is assumed these lands would be managed as they are today. Nonfederal actions most likely to affect catchfly plants on adjacent National Forest System lands is invasive plant control on adjacent private lands, as well as county and state roads leading to and coursing through the national forests. Active weed management programs on adjacent private lands, as well state and local government roadside weed control, would likely benefit catchfly habitat on federal lands because fewer weed propagules would be available for transport, whether by people, vehicles, wind, or wildlife, to disperse into catchfly habitat. The effects of other management activities on adjacent private, state, and federal lands is expected to be confined to those lands and not overlap in time and space with catchfly populations on National Forest System lands.

Increasing Human Populations

Additional stressors that may increase in the future are increasing human population levels, both locally and nationally, with resulting increasing demands and pressures on public lands. As related to forest and vegetation conditions, these changes may lead to increased demands for commercial and non-commercial forest products, elevated importance of public lands in providing for habitat needs of species, and changing societal desires related to the mix of uses public lands should provide. The plan components are adequate to support persistence of at-risk plant populations and habitat on the Nez Perce-Clearwater as human populations and demands increase. However, population and use trends suggest not only that public land will play an increasingly important role in the conservation of these species in the future, but also that management to ensure recovery and prevention of federal listing of species will be an increasingly difficult challenge.

Adjacent Lands and Other Management Plans

Portions of the Nez Perce-Clearwater adjoin other National Forests, each having its own Forest Plan (or Land Management Plan). The adjacent forests include the Idaho Panhandle, Lolo, Bitterroot, Salmon–

Challis, Payette, and Wallowa–Whitman National Forests. Generally speaking, management of vegetation, including species of concern, is consistent across all national forests due to law, regulation, and policy. The cumulative effects would be that the management of at-risk plants and habitats would provide adequate protection to prevent species from decline or loss of persistence. The Nez Perce-Clearwater is also intermixed with lands of other ownerships that include private lands, other federal lands, and state lands.

Bureau of Land Management lands primarily to the west of the Nez Perce-Clearwater are managed by the Cottonwood field office through the 2009 Cottonwood Resource Management Plan. The plan is complementary to the Nez Perce-Clearwater Land Management Plan in terms of managing for multiple uses and sustaining healthy and functional ecosystems. Broadly speaking the plan would likely contribute toward similar general desired conditions as the Nez Perce–Clearwater Land Management Plan, with much of the management guidance having similar intent with respect to resource protections.

The Idaho Natural Heritage Program is a member of NatureServe, an international network of biological inventories known as natural heritage programs or conservation data centers that operate in all 50 United States, Canada, Latin America, and the Caribbean. They provide important tools from the Idaho Natural Heritage Databases, a system that allows locations and related information on rare species to be entered and shared for environmental review and conservation purposes. Lists of rare, unique, or vulnerable plants, animals, and biological communities are maintained by each heritage program.

The State of Idaho manages timberlands to maintain income for endowment trusts in accordance to the Idaho Forest Practices Act. The Idaho Department of Lands administers the Idaho Forest Practices Act of 1974 to promote active forest management and ensure that the health of forest soil, water, vegetation, wildlife, and aquatic habitats. While the State Natural Heritage Program maintains a database of species of concern, only species federally listed by the U.S. Fish and Wildlife Service have official status or management protections on state lands. While maintaining economically sustainable products, the Idaho Forest Action Plan seeks to promote forests that are diverse and resilient to changes in climate and human activities and maintain ecosystem benefits.

No at-risk plant protection is provided as part of any area county resource plans. These plans generally acknowledge the importance of special habitats such as wetlands, riparian areas, and grasslands in supporting species diversity ecosystem function, which provides a course filter benefit for all at-risk species in such habitats. At-risk plants on private lands are considered to be at greater risk of local extirpation due to lack of protections. Such county plans generally are focused on the effective control and reduction of noxious weeds. Successful efforts in weed control would contribute to the maintenance or improvement of habitats important to ecosystem function and at-risk species where they occur.

Climate Change

Climate change is expected to profoundly alter vegetation structure and composition, terrestrial ecosystem processes, and the delivery of important ecosystem services over the next century (Kerns et al. 2017). Climate influences the spatial distribution of major vegetation biomes, the abundance of species and communities within biomes, biotic interactions, and the geographic ranges of individual species. Researchers speculate that a warming climate will alter precipitation patterns, with some regions becoming drier and others becoming wetter. Within the Pacific Northwest, a recent model predicts warmer and wetter winters in 80 years. Being stationary, plants must migrate through dispersal, colonization, and recruitment strategies, a relatively slow process compared to mobile organisms. Some researchers believe that plant species will not be able to migrate at a pace dictated by a warming climate, which would isolate and eventually doom some species, unless new adaptations arise to cope with a changing environment. Under the influence of changing climate, if droughts and warmer winters continue, agents such as insects and disease will likely show increased levels of activity. Mortality from these factors and drought would likely lead to fires that burn with greater intensity when weather favorable to high intensity fires develops. Such events may further reduce potential habitats and limit ability to species to respond and migrate.

Primary strategies to address climate change threats focus on increasing resilience to ecological disturbance, such as wildfire, insects, and nonnative species (Halofsky and Peterson 2016). Rare and disjunct species and communities require adaptation strategies and tactics focused on encouraging regeneration, preventing damage from disturbance, and establishing refugia. Overall, the protection and restoration objectives and practices described in the Land Management Plan will potentially promote resilience and conservation.

Effects to Resource from Other Resources

The following discussion focuses on effects to at-risk plant species presented by the management of other resources areas. For each resource, the general effects of plan components that may contribute to or mitigate effects or maintain general conditions to the benefit of at-risk species or habitats are presented. While effects are reviewed, most individual plan components are not cited as the effects are small or indirect and there are too many to list. Plan components that more directly apply to at-risk species or habitat are specifically listed and discussed.

Timber Management

Timber harvest is most likely to occur on lands identified as suitable for timber production. Harvest increases some threats to at-risk species but also can create a mosaic pattern on a landscape and promote early successional stands with some treatments, such as regeneration harvest. Typically, known at-risk species would receive site-specific protection following botanical reviews and surveys (Forest Service Manual 2670) and negative effects would be minimized; however, this only applies to sensitive species. This would continue to occur with the proposed plan components for at-risk species following project-level evaluation procedures that are not currently finalized.

All alternatives have varying amounts of land suitable for timber production, but the impact of timber plan components on at-risk species is consistent between action alternatives. The moist forest habitat guild would be most impacted by timber management, but all habitat guilds can be affected by timber production even if habitats guilds, such as aquatic, subalpine, meadow, rocky or grassland, are not directly harvested for timber. Mechanical activities include vegetation management treatments, whether for restoration or to meet timber production objectives. Activities, such as logging, can have impacts to plants and plant habitat through canopy removal, soil disturbance and erosion, and stream sedimentation. In addition, mechanical activities for vegetation treatment may require road building. Roads increase access to sensitive habitats and can fragment habitat, thus, providing an avenue for invasive plant species. Reconstruction and maintenance of designated roads can directly or indirectly affect plant populations by introducing competitive weeds and altering availability of light, nutrients, and moisture. Sudden changes in seral stage, or an abundance of early seral stages, also reduce the available habitats for those plants that require mid-to-late seral stages. However, those species that prefer openings, early seral stages, or some ground disturbance could benefit from various levels of mechanical activities.

As a result of plan components and policies, at-risk species and their respective habitats would be considered during vegetation management and are expected to be maintained and continue supporting at-risk plant species despite the potential for impacts in areas used for timber production. The new plan is more explicit regarding resource protections, though similar guides and policies are applied under the old plans. Habitat quality would remain similar between the No Action Alternative and action alternatives for at-risk species in all habitat guilds under the timber plan components. Threats would be reduced for at-risk plants by the action alternatives plan components by including additional language to protect sensitive habitats.

Several plan components express a desired condition to maintain whitebark pine in appropriate habitats on the Nez Perce-Clearwater. These include, FW-DC-FOR-09, FW-DC-FOR-10, MA1-DC-FOR-09, MA2-DC-FOR-09, MA3-DC-FOR-07, and MA3-DC-FOR-10. Specific objectives directing the restoration of cold forest types that support successional stages that could benefit whitebark pine include MA2-OBJ-FOR-02 027, MA3-OBJ-FOR-03, and MA3-OBJ-FOR-04. MA2-OBJ-FOR-01 and MA2-OBJ FOR-02 specifically calls for increased planting of whitebark pine. Open Ponderosa pine forests, which support species of the grassland guild, would be supported by GA-DC-SR-02 and FW-DC-FOR-02. There are numerous plan components under this resource that will contribute to an array of forest cover types and structure to support general floral diversity.

Vegetation Management

All habitat guilds are potentially affected by the action alternative's vegetation desired conditions. Broadly, the desired conditions for terrestrial vegetation on the Nez Perce-Clearwater are characterized by improvements in species composition, desirable densities, and general forest health and condition; vigorous non-forested plant communities; and maintaining native biodiversity on the landscape. The desired conditions are consistent with the Forest Service's understanding of the natural range of variation and are most likely to be resilient in the future given expected drivers, such as climate change, drought, vegetation succession, wildfire, insects and disease, and the demands of people. Desired conditions for vegetation support native species and habitats within their natural range of variation, including at-risk species.

Ground disturbing activities and changes in site conditions that could impact at-risk species are likely to result from the terrestrial vegetation plan components. The restoration of historical fire regimes and restoration of conditions towards historical range of variation with a range of seral stages for different potential vegetation groups may benefit some at-risk species in the long-term.

These revised vegetation plan components are expected to maintain and continue supporting at-risk plant species on the Nez Perce-Clearwater. Generally, habitat quality would be maintained or improved for at-risk species in all habitat guilds under the plan components in the action alternatives. Threats would remain similar for at-risk plants in regard to vegetation plan components. While some occurrences may be impacted, generally activities would maintain a more diverse and natural range of vegetative habitats which would benefit at-risk species.

Plan components that maintain older forests are beneficial to the persistence of at-risk species in the moist forest guild in particular. Contributing components include MA3-STD-FOR-01, MA3-GDL-FOR-02, MA3-GDL-FOR-03, MA3-GDL-FOR-04, and MA3-DC-FOR-10. FW-DC-FOR-01 calls for the persistence of aspen across its range on the Nez Perce-Clearwater and the objective. FW-OBJ-FOR-01 calls for aspen restoration across the Nez Perce-Clearwater. Aspen support unusually diverse floral communities important to species diversity and pollinators. Desired conditions that support grasslands, aquatic, meadow, and subalpine guilds that support at-risk species include FW-DC-GS-01-08. Plan components that are focused on special habitats, diversity, and endemic species include FW-DC-TE-01 through -05. FW-GDL-TE-01 states that uncommon habitat elements should be conserved to allow rare and endemic plant communities to persist.

Fire and Fuels Management

Under all alternatives fire would be used as a tool to accomplish management goals and objectives. The objectives for fuel reduction are usually complementary to the other desired vegetation conditions, including those beneficial to at-risk species, especially as related to forest resiliency. There are several factors that are important to consider with regard to at-risk plants. One factor that is important to some rare plants is the timing and placement of prescribed burns. For example, the use of prescribed fire in the spring has potential to impact some rare plants that are not adapted to fire at this time of year and spring burning can interfere with flowering, fruiting, pollinator availability, and other physiological impacts. Other at-risk species prefer spring burning events due to a lower rate of litter build-up which reduced fire severity and increases survival. Considering at-risk species during the planning process (FSM 2670) should ensure that the timing and placement of prescribed burns is used to maintain at-risk plant populations as much as possible by timing when phenologically appropriate and avoiding populations of species that could be adversely affected by fire.

Another factor is the risk of high severity wildfire resulting from high fuel loads. The current condition is an overall high risk of high severity burns across much of the Nez Perce-Clearwater due to high fuels load, which has resulted from past fire suppression and the outbreak of bark beetle infestations. Without some prescribed fire introduced to mitigate the threat of high severity fire, at-risk species populations are susceptible to being eliminated or reduced in areas on the landscape in all forested habitat guilds. Many species tolerate, and in fact require, frequent low severity fire to maintain populations on the landscape. Stand replacing fires have the potential to kill at-risk plants and reduce or eliminate seed banks, making reestablishment difficult or even impossible without additional seed sources brought in.

Another factor to consider is that some at-risk species require regular fire to maintain early successional conditions that supports known occurrences. This includes species in the wetland-riparian, meadow, grassland, and savanna habitat and transitional habitat guilds. Potentially, other habitats could also be involved in the future depending upon species specific requirements, which can change depending on new best available science and adjustments to the species of conservation concern list. The species that require fire typically need low severity fire to maintain sensitive habitats. The reduction of fire has generally reduced the amount of available habitat for such species. In general, most plant species would benefit by the restoration of more historical fire regimes. For those rare plants that thrive in open areas created by fires, using fire to help restore a more natural fire regime could benefit those species in the long-term. There are also impacts to plants associated with wildfire suppression activities, such as fire line construction and other mechanical activities, reforestation following fire, and the increased potential for the spread of noxious weeds.

At-risk plants have various reactions to fire. As a result of these plan components, all habitat guilds are generally expected to be maintained and continue supporting at-risk plant species, including the species that are currently on the sensitive plant list but that would not be specifically protected as a species of conservation concern once the new plan is implemented. Analysis prior to implementation allows for appropriate mitigation to be developed when necessary to account for at-risk plant species.

Plan component MA2-OBJ-FOR-02 seek to restore cold forests through fire. This would benefit habitat conditions favoring whitebark pine. Desired conditions that seek to support ecosystem function and meet desired conditions of other resources through a range of burn conditions, fire intensities, and fuel conditions of more historic fire regimes include FW-DC-FIRE-01 and FW-DC-FIRE-02. Also, the goal of building understanding of fire's role in sustaining fire adapted ecosystems, as stated in FW-GL-FIRE-03, is important to open plant guilds where fire is a component. Fire guideline FW-GDL-FIRE-02 is designed to decrease the expansion of invasive weeds are important for all plant guilds but particularly grassland and transitional habitats.

Watershed, Riparian and Aquatic Management

The threats to associated wetland and riparian and meadow at-risk plant species include changes to hydrologic function and nutrient alterations. Mechanical vegetation treatments, off-road vehicles, roads and trails, livestock grazing, and high severity wildfires are some of the actions that affect the hydrologic regimes or nutrient inputs. The action alternatives include desired conditions that would specifically support at-risk plant habitat in the previously mentioned guilds that overlap with aquatic ecosystems. The revised plan components have additional protection measures and an increased emphasis on the restoration and maintenance of riparian and aquatic resources.

As a result of these plan components, wetland-riparian habitat guilds are expected to be maintained and continue supporting all at-risk plant species that occur in these habitats. The revised plan is more explicit on aquatic ecosystems protections, connectivity in riparian habitats, and groundwater-dependent systems, in addition to following state guidelines and best management practices in the previous plans.

These plan components are expected to contribute to stable populations for all at-risk species in the moist and wet habitats by preserving required habitat characteristics for these species. Habitat quality would be maintained or improve for all at-risk species in the meadow and wetland and riparian habitat guilds.

Specific plan components that more directly benefit at-risk plants in wetland, riparian, and meadow habitats include FW-DC-WTR-02, which contributes to habitat connectivity that aids potential plant dispersal for both aquatic species and forest species through preserved riparian areas. FW-DC-WTR-07 contributes to instream flows sufficient to sustain riparian, aquatic, and wetland habitats. FW-DC-WTR-08 seeks to maintain groundwater dependent ecosystems, including fens, wetlands, seeps, springs, and riparian habitats, which are all habitats that support at-risk species. FW-GDL-ARINF-08 states that wetlands and seasonally wet meadows should be avoided when developing roads and landings and drainage features should maintain wetland functions and characteristics.

Wildlife Management

Several of the objectives relating to wildlife direction complement the at-risk plant needs by describing a desired condition to manage vegetation to approximate natural succession and disturbance processes and provide a mosaic of habitat conditions through time. These components would generally contribute to the maintenance of diverse habitats for at-risk species. Many forestlands plan components contribute to these overall desired vegetative conditions as well.

FW-GL-WL-01, FW-DC-WL-01, and FW-DC-WL-02 encourages cooperation and collaboration across multiple agencies to work on a variety of planning and management tasks to work toward recovery of federally listed species. While this component is geared mainly to wildlife, the benefits extend to all at-risk listed species. FW-DC-WL-03 and FW-GDL-WL-01 promote the maintenance vegetative patterns to allow for connectivity for wildlife. Such connectivity of habitat also benefits dispersal and genetic exchange of plant species dependent on such habitats. Plan components for fisher (FW-DC-WL-04) maintain warm, moist potential vegetation type habitats that would also benefit species of the mesic forest plant guild. Several elk objectives in Management Area 2 and 3 will promote habitats that may benefit at-risk plant species in the transitional guild on parts of the Nez Perce-Clearwater.

Land Allocation

The alternatives vary in quantity and location of management areas. Designated wilderness areas, wild and scenic rivers, historic sites, and research natural areas do not vary in location or area. The alternatives vary in the number of inventoried roadless areas that are retained or recommended for wilderness. Management Area 3 changes slightly across the alternatives but is largely consistent.

The comparison of alternatives based upon threat categories and management areas is provided in the alternative discussions. Alternative W offers the most area protected in areas that would see the fewest management activities. These more undeveloped and protected areas would generally protect at-risk plant habitat from ground disturbing threats and development, and these areas would be managed allowing natural fire regimes to contribute to a mosaic of different seral stages and diversity habitats as much as possible. An increase in these protected areas decreases threats to at-risk plants overall from ground disturbing activities, such as vegetation projects, some motorized and mechanized access, and weed spread vectors, while promoting a naturally managed system that has the potential to improve the mosaic pattern on the landscape. However, species in the mesic forest guild that require mid-late seral forests could see less habitat in protected areas due to large and extensive wildfires that have reduced such habitats in wilderness. Management Area 3 allocated ground is subjected to more vegetation management, but the needs of at-risk species can be incorporated in planning efforts to protect them when necessary. See the designated areas sections for more details on the management differences between these land allocations.

All action alternatives would have the ability to achieve desired vegetation conditions within inventoried roadless areas through the use of vegetation treatments. All have Land Management Plan direction that allow restoration activities to occur as long as the laws and policies governing such activities are met. Anticipated vegetation treatment activities would often be associated with forest restoration and salvage from existing roads, prescribed fire, and restoration of higher elevation whitebark pine forest communities. There may be other treatments occurring to achieve restoration objectives outlined in the plan components.

Municipal watersheds are protected for water sources (FW-DC-MWTR-01), which would also protect maintenance of habitat for at-risk plant species in the mesic forest guild and potentially other habitat groups that maybe present. Several wilderness components direct management that maintains wilderness characteristics which exclude many activities that are potentially harmful to at-risk species of all guilds. Similarly designated wild and scenic river components protect the river corridors and the habitats contained from activities that may interfere with the protection and enhancement of the values for which the river was designated. In the case of suitable wild and scenic rivers, vegetation management is only allowed to protect users or identified outstandingly remarkable values; or protect, restore, or enhance the river environment (MA2-SUIT-E&SWSR-02). Roadless areas provide undisturbed habitat for several at-risk species in all plant guilds (MA2-DC-IRA-01) and enable dispersal and genetic exchange through habitat connectivity (MA2-DC-IRA-02). Research Natural Areas contribute to ecological sustainability and biological diversity through inclusion of assigned vegetative communities as well as protection of at-risk species and unusual elements (MA2-DC-RNA-01). Disturbance from forest products for personal and commercial uses are not authorized in research natural areas (MA2-STD-RNA-01 and -02). Research natural areas protect examples of all at-risk species guilds. Several special interest areas are established protect and promote unusual or diverse botanical settings. Many of these contain occurrences of threatened or species of conservation concern and many good examples of at-risk plant guilds.

Access and Recreation Management

Motorized and mechanical means of transport impact rare plant occurrences within road prisms and road maintenance activities can remove habitat in these areas. Vehicles that travel off-road can disturb at-risk plant occurrences and compress soil, eliminating habitat along designated travel routes and roads open to motorized use. In addition, motorized routes are primary weed spread vectors.

Recreation impacts can include trampling, both by hikers and off-road vehicle use. Road building and the development of campgrounds and other facilities used by recreationists also contribute to plant impacts, as these developments make more areas accessible and concentrate use. Winter motorized recreation may damage portions of whitebark pine that protrude above the snow. Dispersed camping and recreation have similar impacts, which are more difficult to monitor. Parking areas, particularly undesignated areas, pose similar impacts to plants. In addition, there can be long-term impacts of bisecting a rare plant population with a road or similar feature and affecting the reproduction and/or plant dispersal. Roads and trails for recreational use can contribute to the spread of noxious weeds and increase the accessibility of areas to livestock, as well as native ungulates, which in turn can increase the impacts of trampling, herbivory, and congregation.

The plan components are expected to contribute to the maintenance of at-risk populations on the Nez Perce-Clearwater by including protections associated with recreation opportunities. Most habitat guilds are protected from recreational related damages by other components, reducing risk for species that occur in with these habitats. Wilderness areas and Wild and Scenic Rivers are still protected under national guidance and would continue regardless of alternative. Under the recreation plan components, at-risk species habitat quality would remain similar between the No Action Alternative and action alternatives, with the most protections coming under Alternative W due to increased recommended wilderness.

Minerals Management

Development of energy and mineral resources has the potential to adversely impact special status species through all phases of development. Impacts include mortality to individual at-risk plants, or entire populations, as well as habitat loss and fragmentation. Under plan components, at-risk species habitat quality would remain similar between the No Action Alternative and action alternatives. Threats would be reduced for at-risk plants by the action alternatives plan components including FW-GDL-AREM-01, which calls for avoidance of wetlands and riparian areas in mineral operations and requires the use of native revegetation efforts as part of operations (FW-STD-AREM-01) to reduce invasive species.

Livestock Grazing

All habitat guilds have some potential to be impacted by livestock, which when grazed improperly can cause hydrologic changes, trampling to individual species, habitat degradation through invasive species introduction, and soil impacts. Habitat guilds most likely impacted by livestock grazing include riparian habitats, meadows, transitional habitats, and grasslands. The at-risk plant species would be protected by Forest Service manual guidelines and plan components during project level planning to prevent or mitigate negative impacts.

As a result of these plan components, the effected guilds are expected to be maintained and to continue supporting at-risk plant species in livestock allotments. There would be opportunities in the future to restore habitats that have become degraded over time. The language in the new plan is more explicit than the other plans but management direction to preserve habitat quality is generally similar. Habitat quality would improve with the action alternatives for at-risk species in all habitat guilds due to grazing components to improve or maintain quality habitat.

FW-GDL-GRZ-01 seeks to reduce impacts resulting from livestock use to benefit riparian areas, meadows, and other habitats that may be important to species of conservation concern. FW-GDL-GRZ-02 states that allotment planning should include measures to protect federally listed plant species and evaluate habitats for other at-risk species and adjust prescriptions as necessary to ensure viability. FW-GDL-GRZ-03 directs that utilization occurs at levels that will maintain vegetative vigor and community health and planning considers the condition, timing, and use of the resource along with other values of the area. This is important to maintain overall health of grassland habitats to prevent overall habitat degradation which harms at-risk species.

The guidelines FW-GDL-GRZ-01, FW-GDL-GRZ-02, and FW-GDL-GRZ-03 direct the mitigation or relocation of livestock salting through revised allotment management plans to avoid impacts to riparian management zones. Such activity would benefit at-risk plant species in the riparian and moist forest guilds due to a high affinity for some species to occur in such areas.

Invasive Species Management

Invasive species can have a major impact on at-risk species on the Nez Perce-Clearwater. In general, increased ground disturbance corresponds with increased weed spread. Roads, trails, livestock, and canopy reduction can provide ideal pathways for the introduction of exotic and non-native species. Introduced, invasive plant species can displace at-risk species through competitive displacement, especially in the grassland and rocky guilds. Wetlands, subalpine forests, and moist forests are largely closed to most significant weed invasions, though localized events can occur. Competition from invasive, non-native species and noxious weeds can result in the loss of habitat, loss of native pollinators, and decreased rare plant species viability. Impacts from management activities include herbicide spraying and mechanical ground disturbance to control noxious weeds once they gain a foothold. All habitat guilds, particularly the grassland guild, are expected to benefit from the reduction of invasive species. Such reduction would contribute to stabilize at-risk plant populations on the Nez Perce-Clearwater. The action alternatives provide similar protections and guidelines for invasive species treatment as the existing plans; however, additional plan components in the action alternatives are expected to increase the opportunities for at-risk plant restoration on the Nez Perce-Clearwater.

Plan components that would most benefit at-risk species through reduced weed infestation include FW-DC-INV-01, which calls for invasive species to be either not present or occur at low levels. FW-OBJ-INV-01 call for treating 6,000 acres of weeds annually to contain or reduce weed density, infestation area, or occurrence with emphasis on early detection and rapid response to new invaders. FW-GDL-INV-01 seek to implement project level design features that will reduce weed establishment and expansion. There are many soil plan components that will benefit at-risk species through a reduction of soil disturbance that will offer less opportunity for weed establishment. FW-STD-AREM-01 requires the use of native species in revegetation efforts as part of mineral operations to prevent or reduce weed invasion.

Soils Management

All habitat guilds depend on soil quality and productivity within their respective habitats. Forest Service activities that lead to soil compaction or soil contamination with toxic materials have the potential to negatively impact at-risk plant habitat. Some activities that can threaten soil quality include mechanized vegetation treatments, roads and trails, recreation, grazing, and off-road vehicles. As a result of the soils plan components, all habitat guilds are expected to maintain soil quality and productivity, which would contribute to stable at-risk plant populations on the Nez Perce-Clearwater. The plan components provide protections and guidelines for soil productivity which would support rare plant habitats and populations.

Desired condition FW-DC-GS-06 describes the importance of mollisol soils in healthy grasslands that are important to many species of concern. There are many soil plan components that will benefit at-risk species through a reduction of soil disturbance that will offer less opportunity for weed establishment.

Pollinators

Invertebrate pollinators are crucial components of functioning ecosystems. There is evidence that many species may be in decline due to a variety of factors. Broadly, the desired conditions in the action alternatives increase habitat quality for invertebrate pollinator species. All alternatives provide habitat for pollinator species in the plan area with native plant species, a variety of habitats, and large areas without the habitat fragmentation that has become characteristic of agricultural and developed land. All action alternatives include plan components for other resources that improve habitat for pollinators in the plan area that contribute to increased habitat quality. Forestwide terrestrial ecosystem components and forestlands components are particularly important for restoring and maintaining habitats and successional stages that will benefit pollinators. Activities that benefit habitat for pollinators also benefit at-risk plant species through increased habitat diversity and increased pollinator activity for those species.

At-Risk Plants

Plan components that are relevant to at-risk plants are the same for each action alternative. As a result of these plan components, at-risk plant populations in all habitat guilds are expected to persist with opportunities to restore sites if conditions warrant. Most plan components cited above provide a course filter approach to protect at-risk plant species and their habitats. For some species needs, the listed components may not fully address species persistence and a fine filter approach is needed. FW-DC-GS-07 seeks to maintain Dasynotus and Pacific dogwood in transitional habitats that may be threatened by the progression of succession. FW-DC-GS-08 seeks to maintain Douglas clover and sticky goldenweed in special meadow habitats with unique needs on the Palouse Ranger District.

Some plan components reviewed with a course filter approach in the above discussions should also be included here as they are particularly important and intended largely for at-risk plant species dependent on specialized habitats. FW-DC-TE-01 accounts for uncommon habitat elements are preserved to support the long-term persistence of rare and endemic species with very narrow or specific habitats and limited distribution. This applies to several species of conservation concern plant species. FW-DC-TE-02 is specifically for the maintenance of peatlands and other wetland habitats that support many rare and unique species. FW-DC-TE-04 promotes the composition, structure, function, and connectivity of native plant communities are appropriate for a given landscape and climatic setting. FW-GDL-TE-01 encourages conservation of species found near uncommon habitats elements described in FW-DC-TE-01 and that activities to not remove or alter habitats to improve conditions for terrestrial plant or invertebrate animal communities that have been assigned a NatureServe ranking of G1 globally critically imperiled or G2 globally imperiled. FW-DC-GS-01, FW-DC-GS-02, and FW-DE-GS-06 are particularly important for at-risk plants in the grassland guild and FW-DC-GS-04 is important for persistence of species in wetland and meadow guilds.

There are unknowns about future species of conservation concern policy. The Regional Forester has defined sensitive species policy, but Forest Service manual policy is not yet available for species of conservation concern. An interim management policy is expected to become available prior to the revised manual direction.

Summary of Consequences

Table 93 summarizes the number of species reviewed in each protection category across the alternatives. The occurrence of the threatened Spalding's catchfly is the same regardless of the alternative. The threatened species, Macfarlane's four-o'clock, has no occurrences on the Nez Perce-Clearwater and is thus excluded from the table. Whitebark pine occurrences have not been numbered but it occurs in all categories regardless of alternative. In several cases, occurrences cross area boundaries that vary with each alternative. This is especially true with large occurrences or occurrences with low mapping precision. This results in many occurrences being mapped and counted in more than one category. Thus, the counted occurrence totals are not consistent across the alternatives.

Conclusion

All at-risk plant species are expected to maintain viable occurrences on the Nez Perce-Clearwater under all alternatives due to Forest Service Manual direction in the No Action Alternative and the plan components in the action alternatives. The direction and plan components will ensure that species of conservation concern and federally listed species are considered during ground-disturbing activities. Habitat quality and threats vary slightly between each alternative due to different land allocations through differences in acreage of the more undeveloped and protected areas and proposed land suitable for timber production.

The No Action Alternative would maintain the existing separate plans for the Clearwater National Forest and Nez Perce National Forest. While all plants are expected to remain viable on the Nez Perce-Clearwater as a result of this alternative due to Forest Service manual policy, there are fewer plan components in the current plans that protect some species' habitat. There are no plan components for specific species needs.

The action alternatives provide considerable changes to forestwide plan direction that apply to each at-risk species' habitat on the Nez Perce-Clearwater. The revised plan components provide additional protections to at-risk plant habitats. The variations in plan components between the action alternatives are not expected to affect at-risk species differently because all plan components relevant to at-risk plant species remain the same between the action alternatives. The area proposed as suitable for timber production does not vary considerably by alternative so there is limited difference among any of the alternatives regarding potential effects to at-risk plant species.

The number of species and occurrences are highest in Management Area 3 because the front areas provide more diverse habitats that are important to the distribution of the particular plant species reviewed. Also, because these areas have supported more past projects and provided more opportunity for survey as part of project analysis, documentation of occurrences has been more thorough in these areas. Rare plant occurrence in wilderness and backcountry areas have been documented less due to less access and project level review. The most protected areas only approach Management Area 3 ground in numbers of occurrences due to the inclusion of research natural areas in that category. These small areas are unusually rich ecologically and have received a disproportionate review and documentation as centers of study and research.

While wilderness, recommended wilderness, and other more protected areas are generally considered to have fewer disturbances, species dependent on older forests may actually be more impacted in these settings due to lack of fire suppression and the increasing prevalence of early seral forests following fire. Management Area 3 ground will host more impactive activities; however, the implementation of plan

Table 93. Rare plant indicator comparison of alternatives

Measurement Indicator	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Silene spaldingii Spalding's catchfly	Most Protected 1 occurrence Less Protected No occurrences Timber Production 2 occurrences	Most Protected 1 occurrence Less Protected No occurrences Timber Production 2 occurrences	Most Protected 1 occurrence Less Protected No occurrences Timber Production 2 occurrences	Most Protected 1 occurrence Less Protected No occurrences Timber Production 2 occurrences	Most Protected 1 occurrence Less Protected No occurrences Timber Production 2 occurrences	Most Protected 1 occurrence Less Protected No occurrences Timber Production 2 occurrences
Pinus albicaulis Whitebark pine	Several occurrences	Several occurrences	Several occurrences	Several occurrences	Several occurrences	Several occurrences
Regional Forester Sensitive Species (RFSS)	Most Protected 28 species 162 occurrences Less Protected 25 species 181 occurrences Timber Production 29 species 319 occurrences	No RFSS	No RFSS	No RFSS	No RFSS	No RFSS
Species of Conservation Concern	None	Most Protected 18 species 116 occurrences Less Protected 11 species 50 occurrences Timber Production 26 species 201 occurrences	Most Protected 17 species 94 occurrences Less Protected 13 species 77 occurrences Timber Production 26 species 203 occurrences	Most Protected 18 species 111 occurrences Less Protected 11 species 75 occurrences Timber Production 25 species 190 occurrences	Most Protected 18 species 112 occurrences Less Protected 13 species 64 occurrences Timber Production 26 species 204 occurrences	Most Protected 18 species 96 occurrences Less Protected 14 species 47 occurrences Timber Production 24 species 195 occurrences

components will offer general resource protections that will benefit rare species through a course filter. Additionally, project level analysis may lead to more survey and site-specific protections when appropriate as well as the implementation of restoration activities that maintain or increase habitats that are suitable for some species of concern.

Determinations are provided for federally listed species, species of conservation concern, and sensitive species for all alternatives as follows:

Federally Listed and Proposed Species

The three federally listed species that are reviewed in projects on the Nez Perce-Clearwater are Macfarlane's four o'clock, Spalding's catchfly, and whitebark pine.

Macfarlane's four o'clock is addressed in projects when directed by the U.S. Fish and Wildlife Service. This inclusion is based upon occupied habitat that is very close to parts of the Forest or occurrence within particular counties. Based upon project level and landscape level survey and review, potentially suitable habitat for this species on the Nez Perce-Clearwater is unknown, of marginal quality, or is outside the local ranges of the species. The Forest will continue to review for this species as part of project level analysis as directed by the U.S. Fish and Wildlife Service.

Determination: No Effect on Macfarlane's four o'clock.

Spalding's catchfly occurs at three grassland locations on the Nez Perce-Clearwater. One occurrence is on ground in the most protected category, while the other two are on Management Area 3 ground. All three sites are potentially affected by invasive species, livestock and wildlife grazing, recreation, climate change, and general habitat degradation under all alternatives. Plan components will contribute to the protection and maintenance of the species and its habitat and project level consultation with the regulatory agency completed; however, there is potential for some plants to be subjected to some level of disturbance from a number or sources. These sites are subject to ongoing direct, indirect, and cumulative effects.

Determination: Likely to Adversely Affect Spalding's catchfly.

Whitebark pine is found at many locations on the Forest but primarily on Management Area 1 and Management Area 2 ground. Where sufficient elevations exist in Management Area 3, trace amounts of the species may occur, but developed stands are not expected. In this botanical analysis Management Area 1, and Management Area 2 approximately correspond to the most protected and less protected ground respectively. Factors contributing the species decline will continue through direct, indirect, and cumulative effects. Implementation of some plan components to treat vegetation in suitable habitats and restore whitebark pine may harm some individual trees but would be implemented to the benefit of the species and its habitat and increase the likelihood of persistence of the species on the landscape.

Determination: Likely to Adversely Affect whitebark pine.

Species of Conservation Concern

Indirect and cumulative effects for plant species of conservation (SCC) concern were analyzed using a review of effects of potential management actions and plan components to habitat guilds and a comparison of occurrences in general management categories across alternatives.

There are seven habitat guilds. General effects to these guilds and the species involved were provided in the discussion of guilds in this analysis. The number of species per guild is provided below:

- Grasslands – 7 species
- Meadows – 5 species
- Mesic forest – 12 species
- Rocky habitats – 7 species
- Subalpine forests – 1 species
- Transitional habitats – 2 species
- Wetlands – 2 species

Some species occur in more than one guild.

The No Action Alternative provides the least direction to protect habitats for rare plant species, though agency policy in the Forest Service manual provides adequate direction to maintain viable populations of these species. The No Action Alternative recognizes sensitive species rather than species of conservation concern. All action alternatives include additional plan components to maintain at-risk plant habitat in the plan and are expected to provide additional beneficial impacts to habitat quality for at-risk plant species in the plan area. The comparison between alternatives is largely qualitative and subsequent project analyses would evaluate impacts to these species designated as species of conservation concern.

Species and occurrences were also counted individually between alternatives to compare the relative potential for impacts by threat categories important to the plant species. Threats to species of conservation concern from vegetation management is very similar across all action alternatives due to the small difference in the area designated as Management Area 3 and overarching policies and at-risk plant components protecting these species during project activities. Potential management disturbances would be much less in the more protected categories where management is absent or more restricted.

Determination: May impact individuals but would not contribute toward a trend for federal listing or loss of viability.

Sensitive Plant Species Currently on the Regional Forester's Sensitive List

Of the 41 plant species currently identified as sensitive by the regional forester that are known or suspected to occur on the Nez Perce-Clearwater, 23 have been identified as species of conservation concern by the regional forester. Whitebark pine was on the sensitive list but now as a threatened species it is included as an at-risk, federally listed species rather than included with species of conservation concern. Removing whitebark pine and the 23 species of conservation concern from the Regional Forester Sensitive Species list, leaves 18 sensitive plant species with no status under the revised plan.

Indirect and cumulative effects for the Regional Forester Sensitive Species list were analyzed using habitat guilds to compare plan components and general impacts of habitat management. Of the remaining 18 sensitive species that are not designated species of conservation concern, three are not known to occur in the plan area; therefore, no indirect or cumulative impacts are expected.

The remaining 15 species occur within 7 habitat guilds as follows:

- Grasslands – 2 species
- Meadows – 2 species
- Mesic forests – 6 species

- Rocky habitats – 1 species
- Subalpine forests – 1 species
- Transitional habitats – 4 species
- Wetlands – 5 species

Some species occur in more than one guild.

The habitat and stressors for these sensitive species, as well as the effects of the action alternatives, would be similar to those disclosed for the species of conservation concern within each habitat guild. The protections provided by plan components to plant species of conservation concern and their habitats described above would also help protect sensitive plant species and communities that occupy these types of habitats. Thus, habitat would be maintained in the plan area for all species and threats are not considered to pose a risk to the viability of these species in the plan area. As new information becomes available or additional threats become known, these species or others would be reconsidered for species of conservation concern designation.

Determination: May impact individuals but would not contribute toward a trend for federal listing or loss of viability.

3.2.3 Climate Change and Forest Carbon

Climate change is a particularly complex challenge given its global nature and inherent interrelationships among its sources, causes, mechanisms of action, and impacts. The effects of climate change observed to date and projected to occur in the future include changes in temperature, precipitation, and disturbance patterns that drive and stress ecosystems and the benefits they provide, including degraded air quality, water resources, wildlife, carbon storage, and the quality of recreational experiences.

This analysis considers the potential impacts of climate change on the Nez Perce-Clearwater National Forests, as indicated by consideration of changes in climate, such as temperature and precipitation patterns, and the effects of climate change impacts on ecological, social, and economic resources. Land Management Plans are strategic documents and do not authorize or mandate a specific agency action. Therefore, a qualitative, programmatic approach was used in the analysis and no quantitative estimate of climate impacts resulting from the Land Management Plan was conducted. This section also considers the potential effects of the proposed alternatives on forest carbon, as indicated by consideration of changes in carbon sequestration and storage arising from natural and management driven processes.

Climate Change

Climate change impacts to the environment are interwoven with the social, political, and economic fluctuations occurring at local, national, and world scales. Climate is described by the long-term characteristics of precipitation, temperature, wind, snowfall, and other measures of weather that occur over a long period in a particular place (Halofsky, Peterson, et al. 2018a, b) and is a primary driver of the ecosystem. The Nez Perce-Clearwater lies at the boundary between the warm, wet maritime airflows from the Pacific Ocean and the cooler, drier airflows from Canada. Summers are typically hot and dry, and winters are relatively cold. Precipitation varies seasonally, with little occurring during the summer months. The average annual precipitation ranges from 20 inches in low elevation valleys to 60 to 80 inches at the upper elevations. The majority of precipitation falls as snow between October and April.

Historic trends in climate are correlated to changes in ecosystem components. Therefore, future climate is an important component of the effect’s analyses for Land Management Plan. Natural climate cycles have occurred historically and will continue into the future. Human activities, such as fuel burning, industrial activities, land-use change, animal husbandry, and agriculture, lead to increases in ambient greenhouse gases, which contribute to the "greenhouse effect" (Melillo et al. 2014). The Intergovernmental Panel on Climate Change (IPCC) states human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history (Intergovernmental Panel on Climate Change 2007). Warming temperatures are the most certain consequence of increased carbon dioxide in the atmosphere (Halofsky, Peterson, et al. 2018a, b). Understanding and responding to climate change will play a critical role in the future of land management and the ability of the Nez Perce-Clearwater to continue to provide a range of values and benefits. The current 1987 Forest Plans do not address climate change.

This section provides a broad overview of climate conditions for the Nez Perce-Clearwater. Each resource section of the Final Environmental Impact Statement may address more specific impacts of climate change where relevant.

Relevant Laws, Regulations, and Policy

Executive Orders

Executive Order 14008 of January 27, 2021, Tackling the Climate Crisis at Home and Abroad: provides direction for a government-wide approach to combat the climate crisis. The order requires a coordinated approach from planning to implementation coupled with substantive engagement by stakeholders, including state, local, and tribal governments. The order also emphasizes environmental justice for historically marginalized communities, including low-income, minority, Indigenous, and other overburdened and underserved communities that could be disproportionately affected by climate change.

Agency Regulations

36 CFR 219.8: requires a plan to include plan components to maintain or restore structure, function, composition, and connectivity of terrestrial and aquatic ecosystems and watersheds, taking into account stressors, such as climate change (36 CFR 219.8(a)).

36 CFR 219.12: states that the responsible official should consider measurable changes to the plan area related to climate change and other stressors affecting the plan area when developing a monitoring program for the plan area (36 CFR 219.12(a)(5)(v)).

Policy

FSM 1920, Section 1921.02: states that an objective of land management planning is to improve the resilience of National Forests and Grasslands to climate change and other stressors.

FSH 1909.12, Chapter 20, Section 23: refers to requirements for considering and addressing climate and climate change when developing plan components for ecological sustainability and diversity of plant and animal communities.

FSH 1909.12, Chapter 30: contains direction for considering and addressing climate change when developing the plan monitoring program.

Other Guidance

USDA Action Plan for Climate Adaptation and Resilience: response to Executive Order 14008, outlining how the U.S. Department of Agriculture (USDA) will provide relevant information, tools, and resources to its stakeholders and target programs and activities to increase resilience to climate impacts (U.S. Department of Agriculture 2021).

USDA Forest Service Climate Adaptation Plan FS-1196: presents a comprehensive approach to integrating climate change adaptation into the Forest Service's operations and mission. The plan outlines key climate risks to the agency's operations and critical adaptation actions to reduce these risks and help ensure the Forest Service continues to meet the needs of present and future generations (U.S. Department of Agriculture 2022b).

Council on Environmental Quality, National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change (Federal Register Doc. 2023–00158): interim guidance to assist agencies in analyzing greenhouse gas and climate change effects of their proposed actions under the National Environmental Policy Act.

Secretary's Memorandum 1077-004, Climate Resilience and Carbon Stewardship of America's National Forests and Grasslands: outlines actions that the Department and USFS will undertake so that data-informed policies, strategies, and actions are in place to provide for increased carbon stewardship and climate resilience across our national forests and grasslands.

Best Available Scientific Information

An ever-increasing body of knowledge exists regarding climate and climate change. This climate change summary is based in large part upon the work of the Northern Rockies Adaptation Partnership, which is a "science-management" collaboration with the goals of 1) assessing vulnerability of natural resources and ecosystem services to climate change and 2) developing science-based adaptation strategies that can be used by national forests to understand and mitigate the negative effects of climate change. The Northern Rockies region includes the U.S. Forest Service Northern Region and the adjacent Greater Yellowstone area, spanning across northern Idaho, Montana, northwest Wyoming, North Dakota, and South Dakota. Five subregions are identified and assessed; the Nez Perce-Clearwater is in the Western Rockies subregion. The Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains: Part 1 and Part 2 (Halofsky, Peterson, et al. 2018a, b) documents summarize climate projections, modelling results, peer-reviewed literature, and other information on climate change relevant to the Northern Rockies area. Climate change vulnerability assessments draw largely on available information, including from existing models and spatial data, primary scientific literature, and other larger scale climate impact assessments. Nez Perce-Clearwater specific documents, such as A Climate Change Vulnerability Assessment for Resources of Nez Perce-Clearwater National Forests (EcoAdapt 2014), Climate Change Adaptation Strategies for Resources of the Nez Perce-Clearwater National Forests (EcoAdapt 2015), and the Nez Perce-Clearwater National Forests Forest Plan Assessment - Socioeconomic Climate Change Vulnerability Assessment (U.S. Department of Agriculture 2014e) also offer useful information.

Global climate models are the principal source of future climate projections and are effective at simulating global climate characteristics; however, because the spatial patterns of regional climate are far more heterogeneous than suggested by global climate model outputs, specific downscaling techniques are used to provide inputs for regional and sub-regional analyses (Daniels et al. 2012). The Northern Rockies Adaptation Partnership compiled downscaled climate information to a sub-regional level, which is a scale that is meaningful for the Nez Perce-Clearwater and its surrounding landscapes.

The Coupled Model Intercomparison Project (CMIP) began in 1995 to coordinate a common set of experiments for evaluating changes to past and future global climate, allowing comparison of results from different global climate models around the world (Halofsky, Peterson, et al. 2018a, b). CMIP Version 3 simulations with emissions scenarios from the Special Report on Emissions Scenarios which represent futures with different combinations of global population growth and policies. Conversely, CMIP Version 5 simulations are driven by "representative concentration pathways," which do not define emissions but rather concentrations of greenhouse gases and other agents that influence the climate and do not consider climate policy actions (Halofsky, Peterson, et al. 2018a, b). The Northern Rockies Adaptation Partnership considered CMIP Version 5 climate scenarios but also used the best available information from multiple literature sources, some of which are based upon CMIP Version 3 modeling results.

Climate projections embody several uncertainties, including the uncertainty of future emissions driven by socioeconomic processes and unpredictable policy choices, the variability internal to a given global climate model's simulation of weather and climate, the variability related to parameterization and other model characteristics, and the uncertainty or error in observed climate data used in downscaling global climate model output (Daniels et al. 2012).

Current Climate and Recent Historical Trend

The climate of the Northern Region fluctuates between cool and warm periods and is affected by multiple factors. The influences of sea surface temperature and atmospheric pressure are thought to directly influence drought in the western United States (Kitzberger et al. 2007). Multiple indices exist to measure sea surface temperatures, including the Pacific Decadal Oscillation, which tracks variations in the northern Pacific Ocean that tend to cycle every 20 years (Zhang et al. 1997). Correlations between these variations and ecological disturbances, such as wildfire, have been shown. Also, in the northern Rocky Mountains, the majority of the variability in peak and total annual snowpack and streamflow is explained by season-dependent interannual-to-interdecadal changes in atmospheric circulation associated with Pacific sea temperatures (Pederson et al. 2010).

Recent climate cycles can be demonstrated by variations in the Pacific Decadal Oscillation (Joint Institute for the Study of the Atmosphere and Ocean 2017), as shown in Figure 26. The early 1900s were a relatively normalized period where warm and cool years were relatively equally represented and fluctuations low. The following period until the 1940s was dominated by warm conditions, while the period from about 1950 to 1980 was dominated by cool conditions. During this cool period, ecological disturbances, such as wildfire, affected a relatively small area, although this was also influenced by human actions, such as fire suppression and livestock grazing. Since the 1980s, the Northern Region and the Nez Perce-Clearwater have experienced a warm Pacific Decadal Oscillation cycle, along with increased extent and frequency of disturbances including wildfire and insect outbreaks.

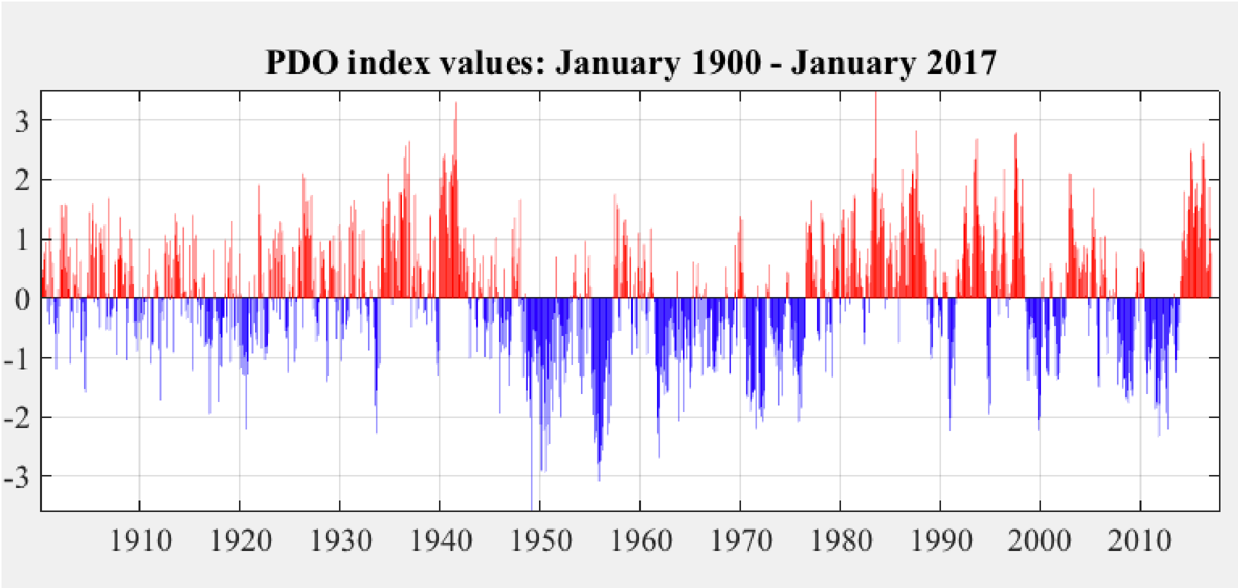


Figure 26. Pacific Decadal Oscillation index values from 1900 to 2017.

Data Source: Source: Joint Institute for the Study of the Atmosphere and Ocean, http://research.jisao.washington.edu/pdo/

Other climate data demonstrates trends for temperature and precipitation over the recent historical period. In the Western Rockies subregion, the Northern Rockies Adaptation Partnership found that from 1895 to 2012, the annual mean monthly minimum temperature increased by about 3.0 degrees Fahrenheit, while the annual mean monthly maximum temperature increased by about 0.6 degrees Fahrenheit. During the same period, the annual mean monthly precipitation increased slightly by an average of about 0.1 inch per month (Halofsky, Peterson, et al. 2018a, b). Current climate conditions in this subregion include an annual mean monthly maximum temperature of approximately 53 degrees Fahrenheit; an annual mean monthly minimum temperature between 27 and 33 degrees Fahrenheit; and an annual precipitation between 35 and 40 inches (Halofsky, Peterson, et al. 2018a, b).

Future Climate and Expected Impacts

The future climate has the potential to influence all resources. Natural variation in climate will continue, coupled with the effects of anthropogenic influences. Different climate models project differing rates of change in temperature and precipitation because they operate at different scales, have different climate sensitivities, and incorporate feedbacks differently. However, the climate models are unanimous in projecting increasing average annual temperatures over the coming decades. As noted in Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains: Part 1 and Part 2 (Halofsky, Peterson, et al. 2018a, b):

"Global climate models project that the Earth's current warming trend will continue throughout the 21st century in the Northern Rockies. Compared to observed historical temperature, average warming across the five NRAP subregions is projected to be about 4 to 5 °F by 2050, depending on greenhouse gas emissions. Precipitation may increase slightly in the winter, although the magnitude is uncertain. Climatic extremes are difficult to project, but they will probably be more common, driving biophysical changes in terrestrial and aquatic ecosystems. Droughts of increasing frequency and magnitude are expected in the future, promoting an increase in wildfire, insect outbreaks, and non-native species. These periodic disturbances, will rapidly alter productivity and structure of vegetation, potentially altering the distribution and abundance of dominant plant species and animal habitat."

Projected climate changes in the Western Rockies subregion (Halofsky, Peterson, et al. 2018a, b), which includes the Nez Perce-Clearwater, include:

- Changes in the climate affecting the mountain snowpack will have important hydrologic implications. Most of the streams in the Western Rockies subregion depend on snowmelt for runoff, and snowpack changes strongly dictate streamflow responses.
- Temperature is projected to increase 5 to 10 degrees Fahrenheit by 2100, including increases in both the annual mean monthly minimum and annual mean monthly maximum.
- Mean monthly maximum and minimum temperatures are projected to increase for all seasons. The mean monthly spring and fall minimum temperature and the mean monthly winter maximum temperature may rise above freezing.
- Seasonal precipitation is projected to be slightly higher in winter and spring and slightly lower in summer than during the historical period of record.

The influence of future climate spans across all resources. Climate change is addressed in further detail in many of the resource sections in the Final Environmental Impact Statement. The following examples of resource specific climate change projections are a summary from Halofsky et al. (2018a, b) and other sources as noted:

- Decreasing snowpack and declining summer flows will alter timing and availability of water supply.
- Declining summer low flows will affect water availability during late summer.
- Decreased snowpack, in combination with higher air temperature and increased wildfire, will increase stream temperatures and reduce the vigor of cold-water fish species.
- Declining summer water flows may result in some communities experiencing summer water shortages. Water quality will decrease in some locations if wildfires and floods increase.
- Increasing air temperature will influence soil moisture and will cause gradual changes in the abundance and distribution of tree, shrub, and grass species, with more drought tolerant species becoming more competitive. The earliest changes will be at ecotones.
- Natural disturbance will be the primary facilitator of vegetation change, and future forest landscapes may be dominated by younger age classes and smaller trees.
- High-elevation forests will be especially vulnerable if disturbance frequency increases significantly.
- As wildfires and insect outbreaks become more common, the supply of timber and other forest products could become less reliable.
- A longer growing season will increase productivity of rangeland types and, thus, available forage for livestock, especially those dominated by grasses.
- In montane grasslands, wildfire may kill Douglas-fir and other species that have been recently established through fire exclusion.
- High-elevation, snowy environments provide habitat for predators, such as the Canada lynx, fisher, and wolverine. Predator prey of snowshoe hare is expected to deteriorate as snowpack decreases.
- Animal species that are mobile or respond well to disturbance and habitat patchiness, such as deer and elk, will be resilient to a warmer climate.
- Some amphibian species may be affected by pathogens that are favored by a warmer climate.

- A warmer climate will generally improve opportunities for warm-weather recreation, such as hiking, camping, and sightseeing, because it will create a longer time during which these activities are possible.
- A warmer climate will reduce opportunities for snow-based winter activities, such as downhill skiing, cross-country skiing, and snowmobiling, because snowpack is expected to decline.
- Recreationists may seek more water-based activities to seek refuge from hotter summer weather.
- Viewsheds and air quality will be negatively affected by more wildfires and longer pollen seasons.
- Regulation of soil erosion will be decreased by agricultural expansion, spread of non-native plants, and increased frequency of wildfire and floods.
- Carbon sequestration will be increasingly difficult if disturbances increase as expected.
- Climate-induced changes in habitats will affect the abundance of culturally valued plants and animals.
- Studies by Westerling (2016) and Morgan et al. (2008) identify the mid-elevational areas located between 5,000 to 7,500 feet in the Northern Rockies as having the greatest risk of climate-induced fire increases in the region and have also found that the timing of spring snow-melt can drive the intensity of fires.
- Hotter and drier weather and earlier snowmelt mean that western wildfires start earlier in the spring, last later into the fall, and burn more acreage (Melillo et al. 2014).
- Changes in the timing of streamflow related to changing snowmelt are already observed and will continue, reducing the supply of water for many competing demands and causing far-reaching ecological and socioeconomic consequences (Mote et al. 2014).
- The combined impacts of increasing wildfire, insect outbreaks, and tree diseases are already causing widespread tree die-off and are virtually certain to cause additional forest mortality by the 2040s and long-term transformation of forest landscapes. Under higher emissions scenarios, extensive conversion of subalpine forests to other forest types is projected by the 2080s (Mote et al. 2014).
- Changing climate is likely to increase the risks of and extent of invasive species. Controlling weeds costs the United States more than 11 billion dollars per year, with most of that spent on herbicides (Hatfield et al. 2014). Both herbicide use and costs are expected to increase as temperatures and carbon dioxide levels rise (Hatfield et al. 2014).

Management Strategies that Address Climate Change

In the broadest terms, natural resource management strategies for addressing climate change can be classified under adaptation and mitigation. Adaptation refers to all approaches taken to adjust, prepare for, and accommodate new conditions that are created by changing climates. Mitigation in the context of climate change is an intervention designed to reduce the human influence on the climate system, primarily through increased removal of greenhouse gases from the atmosphere and the reduction of greenhouse gas emissions. In natural resources, this may include managing forests in a way that sequesters and stores more carbon dioxide. Adaptation and mitigation are often parallel strategies that can be simultaneously integrated into natural resource management. Ecosystems that are better adapted to future climates will be better able to hold on to their stores of carbon and avoid releasing them into the atmosphere. A range of adaptation options exist for managing forests to be better able to cope with the negative effects of climate change, including resistance, resilience, and transition strategies.

Resistance - This set of options promotes resistance to the effects of climate change and focuses on improving the defenses of the Nez Perce-Clearwater against anticipated changes or directly defending the system against disturbance so that the system remains unchanged. A resistance strategy may be appropriate for defending a high-risk or high-value resource in the short-term; for example, creating an in-situ refuge for a critically vulnerable endangered species or constructing fire breaks where a resource is threatened by near-term fire risk. It may also make sense to pursue resistance where microclimates may buffer anticipated climate changes. Resistance options are often expensive and take a considerable amount of time and resources since they are focused on keeping changes at bay. In addition, they can be risky; in some situations, conditions will eventually become so different that a resource passes a threshold and resistance becomes futile. Thus, choosing to resist change and maintain a system in its present condition will not be appropriate in all situations and may become less appropriate over time as external pressures mount.

Resilience - Resilience options accommodate gradual change, usually returning to a prior condition after disturbance or seeking to maintain status quo, even in the face of forces of change. Climate change may lead to new intensities of stressors and extreme events. Management options that improve the ability of a resource to return to or maintain a desired condition after encountering stressors fall under the category of resilience. Healthy species, forests, and ecosystems are considered more resilient to change and many resilience strategies are aimed at creating healthy forests. For example, using a combination of mechanical thinning and prescribed burning in a dense forest threatened by risk of wildfire could reduce the intensity of future fires, allowing the national forest to more easily withstand and regenerate after burning. In the case of endangered or threatened species, reducing harvesting or other non-climate stresses on the species could make the population more resilient to climate change influences. As with resistance options, strategies to promote resilience may only be successful in the relatively short-term in many areas; eventually, climate changes may be too drastic to allow a return to a prior condition.

Transition - Transition options intentionally accommodate change and enable ecosystems to adaptively respond to future conditions. By encouraging a gradual and intentional transition, it may be easier to maintain important functions and values over time, even as the character or a system changes. In certain locations or over longer time scales, it may be difficult for a system to either resist change or return to a prior condition after disturbance. Where this is the case, managers can adopt strategies to help these systems transition smoothly to a future state that maintains ecosystem processes and functions that are considered beneficial. An example would be intentionally increasing tree species diversity on a forested landscape following a disturbance event. A diverse pool of tree species would increase the candidates available for selection under new climate conditions and would reduce opportunities for mass die-offs, such as from pest outbreaks. Promoting connected landscapes to allow species to more easily colonize new environments would be another example of a transition approach. In each of these situations, it is recognized that future landscapes may not be the same as they were historically, but they will ideally maintain certain desired features, such as forested habitat and watershed protection.

A complementary adaptation framework (Schmitz and Trainor 2014) outlines six adaptation approaches considered at three ecological levels—species and population, ecosystem, and landscape scale. The adaptation approaches include protecting current patterns of biodiversity; large, intact, natural landscapes and ecological processes; and the geophysical setting. The adaptation approaches also promote maintaining and restoring ecological connectivity and identifying and managing climate refugia and areas that could provide for species expected to be displaced by climate change.

In forest management, examples of mitigation actions can generally be placed into three categories: emissions avoidance, sequestration, and substitution. Emissions avoidance focuses on maintaining existing carbon storage in trees by avoiding deforestation and reducing potential impacts from catastrophic disturbances, such as wildfire. Through the National Roadmap for Responding to Climate change program (U.S. Department of Agriculture 2011b), the Forest Service actively focuses on reducing emissions by soundly managing vehicles and equipment, promoting telework opportunities to lessen employee commuting, and reducing energy use in buildings. Enhancing sequestration encompasses actions, such as afforestation (planting trees) and managing forests to increase the amount of carbon stored relative to “business as usual.” Substitution describes actions that reduce greenhouse gas emissions by using forest products in the place of fossil fuel intensive products. This would include using renewable forest-derived biofuels for energy instead of fossil fuels and using wood that will store carbon long-term, such as lumber for wood houses, in place of materials that may be more energy-intensive to produce.

In response to government, business, and individual commitments to reduce carbon dioxide emissions, carbon is now a priced environmental commodity in the global marketplace. The United States carbon market is in its formative stages. States and regions are developing climate change strategies and policy for reducing carbon dioxide emissions, and mandatory markets are forming at the regional and state levels. The Voluntary Reporting of Greenhouse Gases Program, established by Section 1605(b) of the Energy Policy Act of 1992, provides a means for organizations and individuals, including forest landowners and other land managers, to record their baseline emissions and emission reductions. The Forest Service’s National Roadmap for Responding to Climate Change (U.S. Department of Agriculture 2011b) outlines the assessment and management of carbon as a mitigation strategy for national forests and identifies a variety of tools and models to evaluate carbon stocks.

Forest Service Climate Adaptation Plan

The U.S. Department of Agriculture (USDA) Forest Service Climate Adaptation Plan, released in 2022, presents a vision for integrating climate change adaptation into the Forest Service’s operations and mission. The plan is part of the Forest Service’s response to Executive Order 14008: Tackling the Climate Crisis at Home and Abroad, which calls on Federal Departments and agencies to develop climate adaptation plans that secure environmental justice and spur economic opportunity. In October 2021, the USDA released its Action Plan for Climate Adaptation and Resilience (U.S. Department of Agriculture 2021) to describe how the USDA is preparing for and responding to current and future impacts of climate change. As part of developing its plan, USDA issued a new departmental regulation (DR 1070-001), directing each of its agencies to update its adaptation plans. The USDA Forest Service Climate Adaptation Plan describes the top risks to the agency’s mission, responsibilities, and operations and outlines key actions to manage these risks (U.S. Department of Agriculture 2022b). The adaptation plan builds on the modes of action outlined in the Forest Service’s National Roadmap for Responding to Climate Change (U.S. Department of Agriculture 2011b) and aligns with other department and agency policies, strategy documents, and initiatives at the interface of climate change, sustainability, and environmental justice (U.S. Department of Agriculture 2022b).

The Forest Service identified six key climate-related vulnerabilities in the adaptation plan that affect the agency’s mission as outlined in Table 94. To reduce these risks, the Forest Service identified six overarching adaptation actions that correspond to the six risk categories (Table 94).

Table 94. Climate-related vulnerabilities and adaption actions identified in the Forest Service Climate Adaptation Plan

Climate-related vulnerabilities	Adaptation Actions
Shifting fire regimes and resulting effects on ecological integrity, multiple uses, human safety and well-being, and wildland fire management operations.	Adapt to changing fire regimes.

Climate-related vulnerabilities	Adaptation Actions
Extreme events and disturbances, including the effects of flooding, drought, insect outbreaks, invasive species, and severe storms.	Prepare ecosystems and watersheds for extreme events and intensifying disturbances.
Chronic stressors to watersheds and ecosystems, such as altered productivity and composition, changes in habitat for plants and animals, and implications for the agency's ability to manage these systems over time.	Sustain and improve ecosystem and watershed function in the face of chronic stressors.
Disruption in the delivery of ecosystem products and services, including clean water, carbon uptake and storage, forest and rangeland products, and recreation opportunities.	Support the delivery of ecosystem products and services in a changing climate.
Disproportionate impacts on disadvantaged communities and Tribal Nations, including human health impacts, loss of cultural resources, and threats to economic prosperity and equity.	Deliver environmental justice through adaptation actions.
Threats to the agency mission, infrastructure, and operations from disruption to operations, strains on workforce capacity, more complex public engagement, and fewer resources.	Increase agency capacity to respond to climate change.

Data Source: USDA Forest Service Climate Adaptation Plan (U.S. Department of Agriculture 2022b).

The Land Management Plan includes management direction that directly aligns with the adaptation actions outlined in the Forest Service Climate Adaptation Plan. Plan components in the Forestlands and Fire Management sections promote adaptation to changing fire regimes by increasing the use of planned and unplanned ignitions and thinning treatments that help reduce near-term wildfire risks and allow landscapes to accommodate beneficial fire. Additionally, there are proposed desired conditions and objectives for vegetation treatments to improve the composition, structure, function, and connectivity of forested ecosystems, which can also help forests adapt to changing climates. The Terrestrial Ecosystems, Aquatics Ecosystems, and Infrastructure sections include plan components that support maintaining or improving ecological integrity, as well as upgrading the road system to better withstand disturbances. These efforts help to prepare ecosystems and watersheds for extreme events and intensifying disturbances and sustain and improve ecosystem and watershed function in the face of chronic stressors. Implementation of plan components in the Forestlands, Aquatic Ecosystems, Municipal Watershed, Livestock Grazing, and Recreation sections would help support the delivery of ecosystem products and services in a changing climate. The Tribal Trust Responsibilities, Aquatic Ecosystems, and Infrastructure sections include plan components that promote the provision of resources and continued access to underserved communities. Goals in many of the resource sections emphasize working with federal, state, and county agencies, tribes, and other partners, which could help with increasing the capacity to respond to climate change.

Land Management Plan Components that Address Climate Change

The 2012 Planning Rule (U.S. Department of Agriculture 2012c) specifies that "land management plans must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, taking into account…stressors, such as climate change" (219.8 (a)(1)(iv). Although not specifically mentioned, most of the physical and biological ecosystem desired conditions in the Land Management Plan were developed to facilitate natural ecological processes and create healthy ecosystems, which are more resilient and better adapted to changing climate. The following plan components explicitly address climate change and promote resilience and adaption to the effects of climate change:

- FW-DC-TE-01. Uncommon habitat elements (mineral licks, talus slopes, fractured wet bedrock, rocky outcrops, scree slopes, waterfalls, and geologic inclusions) support long-term persistence of endemic species with narrow or vary narrow habitat specificity and limited distribution associated with these habitats.
- FW-DC-TE-03. Plant communities are comprised of a diverse mix of native grass, forb, shrub, and tree species, which provide forage for pollinator species.
- Forestlands Desired Conditions. The Forestlands Desired Conditions were developed to promote and increase the resiliency of forest landscapes and incorporate adaptation to changing climates.
- FW-DC-FIRE-01. Restore and maintain landscapes: Landscapes across the Nez Perce-Clearwater are resilient to fire-related disturbances in accordance with management objectives. Natural fuel conditions emulate the structure, species mix, spatial pattern, extent, and resiliency of the historic fire regime of the area. Wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner and meet desired conditions for other resources.
- FW-DC-SOIL-01. Soil productivity and function contribute to the long-term resilience of ecosystems.
- FW-DC-WTR-01. National Forest System lands provide the distribution, diversity, and complexity of watershed and landscape-scale features including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.
- FW-DC-WL-02. Ecological conditions on the Nez Perce-Clearwater contribute sustainable habitat to maintain species of conservation concern. Habitat is resilient and adaptable to stressors and likely future environments.
- GA-DC-SR-02. Habitat for Ponderosa pine associated species, including legacy trees and snags, are within desired conditions within Ponderosa pine systems (See FW-DC-FOR-02, FW-DC-FOR-03, FW-DC-FOR-04, and FW-DC-FOR-05). Understory characteristics do not facilitate stand replacing fires and are composed of native plants that provide insect populations as forage for Ponderosa pine associated species. These habitats are resilient to changes due to climate change.FW-DC-ARINF-02. The transportation network is resilient to the effects of climate change, including the ability to accommodate increased runoff and peak flows that may exceed historic streamflow events.

Strategies included in the Land Management Plan focus on promoting resilience to change, creating resistance to change, and enabling forests to respond to change (Millar et al. 2007). The Northern Rockies Adaptation Partnership publication Halofsky et al. (2018a, b) is a principal source of information for identifying resource vulnerabilities and providing strategies and approaches to address vulnerabilities specific to the Northern Rockies. Appendix G provides further information on climate change adaptation strategies and identifies plan components from the Land Management Plan that support them. The Land Management Plan also includes a monitoring plan (Appendix 3) with climate change specific elements, and a potential management approach for climate change (Appendix 4) that offers possible strategies that may be used to implement plan direction.

Forest Carbon

Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years (Intergovernmental Panel on Climate Change 2013). The global increases in carbon dioxide concentration are due primarily to fossil fuel use and land use change, while those of methane and nitrous oxide are primarily due to agriculture. Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change 2013).

Forests are dynamic systems that naturally undergo ebbs and flows in carbon storage and emissions as trees establish and grow, die with age or disturbances, and re-establish and regrow. Through photosynthesis, growing plants remove carbon dioxide from the atmosphere and store it in forest biomass, such as in plant stems, branches, foliage, and roots. Some of this organic material is eventually stored in forest soils through biotic and abiotic processes (Ryan et al. 2010). Carbon can also be transferred and stored outside of the forest ecosystem in the form of wood products, further influencing the amount of carbon entering the atmosphere (Gustavsson et al. 2006, Skog et al. 2014). Many management activities initially remove carbon from the forest ecosystem, but they can also result in long-term maintenance or increase in forest carbon uptake and storage by improving forest health and resilience to various types of stressors (McKinley et al. 2011).

Changes between Draft and Final Environmental Impact Statement

Comments received since the proposed action and draft environmental impact statement were published have been used where appropriate to improve the Land Management Plan and have helped inform this Final Environmental Impact Statement. An updated baseline carbon assessment was conducted, using new available tools from the Forest Service Office of Sustainability and Climate and has been included in Appendix D. Although the report has been updated, it draws upon many of the same data and literature sources described in the Draft Environmental Impact Statement. Multiple minor changes were made for the Final Environmental Impact Statement; all changes are within the scope of the Draft Environmental Impact Statement analysis and address issues that the public had an opportunity to comment on. As a result of public input, an additional alternative was developed called the Preferred Alternative. Analysis of the Preferred Alternative for forest carbon is similar to the other action alternatives.

Relevant Laws, Regulations, and Policy

There are no applicable legal or regulatory requirements or established thresholds concerning management of forest carbon or greenhouse gas emissions. The 2012 Planning Rule (U.S. Department of Agriculture 2012c) and associated directives require an assessment of baseline carbon stocks and a consideration of this information in management of the national forests.

Methodology

The spatial scale of this analysis includes the forested lands of the plan area. The Nez Perce-Clearwater National Forests consist of approximately 4 million acres, with about 3.7 million acres as forested lands. The effects analysis for greenhouse gas emissions is the global atmosphere given the mix of atmospheric gases can have no bounds. The temporal scale for analyzing carbon stocks and emissions focuses on the expected 15-year lifespan of the plan. This report includes analysis and discussion beyond this expected lifespan to provide context for potential forest carbon dynamics and factors influencing these dynamics in the future. However, estimates of future carbon stocks and their trajectory over time remain unclear because of uncertainty from the multiple interacting factors that influence carbon dynamics.

Analysis Methods and Assumptions

The affected environment section summarizes the Forest Carbon Assessment for the Nez Perce-Clearwater National Forests (Hoang et al. 2019), which is included in Appendix D. The carbon assessment draws largely from two recent U.S. Forest Service reports: the Baseline Report (U.S. Department of Agriculture 2015a) and the Disturbance Report (Birdsey et al. 2019). These reports provide assessments of forest ecosystem and harvested wood product carbon stocks and flux, and the factors that have influenced carbon dynamics. The Resource Planning Act assessment (U.S. Department of Agriculture 2016b) and a regional vulnerability assessment (Halofsky, Peterson, et al. 2018a, b) also provide information on potential future carbon conditions. These reports incorporate advances in data and analytical methods and collectively represent the best and most relevant scientific information available for the Nez Perce-Clearwater.

Potential carbon effects are discussed qualitatively, with supporting estimates where possible. This is accomplished by drawing on the quantitative analysis of the impacts of past management activities on forest carbon stocks and fluxes, as well as through future-looking analysis where available (Hoang et al. 2019).

The following information may be useful in understanding the analysis:

- 1 Hectare (ha) = 2.471 acres
- 1 Teragram carbon (Tg C) = 1,000,000 Megagram carbon (Mg C)
- 1 Megagram carbon (Mg C) = 1 tonne carbon = 1.1023 short tons (U.S.) carbon
- 1 General Sherman Sequoia tree = 1,200 Megagram carbon (Mg C) stored
- 1 Megagram carbon (Mg C) mass = 1 tonne carbon mass = 3.67 tonnes carbon dioxide
- A typical passenger vehicle emits about 4.6 tonnes carbon dioxide per year

Measurement Indicators

The key indicators for carbon sequestration include:

- Carbon pools or carbon stocks, carbon uptake, and carbon dioxide emissions, and
- Natural and human-caused influences on carbon stocks, uptake, and emissions.

Affected Environment

The carbon legacy of the Nez Perce-Clearwater is tied to the history of Euro-American settlement, land management, and disturbances. Human activities associated with settlement, such as mining, logging, and grazing, began in the mid-to-late 1800s. Historical disturbance dynamics, forest regrowth and recovery, and forest aging have been most responsible in driving carbon accumulation trends since the early 1900s.

Wildfire is the most influential disturbance on the Nez Perce-Clearwater. On average, 315,000 acres of large fires (greater than 1,000 acres) burned per decade from 1870 to 2019 (Figure 31). The dominant, historical fire regime that occurred within forested vegetation in the Inland Empire (that is, an area of the Pacific Northwest that includes parts of Washington, Oregon, Idaho, and Montana) can be characterized as a variable or mixed-severity fire regime (Zack and Morgan 1994, Kilgore 1981, Brown 2000). The type of fire regime found within the Inland Empire commonly had a moderately short fire-return interval for nonlethal or mixed severity fires, with lethal crown fires occurring less often. Relative to the other two common fire regimes that are often recognized for forested vegetation—the nonlethal and stand-replacement regimes—the mixed-severity fire regimes are the most complex (Agee and Skinner 2005).

Individual mixed-severity fires typically leave a patchy pattern of mortality on the landscape, which creates highly diverse communities. These fires kill a large percentage of the more fire-susceptible tree species, such as hemlock, grand fir, subalpine fir, and lodgepole pine, and a smaller proportion of the fire-resistant species, including Western larch, Ponderosa pine, whitebark pine, and Western white pine (Arno et al. 2000). See the Fire Management section of the Final Environmental Impact Statement for further information regarding fire history on the Nez Perce-Clearwater.

Previous harvest activities within the project area set the stage for forest cover types to depart from historical species distributions. Harvest activities prior to the 1940s were associated with homesteading, mining, and railroad building. Since the early 1900s, harvest has impacted roughly 40 percent of the Nez Perce-Clearwater's landbase. From 1987 to 2018, the Nez Perce-Clearwater completed harvest activities on an average 13,200 acres per year. See the Forestlands section of the Final Environmental Impact Statement for further information regarding harvest history on the Nez Perce-Clearwater.

Carbon stock

Forests play an important role in regulating the global carbon cycle by taking up (sequestering) and storing carbon. Forests sequester carbon dioxide from the atmosphere through the process of photosynthesis and store this carbon in plant biomass. Over time, plant biomass carbon moves to other carbon pools in the forest and is eventually emitted back to the atmosphere through decomposition or combustion (fire). Forests are dynamic systems that naturally undergo ebbs and flows in carbon storage and emissions as trees establish and grow, die with age or disturbances, and re-establish and regrow. Carbon sequestration is the process by which plants take up atmospheric carbon dioxide and convert it to biomass. The rate of carbon sequestration is commonly measured as the net amount of carbon uptake in teragrams (Tg) per hectare per year. Once carbon is sequestered, it is held in the forest as a carbon stock, the amount of carbon stored at any one time. Carbon is stored in different reservoirs or zones, called carbon pools. Carbon stocks on the Nez Perce-Clearwater are contained in seven forest ecosystem carbon pools: above-ground live trees, below-ground live, understory, standing dead trees, down dead wood, forest floor, and soil (Figure 27). Carbon can also be transferred and stored in harvested wood products, such as lumber and furniture, and does not contribute to greenhouse gas emissions.

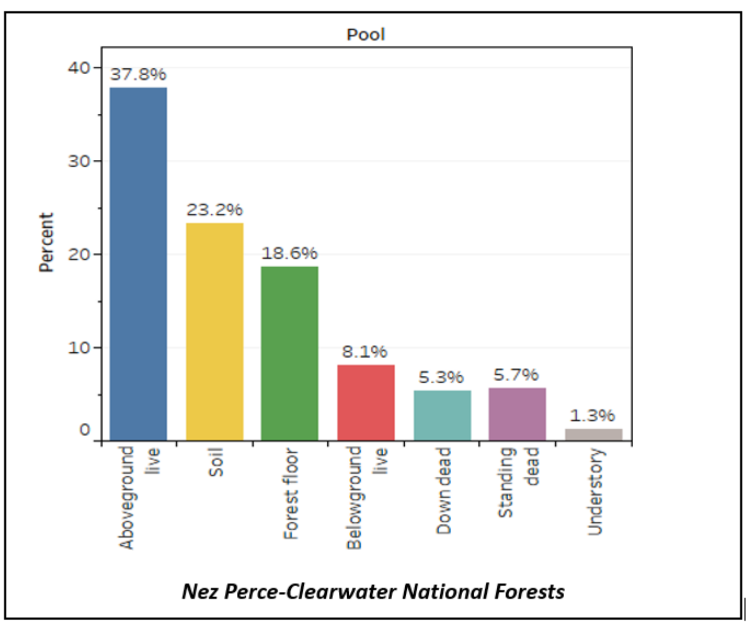


Figure 27. Percent carbon stocks in each of the forest carbon pools of the Nez Perce-Clearwater

Data Source: Nez Perce-Clearwater Carbon Dashboard Report (2019); estimated using the Carbon Calculation Tool (CCT). See the project record for more information.

Interest in terrestrial carbon sequestration has increased in an effort to explore opportunities for climate change mitigation. Carbon sequestration is the process by which atmospheric carbon dioxide is taken up by trees, grasses, and other plants through photosynthesis and stored as carbon in soils and biomass, such as trunks, branches, foliage, and roots. The sink of carbon sequestration in forests and wood products helps to offset sources of carbon dioxide to the atmosphere, such as deforestation, forest fires, and fossil fuel emissions.

Chapter 6 in Halofsky et al. (2018a) discusses the effects of climate change on forest vegetation in the Northern Rockies, providing the following information on carbon:

- Size and persistence of forest carbon sinks depend on land use, land management, and environmental factors, such as vegetation composition, structure, distribution, climate, and disturbance processes, including wildfire.
- Vegetated landscapes play an important role in storing carbon in the form of plant and animal materials (both live and dead), aboveground and in soils. Forests store carbon in soils (about 45 percent of total storage), aboveground and belowground live biomass (about 42 percent), dead wood (about 8 percent), and litter (about 5 percent) (Bonan 2008, Pan et al. 2011).
- Carbon typically accumulates in woody biomass and soils for decades to centuries until a disturbance event releases this stored carbon into the atmosphere (Goward et al. 2008). Disturbance is recognized as the primary mechanism that shifts ecosystems from carbon sinks to carbon sources (Baldocchi 2008). Wildfire in forested ecosystems is one of the primary disturbances that regulates patterns of carbon storage and release (Kasischke, O'Neill, et al. 2000, Kasischke, French, et al. 2000). Forest insect outbreaks can also release carbon through decomposition of needles and other fine fuels from attacked trees (Kurz et al. 2008).
- Although long intervals between disturbance events such as wildfires or insect outbreaks can allow carbon to accumulate for years to centuries, the probability of disturbance increases with time (Goward et al. 2008, Loehman et al. 2014). Thus, disturbance-prone forests will eventually move stored carbon to the atmosphere, regardless of management strategies designed to limit or prevent disturbance events.

According to results of the Baseline Report (U.S. Department of Agriculture 2015a), carbon stocks in the Nez Perce-Clearwater increased from 238.29 Tg C in 1990 to 279.43 Tg C in 2013, a 17.3 percent increase in carbon stocks over this period (Figure 28). Despite some uncertainty in estimates, there is a high degree of certainty that these carbon stocks have increased from 1990 to 2013. For context, 279 Tg C is approximately equivalent to the emissions from 223 million passenger vehicles in a year. The increase in storage indicates that the negative impacts caused by disturbance and recent climate conditions have been modest and offset by forest growth (Hoang et al. 2019).

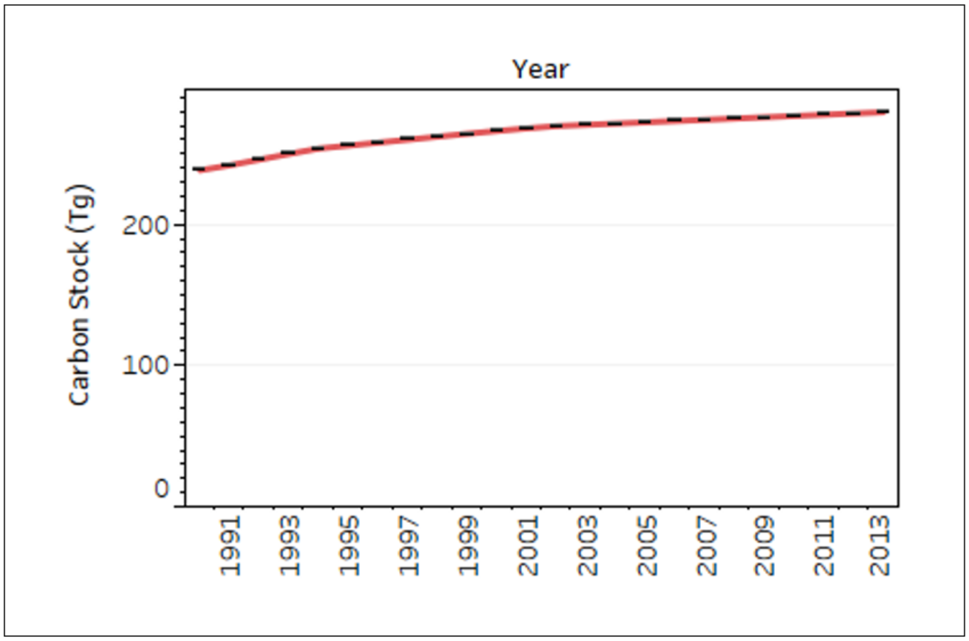


Figure 28. Total forest carbon stocks (in teragrams) from 1990 to 2013 for the Nez Perce-Clearwater.

Data Source: Nez Perce-Clearwater Carbon Dashboard Report (2019); estimated using the Carbon Calculation Tool (CCT). See the project record for more information.

Factors Influencing Forest Carbon

Stand Age

Stands regrow and recover at different rates depending on forest type and site conditions. Forests are generally most productive when they are young to middle age, then productivity peaks and declines or stabilizes as the forest canopy closes and as the stand experiences increased respiration and mortality of older trees (He et al. 2012, Pregitzer and Euskirchen 2004). Based on the 2019 Nez Perce-Clearwater Carbon Dashboard Report, over half of the stands on the Nez Perce-Clearwater are middle-aged and older (greater than 80 years. If the national forest continues on this aging trajectory, the pulse of middle-aged stands will reach a slower growth stage in coming years and decades, potentially causing the rate of carbon accumulation to decline. However, the pulse of young stands will also be moving into a maximum productivity stage, which may offset the declines in the middle-aged stands to a degree.

Disturbance

The ability of forests to store carbon is impacted by disturbances, such as wildfire, air pollution, insects and disease, and invasive plants. Fire and disease were the primary disturbances influencing carbon stocks on the Nez Perce-Clearwater from 1990 to 2011 (Table 94 and Figure 29). In 2011, the Nez Perce-Clearwater contained 2.52 Mg C per ha less non-soil carbon (that is, vegetation and associated pools) due to disease and 2.47 Mg C per ha less due to fire since 1990, as compared to a hypothetical undisturbed scenario. Harvest also played a disturbance role, contributing to 0.82 percent, approximately 12,282 hectares, of the average forested area on the Nez Perce-Clearwater from 1990 to 2011. Overall, harvest during the 21-year period resulted in a 0.37 percent loss of non-soil carbon (0.53 Mg C per hectare). Since the Nez Perce-Clearwater contained an average forested area of about 1,489,421 hectares during this period, non-soil carbon losses from harvest were about 37,590 Mg C per year (0.038 Tg C per year), compared to non-soil carbon losses from fire at 175,184 Mg C per year (0.175 Tg C per year).

Table 95. Estimated impact of disturbance to percent and hectares carbon stock by source of disturbance[1]

Indicator	Fire	Harvest	Insect	Disease	Combined
Percent of disturbance	5.38	0.82	0.56	n/a	6.76
Total estimated forested area disturbed (hectare)	80,143	12,282	8,328	n/a	100,752
Non-Soil carbon loss in 2011 (Mg C per hectare)	-2.47	-0.53	-0.01	-2.52	-5.33
Percent non-soil carbon loss in 2011	1.71%	0.37%	0.00%	1.74%	3.62%

[1]Calculations based on average forested area of 1,489,421 hectares.

Data Source: Nez Perce-Clearwater Carbon Dashboard Report (2019). See the project record for more information.

Although disturbance has played an important role for ecosystem integrity during this period, forest carbon losses associated with disturbances have been small compared to the total amount of carbon stored in the Nez Perce-Clearwater, resulting in a loss of about 3.6 percent of non-soil carbon from 1990 to 2011 from all disturbances, including fire, disease, insect, and harvest (Table 95). Given that the Nez Perce-Clearwater contained an average forested area of about 1,489,421 hectares during this period, non-soil carbon losses from all disturbances were about 378,029 Mg C per year (0.38 Tg C per year). For further information, see Appendix D.

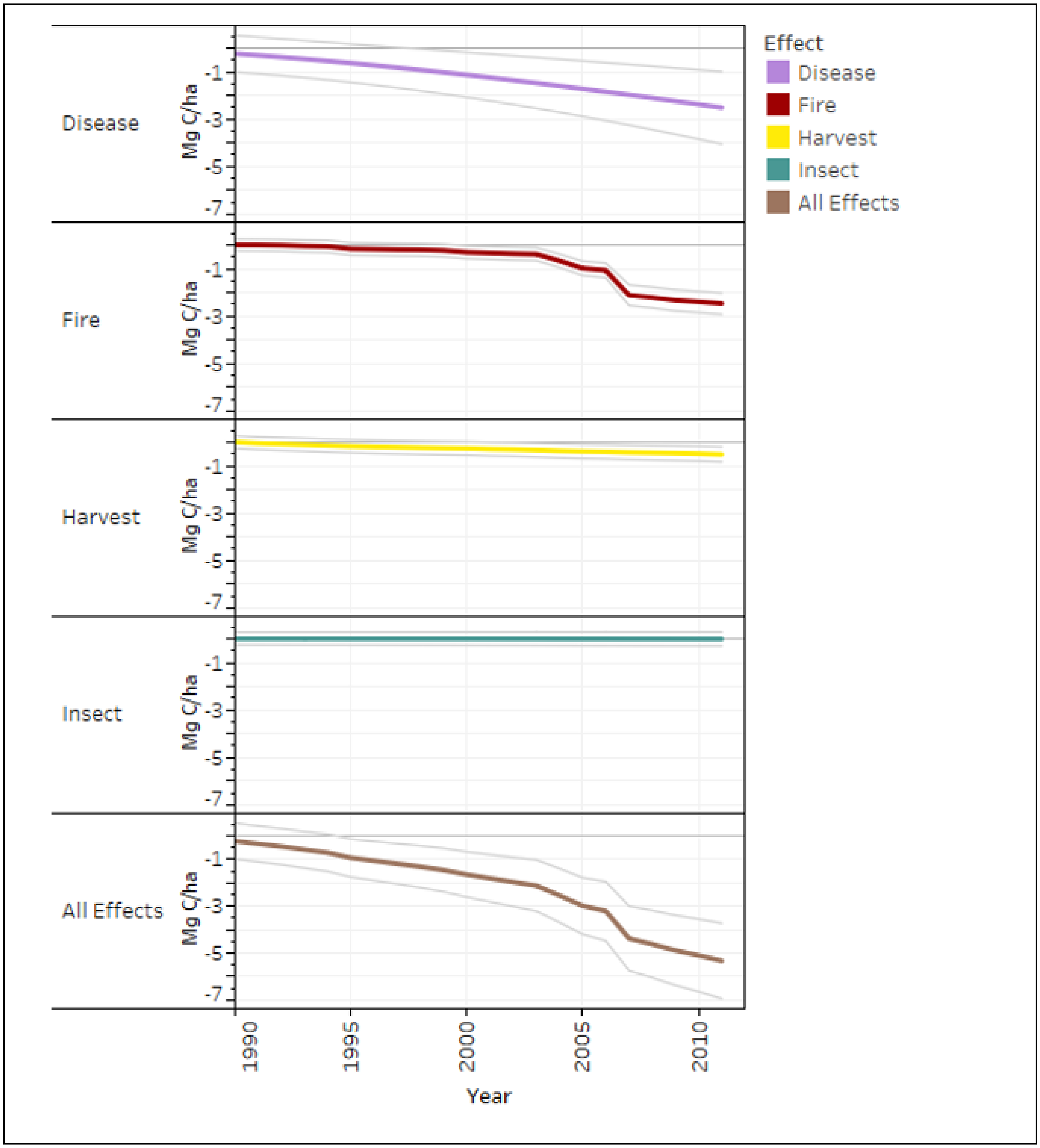


Figure 29. Estimated lost potential carbon storage (in megagrams per hectare) from disturbance (1990 to 2011) in the plan area. The zero line represents a hypothetical undisturbed scenario. Gray lines indicate 95 percent confidence interval.

Data Source: Nez Perce-Clearwater Carbon Dashboard Report (2019); estimated using the Forest Carbon Management Framework (ForCaMF) model. See the project record for more information.

Climate and Environment

Modeling was used to estimate the effects of climate (temperature and precipitation), atmospheric carbon dioxide concentrations, and nitrogen deposition on forest carbon stock change and accumulation. Overall, the climate since 1950 has negatively affected carbon stocks on the Nez Perce-Clearwater relative to other factors (Figure 30). Conversely, modeling estimates suggest increased atmospheric carbon dioxide (CO_2 fertilization) and nitrogen deposition have had a positive effect on carbon accumulation on the Nez Perce-Clearwater, potentially enhancing growth rates and helping to counteract ecosystem carbon losses from disturbance, aging, and climate.

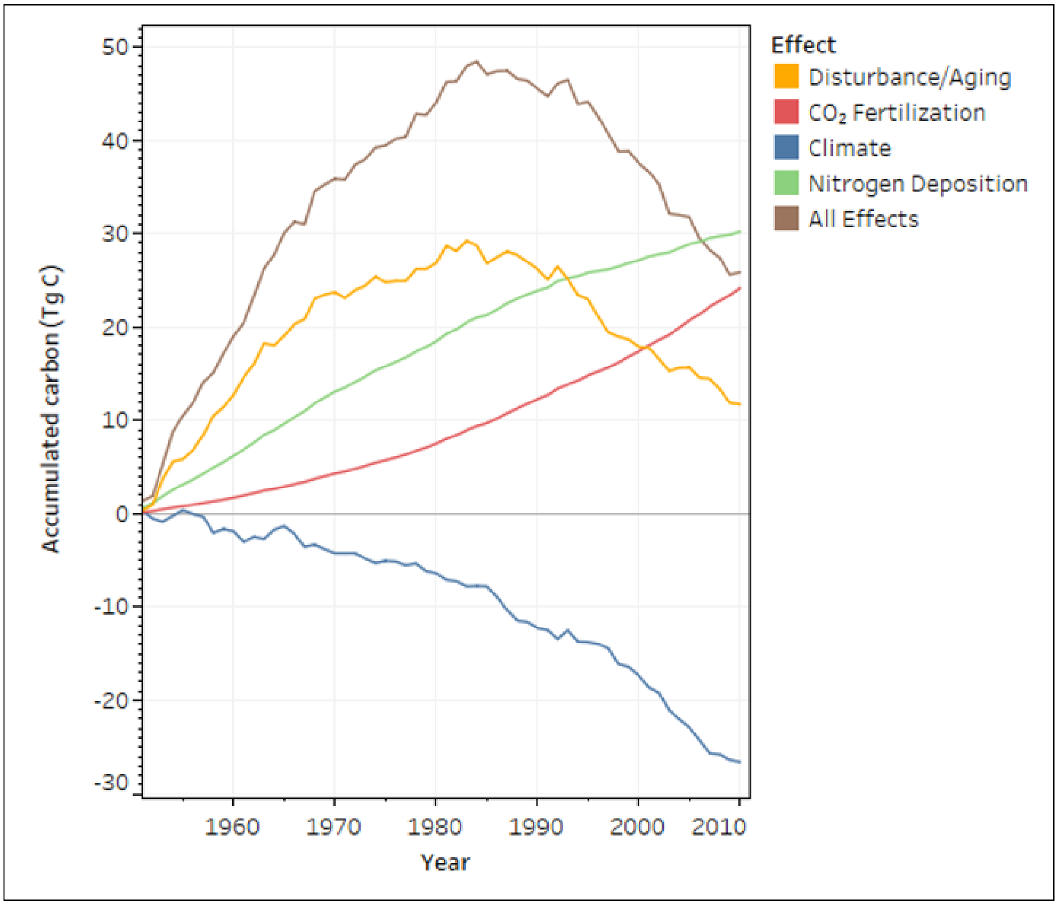


Figure 30. Accumulated carbon storage (in teragrams) in the plan area due to disturbance or aging, climate, nitrogen deposition, carbon dioxide fertilization, and all other factors combined (1950 to 2011), excluding carbon accumulated pre-1950.

Data Source: Nez Perce-Clearwater Carbon Dashboard Report (2019); estimated using the Integrated Terrestrial Ecosystem Carbon model. See the project record for more information. Environmental Consequences

Effects of the No Action Alternative

The effects of actions under the No Action Alternative would result in a similar pattern of carbon storage and flux, as described in the Affected Environment section above, because it represents a continuation of the status quo. Impacts to Forest carbon stocks could intensify though as future climate has the potential to influence all resources. The impacts of climate change on the capacity of ecosystems to store carbon are likely to vary across landscapes, and interactions with other landscape dynamics will add complexity. For example, rising temperatures can enhance forest growth and carbon storage, but this can be offset by reduced water availability during droughts. Changes in the frequency of fire due to temperature and precipitation changes will also modify carbon storage, especially where wildland fire reduces forest cover.

The 1987 Forest Plans do not contain any plan components directly related to carbon storage and sequestration, but they do provide direction on limiting soil disturbance and protecting wetlands, which can both store high amounts of carbon. Soil and forest floor carbon pools account for 42 percent of the overall Nez Perce-Clearwater carbon stock (Figure 27).

Effects Common to Action Alternatives

All action alternatives provide the same desired conditions for terrestrial ecosystems and the standards and guidelines that help achieve or maintain those conditions. Based on Land Management Plan guidance, management activities under all action alternatives would help maintain critical ecosystem functions into the future, in part by balancing the maintenance of carbon stocks and rates of carbon uptake. The following management strategies are incorporated into Land Management Plan direction under all alternatives that also influence carbon uptake and storage potential.

- Manipulate Nez Perce-Clearwater to provide for a variety of forest structures and compositions to support wildlife habitat. This can cause a decline in carbon stocks in some cases, such as when promoting early seral stands or more open stands but, compared with older stands, doing so promotes relatively high rates of carbon uptake over time as forests regrow (Pregitzer and Euskirchen 2004).
- Preserve, enhance, or accelerate the development of large tree stands and structures, and old-growth conditions to support higher carbon stocks in mature forests compared with younger stands (Harmon et al. 1990).
- Decrease forest densities and fuel conditions to reduce the risk of large, stand-replacing disturbance from insects, disease, and fire. Although this strategy initially reduces carbon stocks, it can lower risk for greater carbon stock losses and emissions in the future (Wiedinmyer and Hurteau 2010).
- Ensure successful reforestation after harvest or mortality-inducing disturbances to ensure continued carbon uptake and storage (Intergovernmental Panel on Climate Change 2014).
- Promote desired composition, structure, function, and ecological integrity pattern, which will support long-term carbon uptake and storage in the face of changing environmental conditions (Millar et al. 2007).
- Maintain or improve forest floor, ground cover, and coarse wood material to sustain continued carbon uptake and storage(Intergovernmental Panel on Climate Change 2014, Achat et al. 2015)
- Use harvested wood for valuable and renewable products to store carbon over the long-term and substitute for energy-intensive materials or fuels, reducing the net carbon emissions into the atmosphere (Gustavsson et al. 2006, Lippke et al. 2011).

Land Management Plan components guide where and how certain activities may occur on the landscape. All action alternatives include components addressing carbon storage and sequestration potential through maintenance or enhancement of biodiversity and function and managing for resilient forests. All action alternatives contain plan component FW-CARB-DC-01 that is specific to carbon storage and sequestration (Table 96). By including this plan component, the action alternatives would more explicitly provide for carbon storage and sequestration compared to the No Action Alternative. Table 96 provides the plan components that relate to carbon storage in the Land Management Plan and the expected effects of the direction.

Table 96. Summary of plan components related to forest carbon sequestration.

Plan component	Expected effects
FW-CARB-DC-01	The Land Management Plan recognizes the importance of the role of the Nez Perce-Clearwater related to carbon storage and sequestration, establishing a desired condition that directly addresses carbon sequestration. This desired condition focuses on sustaining this key ecosystem service through maintenance or enhancement of ecosystem biodiversity and function and managing for resilient forests adapted to natural disturbance processes and changing climates. This approach to management of forests for purposes of contributing to climate change mitigation is supported by a number of scientific sources (Hurteau et al. 2008, North and Hurteau 2011, Reinhardt and Holsinger 2010, Ruddell et al. 2006, Ryan et al. 2010, Schaedel et al. 2017, Wiedinmyer and Hurteau 2010).
TE, FOR, FIRE, GS, INV, RMZ	Desired conditions and objectives for vegetation, as found in Terrestrial Ecosystems; Forestlands; Fire Management; Meadows, Grasslands, and Shrublands; Invasive Species; and Riparian Management Zones sections, and the standards and guidelines that help achieve them, are designed to maintain and create resilient ecosystems. Management tools available to achieve these desired conditions would include wildland fire, timber harvest and fuels treatments, planting, thinning, and invasive species treatment. The aboveground live, belowground live, and understory carbon pools accounted for 47 percent of the carbon stock in the Nez Perce-Clearwater in 2013 (Figure 27).
FW-DC-SOIL-01, FW-STD-SOIL-01	Describes desired condition and directs management activities to be designed and implemented in a manner that maintains soil function and productivity. The soil carbon pool accounted for 23 percent of the carbon stock on the Nez Perce-Clearwater in 2013 (Figure 27).
MA2 and MA3-GDL-FOR-01	Sets coarse wood material requirements based on Graham et al. (1994) to ensure sufficient levels of organic materials. Down wood material stores carbon, accounting for 5 percent of the carbon stock on the Nez Perce-Clearwater in 2013 (Figure 27).
FW-DC-SOIL-02, FW-GDL-SOIL-02	Describes desired condition and sets an 85 percent target for effective ground cover, such as litter, fine and coarse woody material, or vegetation, which stores carbon. Forest floor, down wood, and understory carbon pools accounted for 25 percent of the carbon stock on the Nez Perce-Clearwater in 2013 (Figure 27).
MA2 and MA3-DC-FOR-10, MA3-STD-FOR-01, MA2 and MA3-GDL-FOR-02, MA2 and MA3-GDL-FOR-03, MA2 and MA3-GDL-FOR-04	Outline desired condition and requirements for old growth stands and limits fragmentation of old growth stands. These forests would fluctuate in location and abundance over time based on natural disturbances and successional processes. Plan components promote the creation of resilient old growth by emphasizing the establishment of the types of old growth that were historically most important, longest-lived, and most prevalent. By creating resilient old growth that is persistent over the long-term, there could be an increase the amount of carbon sequestered.
FW-DC-TE-02, FW-DC-WTR-08, FW-STD-RMZ-07	Describe desired conditions for groundwater dependent ecosystems, including peatlands, bogs, fens, and wetlands to maintain resiliency to changes in climate and other stressors and delineate riparian management zones. Decomposition of vegetation is slower in wetland areas, leading to the accumulation of organic matter. As a result, wetlands can accumulate large carbon stores, making them an important sink for atmospheric carbon dioxide (Nahlik and Fennessy 2016).

One of the emerging issues facing the U. S. Forest Service is how to manage for natural resource sustainability and meet public needs while also addressing other desired future conditions, such as increasing or maintaining forest carbon sequestration as a tool for climate change mitigation (McNulty et al. 2017). The Forest Service is subject to the Multiple-Use Sustained-Yield Act, requiring national forest lands to provide resources for outdoor recreation, range, timber, watershed health, and wildlife and fish habitat. Managing stands only for carbon storage and sequestration can reduce other key ecosystem services (Schwenk et al. 2012). McNulty et al. (2017) suggests using a multi-scale evaluation process, considering carbon management objectives in the broader context of trade-offs with other forest benefits that are managed at the local scale. Carbon stewardship seeks to optimize carbon within the context of ecosystem integrity and climate adaptation, not to maximize carbon at the expense of forest health or habitat.

Biogenic carbon refers to carbon cycling processes naturally occurring in ecosystems, such as the uptake of atmospheric carbon dioxide through photosynthesis and storage as biologically based materials, known as ecosystem carbon stocks. Biogenic greenhouse gas emissions are those that are related to the natural carbon cycle. Typical Forest Service projects that result in biogenic emissions include vegetation management activities such as timber harvesting, fuels reduction, habitat restoration, and invasive plant removal. Carbon is released when biologically based materials are combusted, harvested, decomposed, or otherwise processed as part of Forest Service management activities. The key point is that there is no ecological type-change, meaning forests or grasslands remain as such after a proposed action is implemented.

Management activities may initially remove carbon from the forest ecosystem, but they can also result in long-term maintenance or increases in forest carbon uptake and storage by improving forest health and resilience to various types of stressors (McKinley et al. 2011). Collectively, Land Management Plan direction would result in short-term losses of carbon in some cases, such as allowing for vegetation treatments, and storage of carbon on the landscape in some cases, such as retaining old growth and soil ground cover, but generally would result in maintaining the capacity of the landscape to sequester carbon by managing for native vegetation and natural disturbance processes.

Vegetation management or natural disturbances on national forest lands are not considered deforestation but rather an altering of stands to a more open state, or the conversion of forests back to the early successional stage of development and the initiation of new forests through regeneration. The forests on the Nez Perce-Clearwater have been cycling through this natural succession process for millennia. Forests are dynamic systems that naturally undergo ebbs and flows in carbon storage and emissions as trees establish and grow, die with age or disturbances, and re-establish and regrow.

The No Action and each of the action alternatives propose varying levels of acres to be treated using harvest, fuels treatments, or prescribed fire; however, the values are similar when considered at the forest scale and would have similar effects on carbon. The action alternatives all propose 53,000 to 64,500 acres of disturbance and restoration per year, including wildfire, prescribed fire, timber harvest and other fuels treatments designed to meet desired conditions and be consistent with natural range of variability.

The evaluation of the effects to carbon stocks from the action alternatives is a modeling exercise that provides information to compare alternatives. The resulting estimates do not reflect true outcomes. Additional site specific carbon analysis would occur for future projects implemented under the Land Management Plan. The harvest and fuels treatments objective for the Preferred Alternative is an average 10,000 acres per year, or about 0.3 percent of the total forested area (3,745,053 acres) on the Nez Perce-Clearwater. Based on satellite imagery, total estimated harvest disturbance from 1990 to 2011 was 30,349 acres, or an average of 1,446 acres per year (Hoang et al. 2019). The Preferred Alternative proposes an increase of about seven times the annual harvest area when compared to past harvest levels. If annual carbon impact also increases up to seven times above past levels, harvest treatments under this alternative may result in a maximum removal of about 260,100 Mg of carbon (0.26 Tg C) per year from aboveground pools.

The Preferred Alternative also includes an objective for prescribed burning of an average 6,800 acres annually and an objective for managing natural, unplanned ignitions of an average 36,000 acres annually. This is an increase of 4.5 times the annual fire compared to past levels from 1990 to 2011, which had an average 9,430 acres of fire disturbance per year (Hoang et al. 2019). If maximum levels of fire objectives occur, it would result in a potential loss of about 795,100 Mg of carbon (0.80 Tg C) annually, as estimated from the historical analysis.

Because wildfires are unpredictable, it is difficult to accurately estimate carbon loss on an annual basis. For example, as displayed in Figure 31 in the Fire Management section, from 2000 to 2019, fires burned on average approximately 74,750 acres annually. For the two previous decades, from 1980 to 1999, wildfires burned on average approximately 16,400 acres annually. From 1980 to 2019 annual wildfire acres ranged from less than 100 to approximately 232,800.

Considering the maximum area treated with timber harvest, thinning, fuels treatments, prescribed fire, and managing unplanned, naturally ignited fires in the Preferred Alternative, potential vegetation management actions would affect approximately 1.4 percent of the forested area annually. The amount of carbon that might be removed is an estimated 1.06 Tg C or approximately 0.4 percent of the approximately 279.43 Tg C stored in the forest ecosystem of the Nez Perce-Clearwater. The highest amount of projected carbon release would be under the No Action Alternative with an estimated loss of 1.2 Tg C. Alternative X resulted in the second highest amount, with an estimated 1.19 Tg C removed, followed by Alternative W with an estimated 1.13 Tg C released. Alternatives Y and Z had the lowest estimated amounts with Alternative Y resulting in a loss of 1.01 Tg C and Alternative Z showing a loss of 0.89 Tg C. Even if no management occurred on the Nez Perce-Clearwater, loss of carbon would still occur from other disturbance factors, such as wildfire and insect and disease. Although the action alternatives vary in the expected levels of vegetation management, these differences are negligible when compared at the Forest scale. Even more difficult is the ability to quantify potential carbon consequences of management alternatives in the future due to potential variability in future conditions and the stochastic nature of disturbances. The result of such uncertainty is often a very low signal-to-noise ratio. Small differences in carbon impacts among management alternatives, coupled with high uncertainty in carbon stock estimates, make the detection of statistically meaningful differences among alternatives highly unlikely.

The action alternatives would not significantly, adversely, or permanently affect forest carbon storage. Implementation of the Preferred Alternative could lead to a more resilient forest condition that could improve the ability of the Nez Perce-Clearwater to maintain carbon stocks and enhance carbon uptake.

Effects to Carbon Stocks from Other Resources

Terrestrial vegetation

All action alternatives provide the same desired conditions for terrestrial vegetation and the standards and guidelines that help achieve or maintain those conditions. Plan components associated with terrestrial vegetation provide direction for the management of forested and non-forested plant communities to trend towards the natural range of variation, therefore ensuring that the carbon sequestration capacity is maintained over the long term on the Nez Perce-Clearwater. Plan components for terrestrial vegetation can be found in the Terrestrial Ecosystems; Forestlands; Fire Management; Meadows, Grasslands, and Shrublands; Invasive Species; and Riparian Management Zones sections. The No Action Alternative does not prescribe desired conditions based on the natural range of variation but does provide direction for enhancing native vegetation communities and, therefore, would provide a similar potential for carbon sequestration.

Based on Land Management Plan guidance, management activities under all action alternatives would help improve composition, structure, and function of forests and grasslands; restore fire-adapted ecosystems; and provide for stable and improved forest and grassland health conditions. Implementing management actions to achieve this desired mix of conditions would enhance the overall ecological integrity of the forest ecosystems, improving their ability to adapt to potential stressors. These proposed activities will help maintain critical ecosystem functions into the future, in part by balancing the maintenance of carbon stocks and rates of carbon uptake.

Old growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth forests provide particularly concentrated sites for carbon sequestration on the landscape. These forests would fluctuate in location and abundance over time based on natural disturbances and successional processes, regardless of alternative. Plan components specific to old growth under the action alternatives promote the creation of resilient old growth by emphasizing the establishment of the types of old growth that were historically most important, longest-lived, and most prevalent. By creating resilient old growth that is persistent over the long-term, the action alternatives would increase the amount of carbon sequestered. The No Action Alternative also includes minimum retention of certain proportions of old growth on the landscape but would not necessarily result in an increase in overall abundance of these areas relative to the existing condition.

Fire and fuels Management

Of all the potential disturbances on the landscape, wildland fire—both natural and planned ignitions—would have the greatest potential to cause short-term reductions in carbon stocks by removing vegetation, as well as causing carbon emissions. However, fire is also a primary mechanism for restoring and maintaining native vegetation with conditions consistent with the natural range of variation, thereby contributing to carbon sequestration potential over the long term. Prescribed burning and hazardous fuels reduction may indirectly reduce the risk of more severe wildfires and greater carbon losses in the future (Agee and Skinner 2005, Wiedinmyer and Hurteau 2010).

Plan components for fire and fuels management would help ensure the long-term sustainability of vegetation communities while also allowing for flexibility in allowing fire to play its natural role on the landscape. The action alternatives propose to continue to use wildland fire to create young stand conditions, reduce hazardous fuels, promote fire-adapted species, and encourage natural fire-return intervals. By promoting natural fire-adapted vegetation and forest resiliency, all the action alternatives would create more advantageous conditions to support long-term forest health in a changing climate (adaptation) and reduce carbon emissions and maintain carbon stocks (mitigation) (Intergovernmental Panel on Climate Change 2007).

In some instances, it is desirable to reduce carbon stocks to ensure the continued provisioning of other ecosystem services and for protecting lives and property. Hazardous fuel reduction treatments lower carbon stocks indefinitely if treatments are maintained. However, in the absence of fuels reduction treatments, the fire-adapted forest may be more at-risk to large and higher-severity wildfires, resulting in decreased ecosystem services and potentially increased carbon emissions. High-severity fires, especially when they occur repeatedly, can affect human health and safety, infrastructure, and ecosystem services and can cause delayed regeneration or even a transition of forests to non-forested ecosystems in some areas. By reducing the threat of uncharacteristic wildfire, management activities may create conditions more advantageous for supporting forest health in a changing climate and reducing greenhouse gas emissions over the long term. Furthermore, the reduction of stand densities is consistent with adaptation practices to increase resilience of forests to climate-related environmental changes (Halofsky, Peterson, et al. 2018a).

Timber Harvest

The U.S. Department of Agriculture's Building Blocks for Climate Smart Agriculture and Forestry (2016a) plan outlines two strategies to reduce greenhouse gas emissions—stewardship of federal forests, which emphasizes vegetation restoration and reforestation, and promotion of wood products.

Implementation of Land Management Plan direction for forestlands and timber would cause a short-term, localized reduction of carbon sequestration through the removal of living vegetation. Although the release of carbon is short-term, it could take several decades before reforested areas sequester carbon at the same rate. The amount of carbon expected to be influenced by harvest under any of the alternatives is less than one percent of the amount of carbon that the Nez Perce-Clearwater contains. Plan components that guide timber harvest and vegetation management, including desired vegetation conditions, would ensure that forest resiliency is promoted by these activities and, therefore, timber harvest would contribute to the long-term capacity of forests to sequester carbon.

Sustainable forestry practices can increase the ability of forests to sequester atmospheric carbon while enhancing other ecosystem services, such as improved soil and water quality. Planting new trees and improving forest health through thinning and prescribed burning are some of the ways to increase forest carbon in the long run. Harvesting and regenerating forests can also result in net carbon sequestration in wood products and new forest growth. In the absence of thinning and harvesting, the forest will thin from natural disturbances and other processes associated with natural succession, such as age-related mortality or competition. The resulting dead trees will continue to store carbon, and they will also decay over time, emitting carbon into the atmosphere.

Under all alternatives, management activities involving timber harvest can result in both long-term carbon storage off site and substitution effects through the use of harvested wood products. Carbon can be stored in wood products for days to centuries, depending on the commodity produced and end use. As more commodities are produced and remain in use, the amount of carbon stored in products increases, creating a cumulative benefit when considered with forest regrowth. Even as more wood products are discarded, the carbon stored in solid waste disposal sites also increases. Harvested wood products can also substitute for more fossil fuel-intensive materials like steel, concrete, and plastic, resulting in a net decline in emissions (Dugan et al. 2018, McKinley et al. 2011, Gustavsson et al. 2006, Lippke et al. 2011). Likewise, harvested wood and discarded wood products can be burned to produce heat or electrical energy, also producing a benefit by substituting for more carbon-producing energy sources. The Intergovernmental Panel on Climate Change recognizes wood and fiber as a renewable resource that can provide lasting climate-related mitigation benefits that can increase over time with active, sustainable management (Intergovernmental Panel on Climate Change 2000). Although not quantified in this document, it is acknowledged that there would be an increase in fossil fuel carbon emissions from the use of equipment during the harvest activity and the transport of timber from the stand to processing facilities. While these emissions represent a reduction in the amount of estimated carbon sequestered in harvested wood products, the magnitude of haul emissions is difficult to calculate at the programmatic level, particularly due to the variation in distance timber must travel to reach milling facilities.

As outlined in: Effects of Climate Change on Forest Vegetation in the Northern Rockies (Halofsky, Peterson, et al. 2018a), timber harvest, prescribed fire, and managing wildland fire can be adaptation options that address climate change effects on forested vegetation. These vegetation management actions can be used to treat departed vegetation conditions, creating more resilient and diverse forests. Reducing stand density may also reduce the risk of more severe disturbances, such as insect and disease outbreak and severe wildfires, which could result in lower forest carbon stocks and greater greenhouse gas emissions. In the absence of timber harvest, forests thin naturally from mortality-inducing natural disturbances and other processes resulting in dead trees that would decay over time, emitting carbon to the atmosphere.

All the action alternatives include plan components (MA2 and MA3-GDL-FOR-01, FW-GDL-SOIL-02) that set requirements for maintenance of down wood and ground cover during timber harvest and fuels treatment activities. These carbon pools accounted for approximately 25 percent of the carbon stock in the Nez Perce-Clearwater in 2013 (Figure 27).

Mining and mineral extraction

Mining and mineral extraction actions undergo site-specific National Environmental Policy Act analysis to determine effects and required mitigation. Effects to vegetation, ground cover, and soil from mining are determined at the project level. The impacts to carbon stores from mineral extraction on Nez Perce-Clearwater would be localized and insignificant at the forestwide scale. Land management plan standards and guidelines and best management practices would lessen effects of vegetation and ground cover removal and soil disturbance.

Livestock grazing

In all alternatives, livestock grazing would occur on the Nez Perce-Clearwater. Permitted numbers of livestock and season of use would be the same for all alternatives. Plan components would ensure that livestock grazing is managed in a manner that would maintain desirable vegetation communities and, therefore, would not preclude the carbon sequestration potential of rangelands under any alternative.

The Environmental Protection Agency (2019) estimates that about 47 percent of the total greenhouse gas emissions in the agricultural sector are attributed to livestock. In turn, the agricultural sector contributes to about 9 percent of total greenhouse gas emissions in the United States. The USDA's National Agricultural Statistics Service estimated in January 2019 that the United States had about 94.8 million cattle (National Agricultural Statistics Service 2019). By comparison, Nez Perce-Clearwater permits approximately 4,600 cattle (29,861 animal unit months). Livestock are present on the national forest at most 6 months out of the year. Permitted season of use varies by allotment, ranging from six weeks to six months. Seasons on some allotments start as early as May 1 and some end as late as October 31. Active livestock grazing allotments occur on about 15 percent of the Nez Perce-Clearwater. Using 4,600 permitted head of cattle and a maximum six month season of use for each animal, it is estimated that livestock produce approximately 167 tons or 0.0002 teragrams of methane emissions per year. See the Carbon on Non-Forest Lands Section in Appendix D for more information.

Invasive Plants

Increases in atmospheric carbon levels and higher temperatures would likely make invasive species, especially annual grasses, more competitive and adaptable, which may allow some species to expand to higher elevations as well as become more difficult to control due to reduced chemical efficacy (Ziska et al. 2004). Not only will some species become more invasive, but the array of species would continue to change (Scott et al. 2013). Invasive species infestations can impact native plant communities and alter disturbance regimes, potentially leading to declines in carbon storage. The Land Management Plan includes desired conditions and objectives to prevent new invaders and limit the spread of existing invasive species.

Aquatic habitat, riparian management zones, and water resources

Measures to protect aquatic habitat, riparian management zones, and watersheds would generally result in vegetation being maintained as needed for watershed function and would result in a greater likelihood of vegetation cover being maintained within riparian management zones specifically. These measures would be greater for the action alternatives than the No Action Alternative. The retention of vegetation in riparian areas would provide areas of refugia, potential old growth, and seed sources to contribute to the overall resilience and, therefore, carbon sequestration potential of vegetation on the landscape over time.

Wetland soils contain some of the highest stores of soil carbon in the biosphere and are an important sink for atmospheric carbon dioxide (Nahlik and Fennessy 2016). Decomposition of vegetation is slower in wetland areas, leading to the accumulation of organic matter. As a result, wetlands can accumulate large carbon stores. The Land Management Plan includes desired conditions for wetlands to persist in size and seasonal and annual timing and exhibit water table elevations within the natural range of variability (FW-DC-WTR-08) and maintain resiliency to changes in climate and other stressors (FW-DC-TE-02). Wetlands are included in the riparian management zone delineations (FW-STD-RMZ-07) and standards and guidelines associated with water resources and riparian management zones would be followed to conserve wetland areas.

Cumulative Effects

Climate change is a global phenomenon because major greenhouse gases mix well throughout the planet's lower atmosphere. Estimated emissions of greenhouse gases in 2010 were 13,336 plus or minus 1,227 Tg carbon globally (Intergovernmental Panel on Climate Change 2014) and 1,881 Tg carbon nationally (U.S. Environmental Protection Agency 2015). All of the plan alternatives are projected to contribute negligibly to overall greenhouse gas emissions. The estimated loss of approximately 1.1 Tg C annually based on the Preferred Alternative is small relative to the approximately 279.43 Tg C of carbon stored in the forest ecosystem in the Nez Perce-Clearwater.

Portions of the Nez Perce-Clearwater adjoin other national forests, each having its own land management plan. The Nez Perce-Clearwater also borders and is intermixed with lands of other ownerships, including private lands, other federal lands, and state lands. Land management plans for state and federal agencies would broadly provide for resilient forest conditions and not reduce the potential of lands to store and sequester carbon; as such, they would be complementary to the proposed land management plan. Adjacent private lands would not necessarily be managed for retention of native vegetation; for example, potential housing developments or shift to agriculture could reduce carbon storage potential on some of these lands.

Currently, the U.S. Forest Service does not participate in carbon markets. Congress has not given the U.S. Forest Service the authority to allow National Forest System lands to participate in carbon markets or produce carbon credits. However, organizations can partner with the U.S. Forest Service in needed restoration work to improve carbon sequestration, forest health, and resilience to climate change.

Conclusion – Climate Change and Carbon Stocks

The proposed activities under all action alternatives generally maintain and improve forest health and resiliency to disturbances. Potential negative effects may be mitigated and completely reversed with time as the forests regrow. Over the longer term, the activities proposed in the plan are likely to increase carbon storage and reduce emissions by reducing disturbance risk and storing carbon in wood products. The management mechanisms applied in all plan alternatives are consistent with internationally recognized climate change adaptation and mitigation practices identified by the Intergovernmental Panel on Climate Change (D'Amato et al. 2011, Intergovernmental Panel on Climate Change 2007, 2000).

Carbon stocks on the Nez Perce-Clearwater will likely continue to increase or remain stable under all plan alternatives into the foreseeable future. Natural ecosystem processes, including forest growth (succession) and small-scale disturbances, such as wildland fire, insects, and harvest, would continue to influence carbon stocks and emissions, but they are not expected to significantly change current trends in carbon over the span of the plan. All alternatives would preserve existing National Forest System lands and forests by improving forest conditions and retaining forest characteristics by maintaining current land use. Given the likely changes in land use in coming decades on adjacent land ownerships, this is a critical goal.

3.2.4 Fire Management

Fire is a necessary and critical ecological function across the Nez Perce-Clearwater that plays a central role in providing quality habitat for both plant and wildlife species. Wildland fire refers to both wildfire (unplanned ignitions) and prescribed fire (planned ignitions). Wildland fire management includes all activities for the management of wildland fires to meet land management objectives. Fire management includes the entire scope of activities from planning, prevention, fuels or vegetation modification, prescribed fire, hazard mitigation, fire response, rehabilitation, monitoring, and evaluation. The management of wildland fire influences whether fire effects have beneficial or non-beneficial impacts on resources such as air and water quality, wildlife habitat, recreation areas, and communities. Wildland fire management incorporates a spectrum of responses ranging from full suppression to managing for land management plan objectives. Suppression is a management strategy used to extinguish or confine all or a portion of a wildfire. Fuels management is the practice of controlling flammability and reducing resistance to controlling wildland fuels through mechanical, chemical, biological, or manual means, or by fire in support of land management objectives. Fuels treatments result in a change in the amount, configuration, and spacing of live and dead vegetation, creating conditions that result in more manageable fire behavior and reduced intensity during future wildland fire events.

Wildland Fire Management

Fire on the landscape is considered a natural process and most fires on the Nez Perce-Clearwater are started by lightning. However, humans have also been a source of fire on the landscape for centuries and, whether intentional or not, have influenced vegetation dynamics. Fire is not a simple process. Many factors influence its character, including fuel characteristics, climate, weather conditions, topography, vegetation characteristics, and elevation.

All wildland fires are managed on a continuum between meeting protection objectives and achieving resource objectives. These objectives come from desired conditions within the Land Management Plan. Environmental conditions that influence how a given fire burns change throughout the season and from year to year, providing both opportunities and restrictions. Where a specific fire falls on this continuum is based both on the location of the wildfire and the conditions in which it is burning.

Forest Service policy dictates that every management response to wildfire must include some aspect of a protection objective (National Interagency Fire Center 2019). This response can vary from monitoring the fire under conditions that are conducive to obtaining resource benefits to an aggressive suppression effort to protect communities and natural resources from potential damages. Factors in all wildfire management decisions include firefighter safety; public safety; risk to property; fire resource availability; national, regional, and forest priorities; costs; and potential resource benefits. All human-caused wildfires require a suppression strategy.

The management of wildland fires that reduce fuels and improve ecosystem conditions is characterized as managing fires, or portions of them, to meet Land Management Plan resource objectives. These fires tend to have effects that are similar to or trend towards desired future conditions. Managing wildfires to meet land management plan objectives is a strategic choice to use natural ignitions to restore or maintain the ecological function of fire in fire dependent landscapes. Some of the benefits of managing wildland fires to meet land management plan objectives are reducing fuel loadings so that future fires in that area burn with lower intensity (Parks, Holsinger, et al. 2015), lesser impacts, and reduced smoke production. Benefits may also include creating a mosaic and diversity of wildlife habitats, accelerated nutrient cycling into the soil (Hungerford et al. 1991), and reducing forest density to favor fire-resistant species (Agee 1993). This results in a more fire resilient ecosystem.

Circumstances leading to wildfire suppression include fuel and weather conditions, proximity to values at risk, time of year, and expected detrimental fire effects that would not improve or maintain landscape desired conditions. However, when natural fires are suppressed in fire adapted ecosystems, there could be detrimental effects to vegetation composition and structure, ecosystem process, soil dynamics, wildlife habitat, and biodiversity (Keane et al. 2002). In combination with climate change, land use change, and twentieth century fire exclusion, suppression of wildfires also increases the existing fire deficit (Marlon et al. 2012).

Effective management of wildland fire addresses the nature of wildfire and its contributing factors, recognizes the positive and negative consequences of fire, addresses uncertainty, and develops responses that reduce the chances of catastrophic losses (U.S. Department of Agriculture and U.S. Department of the Interior 2014b). Forest and fire managers consider the short and long-term risk of managing each wildland fire event. If consequences of each wildland fire are recognized and management actions to obtain positive outcomes are matched, then the long-term risk to resources and assets will be reduced, fire as an ecosystem function on the landscape will be restored, and smoke impacts to communities will be reduced.

Fuels Management

Fuels reduction treatments consist of thinning and prescribed fire but also include other mechanical, biological, chemical, and manual treatments. Prescribed fires are purposely ignited by managers in accordance with applicable laws, policies, and regulations to meet specific objectives. Mechanical treatments include the use of equipment to perform activities that change vegetation composition and structure which alter fuels and reduce hazards. Mechanical treatments are often followed up with prescribed burning for the most effective fuels reduction treatments (Prichard et al. 2010). The focus of the fuels management program has been to modify the fuel conditions to meet varying objectives to reduce threats to values at risk, increase suppression success by minimizing crown fire potential, decrease fire intensity, or decrease rate of spread.

Fuels reduction treatments focus on the part of the fire environment that can be altered, resulting in a change in the amount, configuration, and spacing of live and dead vegetation. The costs, environmental impacts, and effectiveness of different fuel treatment types vary. Desired outcomes of fuels treatments include decreased fire intensities and severity during consequent wildfires (Reinhardt et al. 2008). Additional benefits could include the minimization of impacts to high value resources and assets and reducing fire spread to other ownerships. Strategically located fuels treatments could also provide opportunities to proactively manage the size and costs of future wildfires (Thompson et al. 2013). Fuel reduction treatments can slow rate of spread, shift fire behavior from crown fire to surface fire, and decrease fire severity within previously treated areas. Treatment areas are only effective for a finite length of time and may need periodic maintenance to remain effective. In addition, fuel treatments can achieve multiple resource benefits, such as meeting desired vegetation conditions, creating desired wildlife habitat, and producing timber products.

The vegetation matrix of the wildland urban interface will carry fire when the conditions permit; these interface lands are becoming more densely populated each year. The wildland urban interface designation affects all fire management decisions in those interface areas. Although a wide variety of fire management strategies are available to implement, these options are usually narrowed due to concerns that fire may move from federal to private lands, or vice versa. Hazardous fuels treatments in the wildland urban interface are focused on manipulating the vegetation to enhance the success of fire suppression activities.

Relevant Laws, Regulations, and Policy

Federal Laws

Clean Air Act (USC 7401) of 1970, as amended: This act provides for the protection and improvement of the nation's air resources and applies to the effects of prescribed fire and can help inform wildfire response.

Healthy Forest Restoration Act of 2003 (HR 1904): Aimed at expediting the preparation and implementation of hazardous fuels reduction projects on federal land; encouraging collaboration between federal agencies and local communities; requires courts to balance effects of action versus no action prior to halting implementation; and requires federal agencies to retain large trees under certain conditions.

2002 President’s Healthy Forest Initiative: Emphasizes administrative and legislative reforms to expedite fuels treatments and post-fire rehabilitation actions.

Infrastructure Investment and Jobs Act of 2021 (H.R. 3684; Title VIII National Resources Related Infrastructure, Wildfire Management and Ecosystem Restoration) Section 40803: Wildfire Risk Reduction; Directs the United States Forest Service to conduct restoration treatments and improve the Fire Regime Condition Class of 10,000,000 acres that are located in the wildland-urban interface or a public drinking water source area by September 30, 2027. Section 40807; Emergency Actions: The law authorizes the United States Forest Service to take emergency actions to protect public health and safety, critical infrastructure, and natural resources on National Forest System lands.

Policy

Forest Service Manual (FSM 5100): Provides direction on wildland fire including suppression and fuels management, including prescribed fire in general and within wilderness.

Forest Service Handbook 5109: Provides direction for wildland fire managers.

National Fire Plan, August 2000: Outlines a plan of action for federal agencies in order to protect wildland urban interface and be prepared for extreme fire conditions.

Federal Wildland Fire Management Policy of 1995 (updated January 2001): Guides the philosophy, direction, and implementation of wildland fire management on federal lands.

Interagency Rx Fire Planning and Implementation Procedures Guide 2022 (PMS 484): Provides standardized procedures, specifically associated with the planning and implementation of prescribed fire.

Guidance for Implementation of Federal Wildland Fire Management Policy 2009: Guidance for consistent implementation of the 1995/2001 Federal Fire Policy.

National Cohesive Wildland Fire Management Strategy 2014: The National Cohesive Wildland Fire Management Strategy is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress towards the three goals:

1. Resilient Landscapes
2. Fire Adapted Communities
3. Safe and Effective Wildfire Response

Interagency Standards for Fire and Fire Aviation Operations (NFES 2724): A reference guide that documents the standards for operational procedures and practices for the Forest Service fire and aviation management program.

State and Local Plans

The following plans provide guidance for sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities pertaining to wildfires, hazard fuels, and zonal planning may be implemented prior to, during, or after an incident (State and Local Land Management Plans)

- Lewis County, Idaho Multi Hazard Mitigation Plan (2011)
- Clearwater County, Idaho Multi Hazard Mitigation Plan (2017)
- Idaho County, Idaho County Multi-Hazard Mitigation Plan (2022)
- Latah County, Multi Hazard Mitigation Plan (2011)
- Nez Perce County, Comprehensive Plan (2018)

Measurement Indicators

The following measurement indicators were used for assessing fire management.

Restoration and Maintenance of the Ecological Role of Fire: Measured by projected acres of wildfire within fire regime groups.

Future Fuels Treatments: Measured by acres of projected mechanical treatments and prescribed fire.

Fire Management Flexibility: Measured by acres of land allocations that influence the flexibility to carry out mechanical and prescribed fire treatments and manage unplanned ignitions.

Methodology and Analysis Process

The vegetation management strategy for the Nez Perce-Clearwater is to manage the landscape to maintain or trend towards vegetative desired conditions. Fire is a primary natural disturbance process that changes vegetation conditions within the Nez Perce-Clearwater's ecosystems. Fuels management consists of management activities designed to alter vegetation conditions to achieve desired results. One desired result is the potential reduction in fire intensity and consequent risk to resources and communities. Therefore, the analysis process for determining past, present, and future vegetation conditions provides the basis for the analysis of fire and fuels treatments in this section of the environmental impact statement.

Modeling was used to estimate the extent and effects of disturbance processes by looking at historical fire events to develop a natural range of variation to project future wildfire. Planned and unplanned fire; insects, such as bark beetles; diseases, such as root disease; and harvest treatments are the main drivers of vegetative change interacting with climate and the process of vegetative succession. The main analytical models used were the SIMulating Patterns and Processes at Landscape scaLEs model, commonly referred to as SIMPPLLE (Chew, Bollenbacher, et al. 2012), and the PRISM model, which provides plan-level forest activity scheduling projections (Nguyen 2018).

The SIMPPLLE and PRISM models are used in the Northern Region for plan revision. For further details, refer to the Forestlands section and Appendix B. The analysis assumes climate trends will continue to be warmer and drier than historical conditions (Intergovernmental Panel on Climate Change 2014), naturally ignited wildfire will continue to be the largest contributor to fuels management and development in the wildland-urban interface will continue. Additionally, under warmer and drier conditions, it is anticipated that large fire activity will continue to increase in the future and that fire seasons will be longer than historically observed (Brown et al. 2004).

Naturally ignited wildfire will continue to be the largest contributor to fuels management. The use of wildland fire as a tool to meet land management plan objectives may occur on all acres in all Action Alternatives so long as those fires are moving the landscape towards or helping maintain the desired condition. Prescribed fire and other vegetation treatments will continue to contribute to fuels management as budgets and conditions allow.

With continued development into wildfire hazard areas, wildland urban interface boundaries identified in Community Wildfire Protection Plans will also change over the life of the plan. As the wildland urban interface expands, there will be an increased need to focus fuels treatments in these areas. The increase in human caused ignitions is also associated with the increased wildland urban interface (Syphard et al. 2007).

Information Sources

This analysis also draws upon the best available literature references that were found to be relevant to the ecosystems on the Nez Perce-Clearwater. Literature sources that were the most recent, peer-reviewed, and local in scope or directly applicable to the local ecosystem were selected. Uncertainty and conflicting literature were acknowledged and interpreted when applicable. In addition, local studies and anecdotal information that is not peer-reviewed are included where appropriate to provide context.

Climate data was compiled from the United States Climate Divisional Database from 1895 to 2017 for annual temperature and precipitation. The LANDFIRE database was accessed to collect the fire regime group and mean fire return interval data for each of the five fire regime groups. Best available information was used to build the fire logic and assumptions within the SIMPPLLE and PRISM models, including corroboration with actual data and professional knowledge and experience.

The historic fire occurrence and fire size data used for calibrating fire probabilities in the SIMPPLLE and PRISM models were derived from multiple sources. Forest fire occurrence data was gathered from the FIRESTAT database for fire ignition point data. Next, large fire polygons and prior fuels reduction treatments were obtained from the Forest Activity Tracking System (FACTS) database. Fire severity data was taken from Monitoring Trends in Burn Severity (MTBS) data, which uses only fires greater than 1,000 acres. This analysis did not include unburned acres or areas of increased greenness within fire perimeters.

Wildland-urban interface areas, as identified in Benewah, Clearwater, Latah, Lewis, and Idaho Counties' Community Wildfire Protection Plans, were used for analysis to inform the models where vegetation treatments could take place in relation to constraints of the Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f). Community Wildfire Protection Plans are "living" documents and are subject to change; therefore, the extent of wildland-urban interface will also change over the life of the plan. As of October 10, 2023, the extent of the wildland-urban interface on the Nez Perce-Clearwater is 1,458,924 acres. However, limitations due to budget, land allocation, and resource protections restrict where fuels treatments can be conducted. For additional information, see the Environmental Consequences section below.

Incomplete and Unavailable Information

Terrestrial ecosystems are highly complex and contain an enormous number of known and unknown living and non-living factors that interact with each other, often in unpredictable ways. For this reason, the Nez Perce-Clearwater acknowledges that there are gaps in available information and knowledge about ecological functioning and an inability to even evaluate what those gaps may be. These gaps in information may lessen over time as new information or methodology is devised. The Nez Perce-Clearwater's ability to predict fire or other disturbances into the future is limited and is subject to uncertainty. The level of uncertainty is determined by the level of uncertainty of such factors as natural disturbances, climate change, or human-caused influences.

Spatial Scale

The fire management analysis area encompasses those lands administered by the Nez Perce-Clearwater, as well as the land of other ownership within and adjacent to the Nez Perce-Clearwater. The SIMPPLE model included a 3-mile buffer outside the administrative boundaries of the Nez Perce-Clearwater to account for fire events that have migrated onto the forest from other landownerships.

Temporal Scale

The temporal scale of this analysis is 20 years. While the Land Management Plan is expected to be in place for 15 years, quantitative effects were derived from the SIMPPLLE and PRISM models, which use whole decades as the modeling time steps. Further, using the second time step rather than the first-time step more clearly demonstrates differences between alternatives.

Past, Present, and Future Activities used in the Analysis

Fire and fuels management activities, including timber harvest, non-commercial thinning, prescribed fire, and unplanned wildfire activities were used to develop this analysis. Past fires were analyzed against fire regimes to determine fires' natural range of variation and to determine whether fire has been playing its ecological role on the Nez Perce-Clearwater. Modeled fire occurrence and fuels treatments provide a reasonable representation of future conditions. Refer to the Forestlands section and Appendix B for information on modeling and other aspects of the analysis that also apply to fire management.

Significant acreages within the administrative boundary of the Nez Perce-Clearwater have been designated as roadless as a result of the Idaho Roadless Rule. These lands are subject to management limitations, which will have an impact on the extent to which forest wide management objectives can be met.

Notable Changes between the Draft and Final

In addition to providing new information and sources, clarifying language, minor edits, and analysis of the Preferred Alternative, the notable changes in the plan between draft and final include analysis of fire regimes using mean fire return interval to determine expected amount of fire to be within a fire regimes natural range of variability. The associated analysis in the final environmental impact statement highlights where fire deficits are most pronounced and how the current conditions of fire severity compare to what would historically have been expected, based on the fire regime.

Affected Environment

Existing Condition

Restoration and Maintenance of Fire Regimes

A fire regime represents the periodicity and pattern of naturally occurring fires, described in terms of frequency, biological severity, and aerial extent (U.S. Department of Agriculture 2010c). The natural fire regime is a classification of the role fire would play across a landscape in the absence of modern human intervention but including the influence of aboriginal fire use. Five natural fire regimes are classified based on the average number of years between fires, referred to as fire frequency or mean fire interval, combined with severity, defined as the amount of vegetation replacement, and its effects to the dominant vegetation (U.S. Department of Agriculture 2010c) (Table 97).

Table 97. Fire regime, acres, and percentage of distribution on the Nez Perce-Clearwater.

Fire Regime[1]	Definition[1]	Acres of National Forest System Land[2]	% Landscape
I	0 to 35-year frequency; non-lethal (low/mixed severity)	366,649	9.3%
II	0 to 35-year frequency; replacement (high severity)	17,233	0.44%
III	35 to 200-year frequency (mixed/low severity)	2,121,896	53.8%
IV	35 to 200-year frequency; replacement (high severity)	1,291,463	32.8%
V	Greater than 200-year frequency (any severity)	31,994	0.8%
Sparsely Vegetated	Non-burnable	2,154	<1%
Barren	Non-burnable	643	<1%
Snow/Ice	Non-burnable	570	<1%
Water	Non-burnable	6,993	<1%

[1]Table information is adapted from (Barrett et al. 2010).
[2]Acre summaries in this section may differ slightly due to the data source (raster data versus vector GIS data).
Data Source: Landfire 2010, v.1.2.0.

Prior to European settlement, cultural burning practices along with natural ignitions from lightning were the primary ignition source for fires (Barrett and Arno 1982). There have been several fire history studies completed throughout the Nez Perce-Clearwater to determine the historical fire frequencies and fire severities prior to the 1930s for the following areas. Within the upper Clearwater River drainages, there were extensive stand replacement forest fires in the cool and cool moist vegetation types that burned approximately every 200 plus years. In the upper North Fork, large stand replacement fires had mean fire return intervals greater than 250 years and patchy underburning mean fire return intervals were less than 100 years within the grand fir and Western redcedar warm moist vegetation types during the 1800s. In the lower South Fork Clearwater River, warm dry south facing stands of Douglas fir and Ponderosa pine were maintained by frequent low intensity fires in open stands, which suggests that the mean fire return interval was generally less than ten years. On the more productive slopes, there were multiple classes of Douglas fir, Ponderosa pine, and Western larch burned approximately every 20 to 60 years under mixed severity fires (Barrett 1993). In the river breaks zone within the River of No Return Wilderness, fire history studies concluded an approximate 5 to 50 year mean fire return interval with primary low severity fires within the Douglas fir and Ponderosa pine warm dry vegetation types (Barrett 1984).

Wildfires can be broadly divided into two principal regimes – natural and human-driven. Natural fires are caused by lightning and have historically made up a large percentage of the total fires. They historically burned under conditions that maintained or enhanced the characteristics of vegetation within each of the fire regimes.

Historical human ignitions also contributed to the maintenance of vegetation and the fire regimes. Currently, human-caused ignitions are unpredictable and can occur at any time in the year at any location. The most difficult fires for fire managers to address are on the hottest days and within the wildland urban interface where most human activity occurs.

The desired and existing average acres burned per decade from 1984 to 2021 by fire regime and severity are shown in Table 98This is the same data used in FW-OBJ-FIRE-01 but more in-depth to capture where fire deficits are most pronounced based on methods in (Ager et al. 2014).

Historically, large fires have occurred across the Nez Perce-Clearwater, as shown by fire history studies (Barrett 1993), GIS fire history database records, recent data (1940 to present), and anecdotal evidence (pre-1940). The only fire regimes at or above average in terms of expected burn acreage are Fire Regimes IV and V on the Nez Perce-Clearwater. These regimes represent 32.8 percent and 0.8 percent of the forest, respectively. This recent activity in the long fire return interval replacement severity Fire Regimes IV and V was mainly driven by large fires in 2012, 2015, 2017, and 2021. This recent activity can be attributed to drought and extremely dry fuels at higher elevations, busy fire seasons where responders were more focused on suppressing fires that threatened critical values at risk near towns and communities, and natural ignition fires playing their natural role in Wilderness areas. Fire has been reduced from playing its natural role especially within Fire Regimes I, II, and III. These fire regimes comprise 9.3, 0.44, and 53.8 percent, respectively, of the national forest. The absence of fire in these regimes is likely derived from the combination of cooler climatic conditions in the 1900s (Littell et al. 2009); reduced fuels from large fires in the early 1900s; the increasing capability of fire suppression technology, such as air tankers and aerially delivered firefighters; and the agency's focus on suppression.

The long-term deficit of abundant low- to moderate-severity fire has contributed to modification of seasonally dry forested landscapes across western North America and is also evident on the Nez Perce-Clearwater National Forests (Table 99). The magnitude of change in fire regimes and the resultant increases in forest density and fuel connectivity have increased the vulnerability of many contemporary forests to seasonal and episodic increases in drought and fire, exacerbated by rapid climate warming (Hagmann et al. 2021).

Table 98. Desired and Existing conditions for average amount and severity of wildland fire per decade by fire regime group.

Fire Regime Group[1]	Average Desired Acres Burned per Decade[2]	Existing Average Acres Burned per Decade[3]	Desired Fire Return Interval (Frequency)[1]	Desired Fire Severity[1,4]	Existing Low Severity Acres per Decade[5]	Existing Moderate Severity Acres per Decade[5]	Existing High Severity Acres per Decade[5]
I	173,000 to 218,000	45,919	0–35 years	Low to mixed	30,047	11,183	4,690
II	9,000 to 11,000	3141	0–35 years	High	2,838	277	26
III	286,000 to 325,000	89,579	35–200 years	Mixed to low	48,201	25,779	15,599
IV	70,000 to 91,000	111,496	35–200 years	High	36,026	38,250	37,220

Fire Regime Group[1]	Average Desired Acres Burned per Decade[2]	Existing Average Acres Burned per Decade[3]	Desired Fire Return Interval (Frequency)[1]	Desired Fire Severity[1,4]	Existing Low Severity Acres per Decade[5]	Existing Moderate Severity Acres per Decade[5]	Existing High Severity Acres per Decade[5]
V	600 to 1,100	2,423	200+ years	High to mixed to low	1,518	664	241
Total	538,600 to 646,100	252,557	not applicable	not applicable	118,629	76,151	57,776

Desired condition applies to all potential vegetation types.

[1]Fire regime groups, fire return intervals, and fire severity types, as defined in the Fire Regime Condition Class Guidebook (U.S. Department of Agriculture 2010c).

[2]Expected acres are the average range derived from Mean Fire Return Interval data from LANDFIRE 2012, v.1.3.0. Rounded to nearest hundred where applicable.

[3]Existing comes from 1984 to 2021 Monitoring Trends in Burn Severity data, wildfires greater than 1,000 acres. Does not include unburned areas within wildfire perimeters.

[4]First adjective indicates dominant severity. Mixed severity is defined as a combination of low to high fire severity within the perimeter of a single fire or across consecutive events.

[5]Fire severity classification is defined by Monitoring Trends in Burn Severity. Existing fire severity comes from 1984 to 2021 Monitoring Trends in Burn Severity data.

Wildfire History and Recent Trends

Historical fire data in the Nez Perce-Clearwater's geographic information system database shows wildfire areas burned from 1885–2022 (Figure 31). In this dataset, the earliest records may not be complete and often include only large fires or active fire years, creating the potential to underestimate the quantity and extent of older fires. The data is based on fire start records on National Forest System lands and does not include ignitions that went out prior to being detected. This fire history data has many influences, including fuels, weather (daily, monthly, and long term), ignition sources, and suppression efforts.

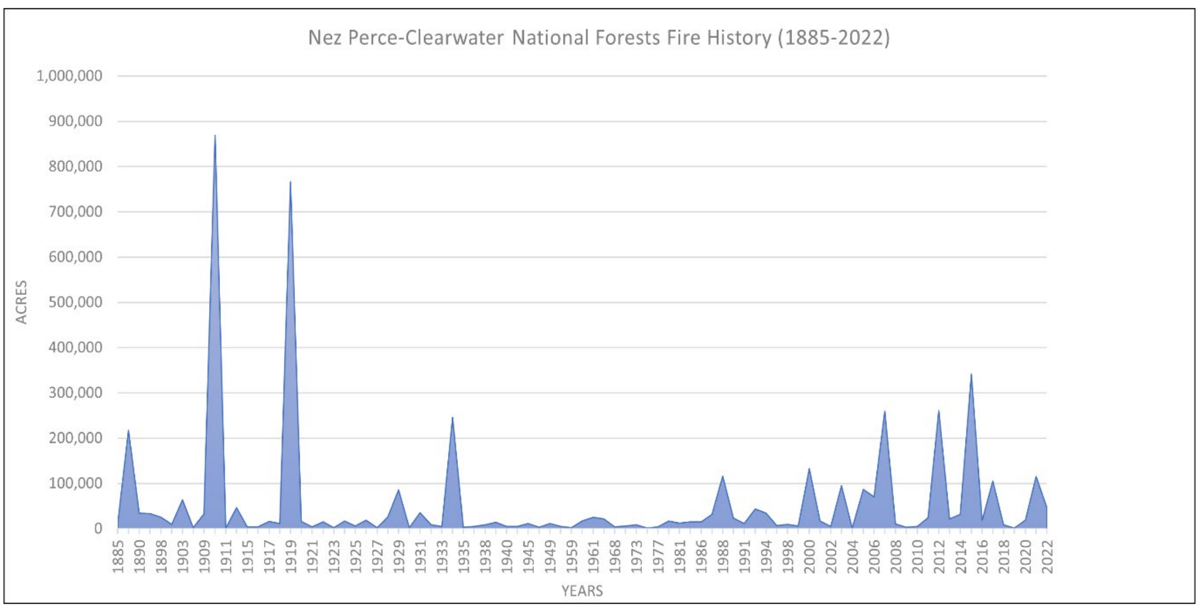


Figure 31. Historical Fire Acreage by year (1885–2022) in the plan area.

Data Source: FireStat and FACTS databases.

Recent increases in large fires can be attributed to climate change (Abatzoglou and Williams 2016), changes in national wildland fire policy since 1980, the recognition and implementation of allowing fire to play its necessary ecological role on the landscape, and the integration of the changing policy into the Nez Perce-Clearwater fire management program. Despite the recent trend of increased acreage since the late 1980s (Figure 31), the northern Rocky Mountains are still experiencing a fire deficit where acres burned historically have been less than what is expected and with longer fire rotations (Parks, Miller, et al. 2015).

Figure 32 displays the distribution of fire severity type within each of the five Historical Fire Regimes within the Nez Perce-Clearwater National Forests plan area from 1984–2021. This data suggests that in terms of fire severity, these regimes are functioning within their natural range. However, the amount of disturbance in terms of acres is significantly less than the desired amount (Table 98) within Fire Regimes I, II and III which represent 9.3, 0.44, and 53.8 percent of the plan area, respectively. These fire regimes are also within areas of the forest that are suitable for timber production and adjacent to the Wildland Urban Interface and other values at risk where fire suppression has been the most common fire management strategy deployed.

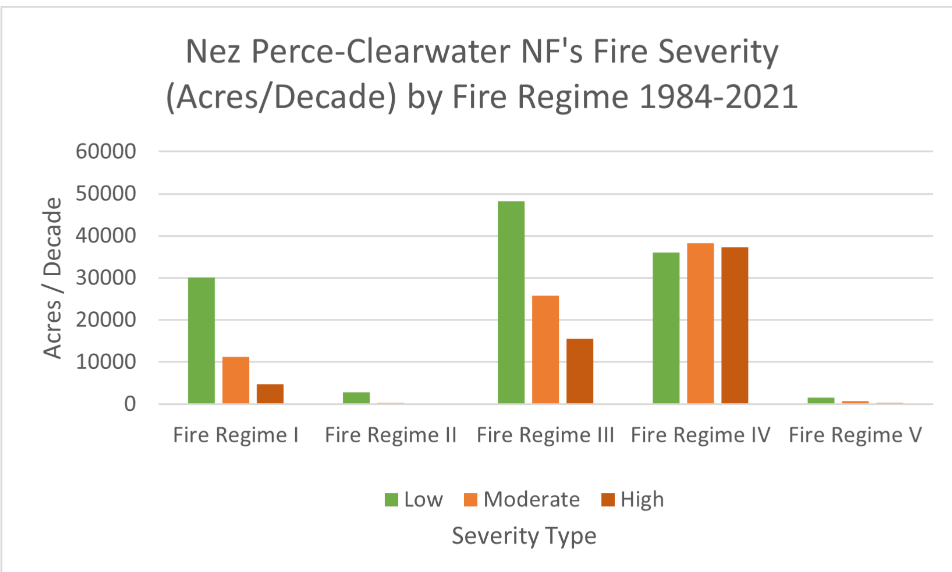


Figure 32. Fire Severity Acres by Decade from 1984 to 2021 within each of the five Fire Regimes within the Nez Perce-Clearwater National Forests Plan Area.

Data Source: MTBS and Landfire databases.

Fuels Treatments

The tools the Nez Perce-Clearwater has used to move towards desired conditions include hazardous fuel reduction by mechanical treatments, such as timber harvest and hand thinning; prescribed burning; and managing natural wildfire ignitions for resource objectives. Most of the mechanical fuels reduction and prescribed fire activities over the past ten years on the Nez Perce-Clearwater have been implemented as timber sales and reducing activity generated fuels resulting from harvest. Prescribed burning treatments have been undertaken to improve wildlife habitat in the forested and non-forested landscape where the forest plans have allowed those activities.

Timber harvest and associated slash disposal treatments such as pile burning, or broadcast burning of timber harvest activity fuels, has averaged 4,345 acres per year for the past ten years across the Nez

Perce-Clearwater and is expected to increase in pace and scale in the future. Hand thinning and other non-commercial mechanical treatments have accounted for approximately 2,510 acres per year over the past ten years. Wildland fire, including management ignited prescribed burning and wildfires managed to achieve land management plan objectives, has accounted for the majority of fuels treatment over the last ten years, with an annual average of 4,346 prescribed burning acres and 35,700 wildfire acres. Prichard et al. (2021) shows that intentional forest management is effective and corrective where practiced, however, the amount and location of fuels treatments and prescribed burning have not been enough to have had a significant effect in fostering fire resilient landscapes or reduce wildfire risk to communities (Kolden 2019).

Climate Change

Of all the ongoing and foreseeable future actions that have the potential to affect fire, especially unwanted wildfire, climate change is likely to be the single most important factor. As indicated by the vegetation composition over the centuries, the climate has fluctuated from cool and moist to warm and dry and has strongly been influenced by naturally occurring climate cycles, such as the 20- to 30-year Pacific Decadal Oscillation (PDO) and the 1- to 2-year El Nino Southern Oscillation (ENSO). These large-scale climate patterns influence the local climate across the Nez Perce-Clearwater by causing warmer or cooler and drier or wetter conditions depending on the phase of the Pacific Decadal Oscillation and El Nino Southern Oscillation (EcoAdapt 2014). Recently, an increase of minimum temperature has been more pronounced in the higher elevations, reducing snowpack and creating earlier spring melting and longer fire seasons. The changes associated with climate also contribute to changes in fire behavior characteristics and the corresponding fire frequency and severities within fire regimes for each of the broad potential vegetation types (Westerling et al. 2006, McKenzie et al. 2000). Since the 1980s, the increase in fire occurrence and extent have been influenced by warm springs and warm, dry summers, which drives the occurrence of regional-fire years throughout the Northern Rockies (Heyerdahl et al. 2001).

Historical weather data for the Nez Perce-Clearwater is represented by the United States Climate Division 4 Central Mountain area, which includes each of the counties that reside within the Nez Perce-Clearwater boundary. A comparison of weather parameters from 1885 to 1987 and 1988 to 2017 is one of the drivers that is associated with an increase in longer fire seasons and larger fires over the last 30 years. During this time, the combined annual mean temperature within these counties has seen an average annual increase of 1.42 degrees Fahrenheit and the combined mean annual precipitation has declined by 0.86 inches, per the National Oceanic and Atmospheric Administration's Climate Divisional Database[13].

Adapting landscapes to climate change and future wildfires will require more active management to open canopies of dry pine and moist mixed conifer species where fire resilient and larger size trees are favored. It will also require removing ladder fuels of smaller size class and fire intolerant tree species that compete for limited resources such as moisture, light, and growing space. Ultimately, promoting adaptation to climate change and future wildfire will require restoring landscapes to function within their historic fire regime (Hessburg et al. 2022).

[13] Vose, Russell S.; Applequist, Scott; Squires, Mike; Durre, Imke; Menne, Matthew J.; Williams, Claude N., Jr.; Fenimore, Chris; Gleason, Karin; Arndt, Derek (2014): NOAA Monthly U.S. Climate Divisional Database (NClimDiv). NOAA National Climatic Data Center: https://www.ncei.noaa.gov/access/metadata/landing-page/bin/iso?id=gov.noaa.ncdc:C00005 [2020]

Environmental Consequences

Effects to No Action Alternative

The current Nez Perce and Clearwater Forest Plans, as amended, are the existing management direction being used by the Nez Perce-Clearwater to address fire and fuels management. This direction represents the No Action Alternative. However, because the No Action Alternative is the baseline to which the Action Alternatives are compared, it is important to understand what actions would continue under the No Action Alternative.

The 1987 Nez Perce National Forest plan, as amended, will provide for resource protection and fire use necessary to protect, maintain, and enhance resource values and attain land management goals and objectives. The plan allows for the forestwide use of all management response options for wildfire such as control, contain, and confine. Exceptions for unplanned ignitions include Management Areas 7, 10, 12-15, 17, and 19-23. Planned prescribed fire is allowed forestwide. Mechanical treatments are not allowed in the Wilderness.

The Nez Perce National Forest Plan Amendment #34 allows fuel hazard reduction and watershed improvement activities in the Red River watershed concurrently with aquatic improvement activities if an upward trend is indicated.[14]

The 1987 Clearwater National Forest plan includes the following forestwide standard: fire strategies allow for the management of planned or unplanned ignitions to achieve a variety of resource objectives in many of the management areas. Wildfire strategies consist of confine, contain, and control objectives with maximum acres allowed to burn within each management area. Prescribed fire acres for natural and activity fuels were assigned for each management area. Recreation and research natural areas were not allowed to have unplanned ignitions and were only assigned contain wildfire strategies. Mechanical treatments are not allowed in the Wilderness.

Resource management would continue to occur at a similar pace and scale considering the appropriate management responses for each discrete management area within each plan. Wildland fire management would continue to use the full spectrum of responses to wildfire, as well as perform hazardous fuels treatment where and when appropriate. Most wildfires managed to achieve resource benefits would take place in the designated wildernesses or inventoried roadless areas. Wildfire suppression would be the primary strategy on fires that occur outside wilderness boundaries.

The majority of mechanical fuels reduction activities would be timber sales and the prescribed fire treatment acres, and emphasis would be treating activity fuels resulting from timber harvest residual slash. Fuels will continue to accumulate faster than management activities can treat them, resulting in an increased risk of losing key ecosystem components over time, especially in Fire Regimes I, II, and III.

Effects Common to Action Alternatives

Restoration and Maintenance of Fire Regimes

Natural, long-term variations in temperature and precipitation patterns, past management, and fire exclusion have resulted in continuously changing fire regimes (Whitlock et al. 2008) and, thus, continually changing forest conditions. This past climatic variability has had major effects on the timing, frequency, intensity, severity, and extent of wildfires, as would future changes in climate. The effect may be due to direct climate-related factors, such as increased temperature and greater drying of forest fuels,

[14] https://www.fs.usda.gov/detail/nezperceclearwater/landmanagement/planning/?cid=stelprdb5404075

or indirectly related to potential changes in forest composition and structure due partly to climate change. These climate-induced changes in fire regimes could have substantial impacts on ecosystems, with associated effects to communities and economies (Littell et al. 2009).

Restoring active fire regimes and reducing climate vulnerability requires managed wildfires that significantly thin forests, consume fuels, and favor fire-resistant, larger trees, or coupled mechanical thinning and prescribed or cultural burning treatment followed by regular maintenance burning (Prichard et al. 2021).

Wildfire has been, and will be, the greatest driver of vegetation change on the Nez Perce-Clearwater. Under all alternatives, natural unplanned wildfire would be allowed to play its ecological role. Along with prescribed fire, use of wildland fire will help in alleviating the fire deficit (Parks, Holsinger, et al. 2015, Vaillant and Reinhardt 2017), as well as providing many ecological benefits. Climate effects (Halofsky, Peterson, et al. 2018a, b), as well as plan components, that encourage the ecological role of fire will increase the amount of wildfire on the landscape under all revised plan alternatives.

The Forest Service manages wildfires to meet Land Management Plan desired conditions and resource objectives, using unplanned natural ignitions to achieve these objectives and ecological purposes to foster resilient ecosystems. The benefits of managing wildfires to meet resource objectives may include reducing fuels so that future fires burn in that area with lower severity (Parks, Holsinger, et al. 2015), increasing biodiversity (Martin and Sapsis 1991), cycling nutrients back into the soil (Hungerford et al. 1991), or reducing forest density to favor fire resistant species (Agee 1993). The increased use of unplanned ignitions in the revised plan alternatives would lead to greater fuels reduction and forest vegetation would be restored to more resilient conditions, which could mitigate climate change effects (Parks, Miller, Abatzoglou, et al. 2016) and help achieve the desired conditions.

From an ecological standpoint, fire should be allowed to serve its natural role. There are limited options for managing unplanned ignitions in proximity to human settlements and infrastructure, or in some cases where economic resource values are high (Noss et al. 2006). In all alternatives, fire suppression would continue to be an option for unplanned natural ignitions. Circumstances where wildfires are suppressed consider certain fuel and weather conditions, proximity to values at risk, time of year, or fire effects that are predicted to move the landscape away or not maintain desired conditions. Fire suppression may also be appropriate where rare or unique ecological values could be lost, such as imperiled species habitat where uncharacteristic fuel accumulations have created the potential for a fire that is outside the historical range of variability or where infrequent high severity fires are characteristic but where such fires are not viewed as ecologically desirable, such as old growth (Noss et al. 2006). These areas, as well as unburned areas or low severity burn areas within large mixed and high severity fires, could offer areas that are considered fire refugia. These areas are landscape elements that remain unburned or minimally affected by fire, thereby supporting postfire ecosystem function, biodiversity, and resilience to future disturbances. Fire refugia provide habitat for individuals or populations in which they can survive fire in which they can persist in the postfire environment and from which they can disperse into the higher-severity landscape (Meddens et al. 2018). However, when natural fires are suppressed in fire-adapted ecosystems, there could be detrimental effects to vegetation composition and structure, ecosystem processes, soil dynamics, wildlife habitat, and biodiversity of ecosystems (Keane et al. 2002). In combination with climate change, land-use change, and 20th century fire exclusion, suppression of wildfires also increases the existing fire deficit (Marlon et al. 2012). Fire suppression actions can also have direct negative impacts to resources (Ingalsbee 2004) and are sometimes ineffective at achieving objectives (Ingalsbee 2017).

Simulation modeling (SIMPPLLE) was used to estimate wildfire activity on the Nez Perce-Clearwater for five decades into the future. Best available information was used to build the fire logic and assumptions within the model, including corroboration with actual data, professional knowledge, and experience. Refer to Appendix B for a detailed discussion on model development and outputs. The model predicts that wildfire will continue to a similar degree under all alternatives, which equates to an average of approximately 587,500 acres per decade in forested vegetation types. The similarity across all alternatives is due to both natural and human caused ignitions, an expansive fuel source, and climate effects. It cannot be predicted with high accuracy where and when fires will occur. There is also a high degree of variation, both spatially and temporally, in the amount and location of fire.

Future Fuels Treatments

All alternatives contain desired conditions and objectives for treating vegetation through wildland fire and mechanical treatments to improve vegetative structure and composition. This includes reducing surface fuels, ladder fuels, and canopy density to reduce fire intensity. Additional benefits consist of minimizing impacts to values at risk and reducing fire spread to other ownerships. As of September 5, 2023, the Fuels Treatment Effectiveness Monitoring Database FTEM (firenet.gov) indicated there were at least 46 instances of wildfires interacting with previous mechanical and prescribed burning fuels treatments on the Nez Perce-Clearwater from 2018 to 2022. Most of these interactions documented the fire behavior being lessened when they breached the fuels treatment areas, often changing fire behavior from active or passive crown fire to surface fire. Wildfires that are documented in the FTEM database include Swan Boundary (2018), Grizzly (2019), Willow (2020), Shissler (2020), Crown (2021), BM Hill (2021), Snow Creek (2021), Fan (2021), Boulder Creek (2021), Dixie (2021), Larch (2022), Radcliff (2022), Wallow (2022), and Williams Creek (2022).

While mechanical treatments alone cannot fully mimic the ecological effects of fire, they are a valuable tool in creating stand structures that are more resilient to future disturbances (Schwilk et al. 2009). Prescribed fire and mechanical surrogates are generally successful in meeting short-term fuel reduction objectives and in changing stand structure and fuel beds such that treated stands are more resilient to high intensity wildfire (Stephens et al. 2012). Mechanical thinning of small stems and prescribed fire are effective techniques for restoring stand densities to levels that existed prior to fire exclusion, livestock grazing, logging, and plantation establishment within forests where low severity fires were most common (Noss et al. 2006).

In mixed-severity fire regimes where sufficient fire history information is available, a combination of thinning and prescribed fire might be used in restoration, yet only parts of these landscapes may warrant treatment because spatial variability is a hallmark of these landscapes. Hence, a landscape-level rather than a stand-level approach to restoration is warranted (Noss et al. 2006). Landscape-level treatment prescriptions that promote resilient patchworks with heterogeneous non-forest and forest ages can reduce the extent of high-severity wildfires and make landscapes less susceptible to extensive insect and disease outbreaks. Restoration of fire resilient mosaics in moist mixed-conifer forests, mixed conifer hardwood forests, fire-prone deciduous forests (for example, aspen), and cold forests is also needed (Prichard et al. 2021).

Fire exclusion and past management activities may have had little impact on high severity fire regimes (Westerling et al. 2006). Research following large fires within these fire regimes showed fuels treatments, such as mechanical thinning and prescribed fire, can be successful at protecting values at risk from subsequent fire even during extreme fire behavior (Graham et al. 2009). Locally on the Nez Perce-Clearwater National Forests, The Orogrande Community Protection Project was signed in 2016 and implementation began in 2017. The project consisted of harvest adjacent to the private property, non-commercial thinning along the main access road, and prescribed fire. The commercial harvest and non-commercial thinning activities were completed and the activity fuels from harvest were burned prior to the start of the Williams Creek fire in August 2022. This fire started in the Gospel Hump Wilderness and initial response was to suppress. Considerable effort and dedication of resources to the fire proved to be ineffective and responders switched to the strategy of point protection for the town of Orogrande. On September 8th, the fire burned 3 miles and the flaming front hit the fuels treatments and went around and over the top of the community. Some structures were damaged and some lost, however, fire managers stated that had the fuels treatments not been there to break the continuity of fuel into the community that there would have been significantly more loss and damage to infrastructure within the community of Orogrande.

Prescribed fire is essential to reducing fuels. It is possible to craft treatments to achieve both ecological restoration and fire hazard reduction (Reinhardt et al. 2008). However, ecological restoration will also include reintroducing fire and other active management. Additionally, the most effective ecosystem treatments should include prescribed fire. Prescribed fire on the landscape in all alternatives would be expected to partially offset predicted effects from climate change (Wiedinmyer and Hurteau 2010). Prescribed fire is essential to reducing fuels. It is possible to craft treatments to achieve both ecological restoration and fire hazard reduction (Reinhardt et al. 2008). However, ecological restoration will also include reintroducing fire and other active management. Additionally, the most effective ecosystem treatments should include prescribed fire. Prescribed fire on the landscape in all alternatives would be expected to partially offset predicted effects from climate change (Wiedinmyer and Hurteau 2010).

Fire Management Flexibility

Key considerations for fire management are described in this section. A large number of burnable acres of National Forest System lands cannot be actively managed by mechanical means. Additionally, mechanical treatments in designated wilderness are limited, except as necessary, to meet the minimum needs for protection and administration of the area as wilderness. Administrative use of motorized equipment is allowed in recommended wilderness. Appropriately managing wildfire in places with an opportunity to obtain resource benefits and a low risk of potential damages may be the only way in many areas to increase the pace and scale of ecosystem restoration activities. Informed management of wildfire would also be needed to maintain areas once restoration has occurred. Wildland fire also exhibits self-regulating effects where a burned area will act as a fuel break and reduce the probability of subsequent fire spread (Parks, Holsinger, et al. 2015). This effect is dependent upon many factors, including vegetation type, previous burn severity, and climate but can be reduced by climate-induced extreme weather events (Parks, Miller, Abatzoglou, et al. 2016) which are predicted to be more common in the future (Westerling et al. 2011).

The alternatives vary from the fuels management perspective on the allocation of acres and different designated areas; the primary designated area that impacts fuels management is recommended wilderness. Other management limitations apply to all alternatives. In inventoried roadless areas, which comprise most recommended wilderness areas, there are limitations on road construction and timber cutting relating to the purpose and location of treatments in relation to identified wildland urban interface. Additionally, the implementation of the Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f) constrains treatments in lynx habitat outside the wildland urban interface where multi-storied hare habitat or stand initiation hare habitat is present.

The use of prescribed fire within the wildland urban interface is a high-risk action and is often more expensive than prescribed fire in the non-wildland urban interface. This is due to the extra steps taken to ensure public safety and mitigate hazards to private property. Additionally, impacts from smoke emissions adjacent to homes for extended periods limit the number of acres that can be treated. Within the wildland urban interface, there is an increased need to rely on mechanical and hand treatments rather than fire. In addition, social issues, such as the effects of treatments on scenery, air quality, noise, and wildlife viewing, can be more contentious.

Effects that Vary by Alternatives

Future Fuels Treatments

In all alternatives, mechanical fuels reduction and prescribed fire would continue to be used to move vegetation on the Nez Perce-Clearwater toward desired future conditions. Mechanical treatments, including harvest, can be used to achieve fuel management objectives, such as reducing forest densities and favoring fire-resistant species, but effectiveness is dependent upon harvest type and subsequent slash disposal (Hartsough et al. 2008). Mechanical treatments are often more effective when combined with prescribed fire to reduce surface fuels. Mechanical plus burning treatment produces stand structures with fewer ladder fuels (saplings) and lower rates of fuel accumulation (that is, fewer snags that remain to fall and less twig and litter fall from live trees due to reduced basal area), leading to more rapid development of conditions resilient to wildfire (Schwilk et al. 2009). Treatment of surface fuels through prescribed fire has shown to reduce surface fire intensity, flame lengths, and convective and radiative heating and contributed to lower postfire mortality than thin only treatments in mixed conifer forest (Prichard et al. 2010). Relative to impacts to fire management, treatments that may occur in the wildland urban interface may be the most important for protecting values at risk. Each alternative should emphasize treatments inside the wildland urban interface. The amount of anticipated mechanical treatments within forested areas varies by alternative (Table 99). The current plans would treat the fewest acres followed by Alternative Z. Alternatives W, X, Y, and the Preferred Alternative are projected to result in similar acres being treated mechanically. The Preferred Alternative would result in the most acres treated, consistent with the theme of this alternative, meeting vegetative desired conditions in 30–35 years. The No Action Alternative is projected to result in the least mechanical treatments within forested vegetation types. Additional potential treatments in non-forested vegetation types are not reflected in the projections but may be necessary to facilitate prescribed burns to achieve desired conditions.

Table 99. Estimated average mechanical treatment acres per decade over 50 years by alternative.

No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
43,450[1]	155,767	155,935	149,904	84,552	159,255

Acres are from the PRISM model and only include forested areas. Non-forested area is not included in these figures. Calculations include areas both inside and outside the wildland urban interface.

[1]Acres of mechanical fuels treatment over the past 10 years under the current plans.

In all alternatives, prescribed fire would continue to be used to move the Nez Perce-Clearwater towards desired future conditions. The amount of anticipated prescribed fire within forested areas varies by alternative (Table 100). These acres do not account for site prep or brush disposal burning associated with timber harvest as identified in Table 99. These are landscape burns implemented to achieve the desired vegetative conditions. The No Action Alternative is projected to result in the fewest acres treated with landscape prescribed fire, followed by Alternative Z. Alternative X is projected to result in the most acres treated to meet vegetative desired conditions in 20 years. Additional potential treatments in non-forested vegetation types are not reflected in the projections but may be necessary to achieve desired conditions in all alternatives.

Table 100. Estimated average prescribed fire acres per decade over 50 years by alternative.

No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
55,600[1]	73,449	83,320	80,171	64,505	67,987

Acres are from the PRISM model and only include forested areas. Non-forested area is not included in these figures. Calculations include areas both inside and outside the wildland urban interface.

[1]Acres of prescribed fire treatment over the past 10 years under the current plans, includes non-forested treatments.

Fire Management Flexibility

The alternatives vary from the fuels management perspective on the allocation of acres to different designated areas. The primary designated area that impacts fuels management is recommended wilderness due to limitations on mechanical treatments. However, most recommended wilderness areas are inventoried roadless areas, which would already limit mechanical treatments due to constraints on road building and access. This is most important where recommended wilderness overlaps with wildland urban interface where it is assumed that the majority of fuels mitigation would occur. Due to the objectives of fuels treatments, such as reducing canopy density and ladder and ground fuels, fuels treatments in the wildland urban interface would produce vegetation structure that is most likely not compatible with wilderness characteristics, especially in higher elevation vegetation types. Due to this constraint, wildland urban interface mechanical fuels treatments within recommended wilderness would be very limited as they would not meet their purpose and need and could be ineffective.

Within recommended wilderness, wildfire would primarily be used to meet resource objectives, with less emphasis on mechanical treatments and prescribed fire. However, fuels management would be dependent upon the use of unplanned ignitions and the risk assessment associated with each season and event that may require suppression actions instead. Due to constraints on mechanical treatments, there would be limited opportunities to pretreat areas that would serve as buffers for naturally ignited wildfires and the ability to use wildfire for resource benefit would likely be reduced. The location of the ignition would weigh heavily on decisions relating to suppression or long-term management of a given fire.

Fuels treatments and wildland fire within the suitable Wild and Scenic River lands could be used if they adhere to maintaining, enhancing, or protecting the outstandingly remarkable values, free flowing characteristic, or water quality for which the river was designated. These protections may or may not be compatible with some fuels treatment methods. Table 101 displays total acres of recommended wilderness and the eligible and suitable Wild and Scenic rivers by alternative.

Table 101. Acres of recommended wilderness and eligible and suitable Wild and Scenic Rivers by alternative.

Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Recommended Wilderness	197,695	856,932	0	309,332	569,755	258,210
Wild and Scenic eligible and suitable lands	155,477	74,646	0	110,252	166,176	61,849

Alternative W would have the most acreage of recommended wilderness compared to the other alternatives and the second least acreage within eligible and suitable Wild and Scenic rivers. Based on land allocations, this alternative provides the least flexibility for fire management, resulting in the fewest opportunities of mechanical fuels treatments. With less flexibility in conducting associated fuel management activities, unplanned natural ignitions may require suppression actions and desired conditions may not be met.

Alternative X provides the most flexibility for fire management by including no recommended wilderness or eligible and suitable Wild and Scenic rivers, resulting in the greatest opportunities for mechanical treatments and prescribed fire, which could lead to more opportunities to effectively use future natural unplanned fires for desired conditions.

Alternative Y has more recommended wilderness and the second most acres of eligible and suitable wild and scenic rivers than the current plans and would offer less flexibility than the current plans to meet desired conditions.

Alternative Z would be like Alternative W except there would be fewer acres of recommended wilderness and the most acres of eligible and suitable Wild and Scenic rivers. This may result in reduced flexibility for unplanned natural ignitions used to meet the revised plan desired conditions and the least flexibility to use mechanical fuels reduction methods to achieve desired conditions.

The Preferred Alternative has slightly more acres of recommended wilderness as compared to the current plans. It also has the least amount of eligible and suitable wild and scenic river acres. Of all the revised plan alternatives, except for Alternative X, which has no acres of recommended wilderness or eligible and suitable wild and scenic river acres, this alternative provides the most flexibility for the greatest number of fire management activities to meet desired conditions.

Cumulative Effects

Human Population Increases and Shifts towards Wildland Urban Interface

More human development is occurring near the boundary of lands administered by the Nez Perce-Clearwater. This trend is expected to continue in the future and is likely to have effects on forest vegetation. The need for vegetation treatments being implemented within wildland urban interface areas will increase. The objective is to reduce hazardous fuels, as well as conduct fewer vegetation treatments, in areas located away from communities. To work individually with property owners is costly and creates a patch work of defendable properties among those that are not. In addition, the types of fuel treatments used in the wildland urban interface are often more expensive than methods elsewhere and social issues, such as the effects of treatments on scenery, air quality, noise, and wildlife viewing, can be more contentious. Therefore, higher public involvement, planning, and implementation expenses are likely to lead to fewer acres being treated within a given budget level. The ability for fire managers to implement prescribed burns will lessen in the wildland urban interface Despite efforts to suppress human-caused fires, these types of fires are more likely in the wildland urban interface as more people live and recreate in the area.

The wildland urban interface has become the focus of wildland fire suppression resources. The future increase in the wildland urban interface will continue to challenge wildfire management during large fire events as “firefighters will likely have to protect dispersed housing over an extremely large area of fire-prone forest” (Gude et al. 2008).

Relative to current levels, more wildfire in the future is expected and policies that foster adaptive resilience in the wildland urban interface (WUI) are needed (Shoennagel et al. 2016). Building homes with fire-resistant materials and landscaping will reduce ignitability and result in fire-resilient properties capable of withstanding future fires (Cohen 2000). This is consistent with Goal 2 of the National Cohesive Wildland Fire Management Strategy that targets creating fire adapted communities, which is primarily the responsibility of private landowners and local and state governments. While the Forest Service cannot directly engage in any private structural fire, strategy and tactics are used to prevent a wildland fire from reaching private structures (U.S. Department of Agriculture 1991). The other two goals of the National Cohesive Wildland Fire Management Strategy are for restoring and maintaining landscapes and wildfire response, which is the focus of forest service fire management. By working together across boundaries, all three goals can come together to better facilitate managing wildland fire on the landscape in closer proximity to the wildland urban interface. Treating dry and moist mixed-conifer forests beyond WUI buffers can modify fire behavior and change the intensity of wildfires arriving at communities.

Increased Regulation and Concern over Smoke Emissions

The ability to use fire to maintain and restore the fire-adapted ecosystems on the Nez Perce-Clearwater or to reduce hazardous fuels in the wildland urban interface is dependent upon air quality regulations. As air quality regulations become stricter, the ability to use prescribed fire as a management tool becomes limited. If past trends of increasing regulations and decreasing burn opportunities continue, the effects would likely result in not being able to use fire enough to make meaningful improvements to forest and fuel conditions and meet objectives.

Timber Product Manufacturing Infrastructure and Economics

The ability of the Nez Perce-Clearwater to positively affect forest vegetation is partially dependent upon the ability to sell forest products and to use harvesting process, including the residual slash disposal activities to positively affect the forest vegetation and reduce hazardous fuels. If the forest products industry declines in areas surrounding the Nez Perce-Clearwater to the degree that it is difficult to sell forest products, or if "stumpage prices" decrease substantially, it would affect how many acres could be treated. While some treatments could be accomplished by using prescribed burning only, it is generally very risky in the wildland urban interface and expensive, leading to fewer acres treated.

Other Plans

Since they were developed, national level plans, initiatives, and acts, such as the National Fire Plan, Healthy Forest Initiative, Healthy Forest Restoration Act, and National Cohesive Wildland Fire Management Strategy, have influenced the vegetation and fuel management programs on the Nez Perce-Clearwater. Therefore, they have had some effects on hazardous fuels and it is anticipated that they will continue to do so for the foreseeable future. In general, these plans have resulted in more vegetation treatments being implemented near wildland urban interface areas with the objective of reducing hazardous fuels and vegetation treatments in areas located away from communities. Not only do these plans emphasize the need to reduce hazardous fuels in the wildland urban interface, but they also stress the need to restore the natural fire regimes and forest conditions to the larger national forest landscape. These plans encourage the development of more resistant and resilient forest vegetation that would be less susceptible to large undesirable wildfires and insect outbreaks.

Portions of the Nez Perce-Clearwater adjoin other national forests, each having its own forest plan or land management plan. The Nez Perce-Clearwater is also intermixed with lands of other ownerships, including private lands, other federal lands, and state lands. Some adjacent lands are subject to their own resource management plans. The cumulative effects of these plans, in conjunction with the Nez Perce-Clearwater Land Management Plan, are summarized below for those plans applicable to fire management.

The forest plans or land management plans for National Forest System lands adjacent to the Nez Perce-Clearwater include the Payette, Wallowa Whitman, Idaho Panhandle, Lolo, and Bitterroot National Forests. All plans address fire management and generally are consistent across all national forests due to law, regulation, and policy. The cumulative effect would be that the management of fire and fuels would be generally complementary. This includes specific adjacent landscapes that span national forest boundaries, such as the Selway-Bitterroot and Frank Church River of No Return Wilderness areas, Hells

Canyon National Recreation Area, Rapid River Wild and Scenic River, Mallard-Larkin Pioneer Area, and the Salmon River.

Other adjacent federal lands are administered by the Bureau of Land Management and the United States Army Corps of Engineers. The Cottonwood Field Office of Bureau of Land Management has Resource Management Plans that were signed in 2009 for lands near the Nez Perce-Clearwater. The United States Army Corps of Engineers has the Dworshak Master Plan that was signed in 2015. These plans contain components related to fire and fuels and would likely be complementary to Nez Perce-Clearwater plan components.

The Idaho Department of Lands Fire Management Plan guides fire management on state lands in Idaho. The plan includes concepts that are complementary to revised plan components for the Nez Perce-Clearwater, such as state direction for suppression of wildfires. While specific desired conditions are not stated in the same terms as the Nez Perce-Clearwater, it is likely that some elements, such as providing for firefighter and public safety, would be similar. State forestlands may be actively managed to a greater degree than National Forest System lands and would likely contribute to achievement of some desired fire and fuels conditions across the landscape. The Idaho State Wildlife Action Plan describes a variety of vegetation conditions related to habitat for specific wildlife species. These plans would likely result in the preservation of these habitats on state lands, specifically wildlife management areas. The vegetation conditions described would be complementary to the conditions being managed for in the revised Nez Perce-Clearwater Land Management Plan.

Some county wildfire protection plans map and define the wildland urban interface. The Forest Service notes that these areas may be a focus for hazardous fuels reduction. Other plan components, such as Northern Rockies Lynx Management Direction, have guidance specific to these areas. Managing for more open forests of large diameter fire resilient species may be particularly emphasized in these areas. Overall, the effect of the county plans would be to influence where treatments occur to contribute to desired vegetation conditions.

Effects to Resource from Other Resources

Air Quality

The consequences to fire from air quality are the same for all alternatives. All alternatives have the same plan components to meet air quality standards established by federal and state agencies. The Forest Service would meet the requirements of state implementation plans and smoke management plans. Laws and regulations on smoke emissions can limit opportunities to conduct prescribed burning. These limitations are most frequently encountered in high population density areas.

Climate Change

As climate changes, the number of large, severe fires could continue to increase. Many of these ecosystems that historically burned under low to mixed severity are now burning with higher severities. Climate changes could also reduce the potential for some species to naturally regenerate and increase the potential for more disturbance-adapted species that could reduce the resiliency of ecosystems. The current and potential increase of fire frequency and severity could also increase water temperatures, increase sedimentation, and alter or loss of wildlife habitat (EcoAdapt 2014). Adapting landscapes to climate change and future wildfires will require more active management to open canopies of dry pine and moist mixed conifer species where fire resilient and larger size trees are favored. It will also require removing ladder fuels of smaller size class and fire intolerant tree species that compete for limited resources such as moisture, light, and growing space. Ultimately, promoting adaptation to climate change and future wildfire will require restoring landscapes to function within their historic fire regime (Hessburg et al. 2022).

Livestock Grazing

In all alternatives, livestock grazing would occur on portions of the Nez Perce-Clearwater. Plan components would enable grazing activities to complement fire management, such as reducing fine fuels to lower fire risk. However, grazing can alter grassland and shrubland fire regimes through soil disturbance, increased competition from non-native annual grasses, and reduction in fine fuels (Knick et al. 2005). Duration and intensity of grazing could affect prescribed fire implementation by reducing available fuels. Location and timing of grazing could also affect prescribed fire implementation by restricting available burn units. Coordination with affected grazing allotment permittees should occur for all fuels treatments to meet objectives.

Timber

Consequences from timber management for all alternatives could complement fuels management by reducing fuel loads and increasing resilient landscapes. Vegetation treatments would need to be designed and implemented to achieve multiple resource social and economic objectives, as well as those associated with fuels management. However, there are differences with the number of acres of timber harvest activity within each of the action alternatives. Timber harvest treatments in conjunction with prescribed fire could help moderate fire behavior and will help to reduce the overall risk to resources and communities. All alternatives also recognize that not all fire is detrimental to timber production. Therefore, there is opportunity to allow wildfires to burn to help maintain and restore fire adapted ecosystems.

Watershed, Soil, Riparian and Aquatic Management

Plan components recognize that wildland fire, along with mechanical fuels treatments, will play a key role in maintaining and restoring watersheds and riparian ecosystems. Consequences from these components would be generally similar for all alternatives. However, in order to meet the plan direction associated with these resources there could be occasions where prescribed fires or mechanical treatments cannot be used if there are potential negative effects to aquatic and riparian-associated resources. Fuels management activities occasionally require some soil disturbing activities or road construction, which may be limited to meet other plan components. Although it is difficult to quantify the effects, all the alternatives have components that would limit fire or fuels treatments for ecosystem maintenance or restoration.

All alternatives would contain components that limit equipment use on steep slopes. However, the revised plan alternatives also include guidelines that require a minimum amount of organic matter to be present following treatments, which may be difficult to achieve following prescribed fire in some cases. The revised plan alternatives also contain guidelines for the retention of snags and coarse woody debris, which would also factor in to prescribed burning prescriptions. Finally, the revised plan alternatives include the adoption of riparian management zones, which are similar in size to the riparian zones currently identified on the forest. The plan components associated with riparian management zones would also influence fuels treatments and fire suppression actions to ensure minimal impacts and ecological benefits.

In summary, all alternatives include plan components for the protection of water, soil, and aquatic resources. The components for the revised plan alternatives are similar to those in the current plans.

Wildlife

In general, wildlife management direction has low impact on fire risk, fire management, and ecosystem resiliency to fire. The management direction recognizes the importance of managing vegetation for fuels reduction and vegetation structure and composition across the Nez Perce-Clearwater that is consistent with natural range of variation.

The Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f) recognized the importance of fuel treatments within the wildland urban interface as designated by the Healthy Forest Restoration Act. However, opportunities to conduct vegetation treatments, including prescribed fire or mechanical fuels reduction treatments, outside the wildland urban interface are limited under current lynx management direction. The restrictions on treatments within these forest conditions are likely to reduce the ability and effectiveness of achieving desired forest and fuel conditions outside the wildland urban interface, for reasons summarized below.

Restrictions from lynx management direction on treatment in multistory hare habitat and young seedling and sapling forests have the greatest impact. These forest conditions are widespread in the plan area due to dominant subalpine fir and spruce forest, as well as using fire as a natural disturbance process to create large areas of seedling and sapling forest. Thinning of dense sapling stands is typically designed to create future forests composed of larger trees and desired species such as fire resistant Western larch. These forests are more resilient in the face of future wildfire events and may burn less severely, reducing potential future impacts to values at risk. Thinning in most dense seedling and sapling stands outside the wildland urban interface is not allowed under current management direction. Treatments in multi-story forests that provide hare habitat that would result in it no longer qualifying as multi-story hare habitat is also not allowed outside wildland urban interface, thereby limiting the Nez Perce-Clearwater’s ability to manage landscape patterns and fuel conditions across some portions of the Nez Perce-Clearwater to achieve desired conditions. The use of unplanned wildfire ignitions to achieve desired conditions is frequently infeasible due to seasonal changes in weather and fuel conditions.

Conclusion

Fire is a critical ecological function that plays a central role in providing quality habitat for both plant and wildlife species. Table 102 contains a summary of annual fire management consequences by alternative. All alternatives would ensure fire remains a part of the ecological system and would move the Nez Perce-Clearwater towards desired future conditions. This is achieved through a variety of management actions, including wildland fire and mechanical treatments.

Table 102. Potential consequences to annual fire management (in acres), by alternative.

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Restoration and Maintenance of Ecological Role of Fire/Year[1]	35,700[2]	35,828	34,825	35,742	43,844	36,026
Future Fuels Treatments/Year	9,905	22,922	23,925	23,008	14,906	22,724
Fire Management Flexibility[3]	353,172	931,578	0	419,584	735,931	320,059

[1]Unplanned natural fire managed to meet forest plan desired conditions and objectives.

[2]Acres of unplanned fire managed for resource benefit over the past 10 years under the current plans.

[3]Denotes acres of special management considerations, such as recommended wilderness and suitable wild and scenic river designation, where certain treatments may not be allowed.

Future wildfire and fire regimes: The projected levels of future wildfire, and their subsequent impact on fire regimes, are generally the same across alternatives because vegetation over time is generally the same for all alternatives and projected future treatments are also similar. Factors such as climate have a greater bearing on vegetation change and potential wildfire activity than active management.

Future fuels treatments: The No Action Alternative would achieve the least amount of fuel reduction and prescribed fire in forested areas, followed by Alternative Z. This is due to the projection of meeting vegetative desired conditions in 100 years. Alternatives W, X, Y, and the Preferred Alternative would treat similar amounts of acreage over the course of the plan. All alternatives would tend to treat more acres than the current plans. Alternative X would treat the most acres due to the projection of meeting desired conditions in the shortest amount of time. However, other factors affect the number of acres treated to meet the revised plan desired conditions relating to fire and fuels management. Some of these factors include budget allocation, climate and seasonal weather variation, and wildfire occurrence. Budget has direct affects to the extent the National Forest can treat mechanically and with prescribed fire. Climate and seasonal weather variation affect the ability to conduct prescribed burns. Wildfire activity requires the use of personnel and other resources that would be used for implementing mechanical and prescribed fire treatments.

Flexibility for fire management: Different management designations, specifically recommended wilderness, affect where management tools, such as mechanical treatments, can be used. The current plans and Alternatives W, Y, Z, and the Preferred Alternative would all limit mechanical treatment options within recommended wilderness areas and eligible and suitable wild and scenic river areas, with Alternative Y having the most area restricted. If these areas became designated wilderness or designated Wild and Scenic rivers, then additional constraints on treatments would exist. Alternative X has the greatest flexibility for fire and fuels management, followed by the Preferred Alternative, the current plans, and Alternatives Y, Z, and W.

3.2.5 Invasive Species

This section addresses invasive species management. The mission of the Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. Invasive species are among the most immediate environmental and economic threats facing the Nation's forest, grassland, and aquatic ecosystems, endangering native species and threatening ecosystem services and natural resources (U.S. Department of Agriculture 2013a).

A species is considered to be invasive if it meets two criteria: 1) it is non-native to the ecosystem under consideration, and 2) its introduction causes, or is likely to cause, economic or environmental harm, or harm to human, animal, or plant health (Executive Order 13571). Invasive species include all taxa, including plants, vertebrates, invertebrates, and pathogens.

An invasive species can drastically modify or disrupt the ecosystem it colonizes. Although invasive species often adapt to habitats where they are not native, they lack the natural controls, such as predatory insects and disease, that may have evolved with them within their native ranges. As a result, they tend to spread aggressively and reduce overall native community diversity and generally disrupt the natural processes of the environment. Invasive species displace native species, reduce forage for some animal species, degrade natural communities, change hydrology, change microclimatic features, increase soil erosion, alter wildfire intensity and frequency, and cost land management agencies millions of dollars in treatments (U.S. Department of Agriculture 2001a). Invasive species concerns on the Nez Perce-Clearwater are primarily associated with invasive terrestrial and aquatic plants and aquatic invertebrates. Invasive plants can compete and displace desirable native vegetation, alter effective ground cover, and disrupt natural ecological processes. Aquatic invasive species are non-native plants, animals, and microorganisms living in aquatic habitats that have the potential to impair aquatic ecosystem conditions.

Changes Between Draft and Final

Comments received since the publication of the proposed action and Draft Environmental Impact Statement have been used where appropriate to improve the Land Management Plan and have helped inform the Final Environmental Impact Statement. An additional goal was added to emphasize working with other agencies, groups, and adjacent landowners to support integrated invasive species management. The desired conditions were consolidated with more focus on retaining ecosystem resilience and biodiversity. Multiple minor changes were made in the Final Environmental Impact Statement; all changes are within the scope of the Draft Environmental Impact Statement analysis and address issues that the public had an opportunity to comment on. As a result of public input, an additional alternative was developed. The Preferred Alternative is a compilation of portions of the other alternatives analyzed in detail in the Draft Environmental Impact Statement. Analysis of the Preferred Alternative for invasive species is similar to the other action alternatives.

Relevant Laws, Regulations, and Policy

Federal Laws

Federal Insecticide Fungicide and Rodenticide Act of 1947, as amended (Pub. L. 92-516): This act requires all pesticides to be registered with the Environmental Protection Agency. It also states that it is unlawful to use any registered pesticide in a manner inconsistent with its labeling.

Carlson-Foley Act of 1968 (Pub. L. 90-583): This act authorizes and directs the heads of Federal departments and agencies to permit control of noxious plants by state and local governments on a reimbursement basis in connection with similar and acceptable weed control programs being carried out on adjacent non-federal land. In other words, this act permits county and state officials to manage noxious weeds with herbicides on federal lands and to be reimbursed for that management, given that other applicable laws, such as the National Environmental Policy Act are also met.

Federal Noxious Weed Act of 1974, as amended (Pub. L. 106-224): This act states that each federal agency shall establish and adequately fund an undesirable plant management program, complete and implement cooperative agreements with state agencies regarding the management of undesirable plant species on federal lands under the agency's jurisdiction, and establish an integrated management system to control or contain undesirable plant species targeted under cooperative agreements.

Federal Land Policy and Management Act of 1976 (Pub. L. 94-579): This act provides authority to federal agencies to control weeds on rangelands as part of a rangeland improvement program.

National Invasive Species Act (NISA): This act was passed in 1996 amending the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990. It includes regulations to prevent the introduction and spread of aquatic invasive species from entering inland waters through ballast water carried by ships and other watercraft, the development of state management plans and regional panels to combat the spread of aquatic nuisance species, and additional aquatic nuisance species outreach and research.

Plant Protection Act of 2000: This act consolidates and modernizes all major statutes pertaining to plant protection and quarantine, including the Federal Noxious Weed Act and the Plant Quarantine Act, and permits the Animal and Plant Health Inspection Service to address all types of weed issues. It also authorized the Animal and Plant Health Inspection Service to take both emergency and extraordinary emergency actions to address incursions of noxious weeds.

Executive Orders

Executive Order 13112 (Feb. 3, 1999): This order directs federal agencies to prevent the introduction of invasive species, detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner, to monitor invasive species populations accurately and reliably, to provide for restoration of native species and habitat conditions in ecosystems that have been invaded, to conduct research on invasive species and develop technologies to prevent introduction, to provide for environmentally sound control of invasive species, and to promote public education on invasive species and the means to address them. All of these actions are subject to the availability of appropriations (Clinton 1999).

Executive Order 13751 (Dec. 8, 2016): Safeguarding the Nation from the Impacts of Invasive Species: This order Amends EO 13112 and directs coordinated Federal prevention and control efforts related to invasive species; incorporates considerations of human and environmental health, climate change, technological innovation, and other emerging priorities into Federal efforts to address invasive species; strengthens coordinated, cost-efficient Federal action; and revises several definitions.

National Forest System Policy

Forest Service Manual 2900 - Invasive Species Management: This policy ensures that forest management activities are designed to minimize or eliminate the possibility of establishment or spread of invasive species on National Forest System lands or to adjacent areas (U.S. Department of Agriculture 2011a). The Manual mandates management activities for aquatic and terrestrial invasive species (including vertebrates, invertebrates, plants, and pathogens) will be based on an integrated pest management approach on all areas within the National Forest System, and on areas managed outside of the National Forest System under the authority of the Wyden Amendment (P.L. 109-54, Section 434), prioritizing prevention and early detection and rapid response actions as necessary.

Forest Service Manual 2070 - Vegetation Ecology: This policy provides direction for the use of native and non-native seed use on National Forest System lands. It specifically emphasizes the use of native seed mixes in all revegetation, rehabilitation, and restoration projects on National Forest System lands.

Forest Service Manual 2150 - Pesticide Use Management and Coordination: This policy provides direction on the use of pesticides as part of an integrated pest management approach. Additional guidance is provided in the Pesticide Use Management Handbook (FSH 2109).

State and Local Law

Idaho Invasive Species Act of 2008: This act provides policy direction, planning, and authority to combat invasive species infestations throughout the state and to prevent the introduction of new species that may be harmful.

Idaho Code Title 22 Chapter 24 - Noxious Weeds: This law defines State of Idaho noxious weeds and identifies landowner and agency responsibilities and penalties for violations. It also establishes Weed Control Advisory Committees and authorized cooperative agreements.

Idaho Department of Agriculture, Rule 02.06.09 - Rules Governing Invasive Species and Noxious Weeds: This rule governs the designation of invasive species, inspection, permitting, decontamination, record keeping, and enforcement and applies to the possession, importation, shipping, transportation, eradication, and control of invasive species. The rule also identifies those noxious weeds which have been officially designated by the Idaho Department of Agriculture Director as noxious weeds in the State of Idaho, designates articles capable of disseminating noxious weed, requires treatment of articles to prevent dissemination of noxious weeds, and provides the authority to designate cooperative weed management areas for the management of noxious weeds. In addition, this rule governs the inspection, certification, and marking of noxious weed free forage and straw to allow for the transportation and use of forage and straw in Idaho and states where regulations and restrictions are placed on such commodities.

Other Regulation, Policy, and Guidance

Forest Service National Strategic Framework for Invasive Species Management of 2013: This framework provides broad and consistent strategic direction on the prevention, detection, and control of invasive species. This policy directs the Forest Service to 1) determine the factors that favor establishment and spread of invasive plants; 2) analyze invasive species risks in resource management projects; and 3) design management practices that reduce these risks.

National Road Map for Integrated Pest Management, Revised September 2018: The goal of the National Road Map for Integrated Pest Management is to increase the adoption and efficiency of effective, economical, and safe integrated pest management practices. The Road Map is intended to be updated periodically by the Federal Integrated Pest Management Coordinating Committee.

Annual National Forest Service Invasive Species Program Management Program Direction and Business Area Requirements: This document provides National Forest System invasive species management program direction and business areas for the management of all aquatic and terrestrial invasive species on all National Forests and Grasslands and on adjacent areas under the provisions of the Wyden Amendment. It provides annual guidance on work activity planning, record keeping, and reporting and program performance.

Region One Weed Free Forage and Mulch Order: The purpose of this order is to restrict the introduction or spread of noxious weeds on National Forest System lands. The order prohibits possessing, storing, and transporting straw, hay, grain, seed, or other forage or mulch product without proper documentation and markings by a State of Idaho certification program that meets or exceeds the North American Weed Free Forage standards.

Methodology

The quantitative analysis focuses on invasive plants. Other invasive species are analyzed qualitatively due to lack of quantitative data. The geographic scope of the analysis for invasive plant species is the National Forest System lands of the Nez Perce-Clearwater. This area represents the area where changes may occur to invasive species or their habitats from Forest Service management actions. For cumulative effects, the analysis area also includes the non-National Forest System lands within, and adjacent to, the administrative boundary of the Nez Perce-Clearwater. For the purposes of this analysis, the temporal scale is considered the anticipated 15-year life of the plan.

Analysis Methods, Information Sources, and Assumptions

The 2012 Planning Rule identifies invasive species as a “stressor” to natural processes. It requires the responsible official to consider stressors when developing plan components for integrated resource management in order to provide for ecosystem services and multiple uses in the plan area. The degree to which invasive plant species create stressful conditions to other natural processes is based upon a variety of factors, including weed growth characteristics, weed density, site favorability, health and stability of the native plant community, and the ability of the invasive plant to spread. Management related influences, such as removal of vegetation, active soil disturbance, and inadvertent movement of invasive plants or weed seed, are important contributors to weed introduction, establishment, and spread.

Pathways are the means and routes by which invasive species are introduced into new environments. Pathways can generally be classified as either natural or human mediated. Natural pathways are those not aided by humans and include wind and other forms of natural dispersal that can bring species to a new habitat. Human-mediated pathways are those which are created or enhanced by human activity and are intentional or unintentional. Intentional pathways are the result of a deliberate movement of a species by humans outside of its natural range, such as the introduction of biological control organisms or the movement of species for the horticultural or pet trade. Unintentional pathways are the inadvertent movement of species as a byproduct of some other human activity. For example, transferring spores or seed of invasive species by vehicles, equipment, livestock, pack stock, or recreational gear and the movement of aquatic invasive species from recreational watercraft and ballast water discharge. The term "vector" is viewed as a biological pathway for a disease or parasite, such as an organism that transmits pathogens to various hosts and is not completely synonymous with the much broader definition of a pathway.

In general, the analysis assumes removal of ground cover and increased ground disturbance corresponds with increased risk of invasive plant establishment. An increase in pathways also corresponds to a higher potential for invasive plant dispersal and spread. Roads, trails, livestock, and ground disturbance from recreation use, wildland fire, and timber harvest and fuels treatments can provide ideal pathways for the introduction of invasive species.

The analysis also assumes that the Nez Perce-Clearwater will follow all laws, regulations, and policies that relate to managing National Forest System land. The Land Management Plan is designed to supplement, not replace, direction from these sources. Other Forest Service direction, including laws, regulations, policies, executive orders, and Forest Service directives found in manuals and handbooks, are not repeated in the Land Management Plan.

Survey, inventory, and treatment data are stored in the Natural Resource Manager’s Threatened, Endangered, and Sensitive Plants and Invasive Species national database. This database is continually updated. Accomplishment reports are generated at the beginning of each fiscal year, and forest plan monitoring reports are generated every two years. Inventory records do not represent all infestations and are primarily associated with project, treatment, and early detection efforts. Treatment records represent fiscal year activity priorities. Many areas of the Nez Perce-Clearwater have not yet been inventoried for invasive species infestations, including wilderness and other remote areas. There is also a lack of information on areas that are weed free. The Natural Resources Manager database is continually updated with field observations that are reported by Forest Service personnel and contactors. It is assumed that the establishment of new undocumented invasive plant infestations has likely occurred and is not reflected in the existing condition description for invasive plant infestations.

Measurement Indicators

Risk of invasive species introduction, establishment, and spread are assessed by evaluating the difference in frequency, intensity, or type of management activity or natural processes by alternative, insofar as they may potentially remove ground cover and increase ground disturbance or pose as pathways. Table 103 outlines the indicators and measures used to compare differences between alternatives associated with invasive plant species.

Table 103. Invasive plant species measurement indicators.

Indicators	Measures
Potential soil disturbance prone to introduction by invasive plants	• Acres of ground disturbing activities, specifically timber harvest and fuels treatments and prescribed fire • Acres affected by livestock grazing, measured as a qualitative assessment of disturbance from livestock grazing and management practices.
Pathways for invasive plant spread, including recreational travel, livestock grazing, and timber harvest and fuels treatment activities	• Change in summer recreation opportunity spectrum • Risk of opportunity for recreation travel on open roads and trails that serve as a pathway for weed spread • Acres of projected timber harvest and fuels treatment • Risk of invasive plant spread from livestock grazing in transitory range

Affected Environment

Existing Condition

Invasive species are among the most immediate environmental and economic threats facing National Forest System lands, grassland, and aquatic ecosystems, endangering native species and threatening ecosystem services and natural resources (U.S. Department of Agriculture 2013a). Infestations are difficult to manage and can substantially change biological diversity by affecting the amount and distribution of native plants and animals. They can also have negative effects on forest regeneration, wildlife and livestock forage, native plants associated with tribal rights, landscape and soil productivity, fire cycles, nutrient cycling, riparian and hydrologic function, water quality, and human recreational activities (U.S. Department of Agriculture and U.S. Department of the Interior 2000).

The Nez Perce Tribe has ancestral and treaty-reserved rights to uses and resources on the Nez Perce-Clearwater. Invasive species pose a potential serious threat to the diversity, integrity, and health of native plant communities that are of tribal importance. Invasive plants can reduce the abundance and health of culturally important native plants by invading sacred landscapes, displacing native plants in traditional gathering sites, and stunting or reducing native plant growth or development (Pfeiffer and Steuter 1994).

The State of Idaho is responsible for overseeing and directing noxious weed management. The term noxious weed is a legal designation and is defined by Idaho Code (State of Idaho n.d.) as "any plant having the potential to cause injury to public health, crops, livestock, land or other property; and which is designated as noxious by the director of the department of agriculture." Management priorities, objectives, and activities on the Nez Perce-Clearwater are coordinated and collaborated through multiple partnerships, such as Cooperative Weed Management Areas, the Idaho Invasive Species Council, and the Idaho Weed Control Association. Currently, the Idaho State Department of Agriculture recognizes 54 terrestrial invasive plant species or noxious weeds within the State of Idaho (Idaho State Departement of Agriculture 2023).

Forest Service policy (specifically Executive Order 13112; Forest Service Manual 2900) and the national invasive species strategic framework (U.S. Department of Agriculture 2013a) identify prevention of the introduction and establishment of non-native plant species as an agency objective. This policy directs the Forest Service to determine the factors that favor establishment and spread of invasive plants, analyze invasive species risks in resource management projects, and design management practices that reduce these risks.

Allocation of funding seldom corresponds to the magnitude and potential threat of invasive species on the Nez Perce-Clearwater. Widely fluctuating funding levels hinder effective programs. Long-term prevention and control efforts require consistent annual commitment to be successful. The easiest and least expensive method of control is prevention. Awareness by land managers and the public is the key factor in a successful prevention program. Methods used to prevent invasive species from being introduced and spreading into new areas include closing infested areas to travel, washing vehicles and equipment upon entering an area, requiring the use of weed-free hay for pack animals, and using weed-free seed and straw mulch for revegetation. Manual, mechanical, biological, and chemical methods of treatment are generally limited to localized areas and those species on the State of Idaho noxious weed list. Infestations in some sites have been reduced by these measures. However, in spite of these control efforts, existing infestations continue to invade disturbed areas and intact plant communities. It is still common to see invasive plants along many roadsides, log landings associated with timber harvest, gravel pits, and other disturbed areas.

Presence and amount of invasive species is a key indicator for overall ecosystem health. The 2011 watershed condition framework assessment for the Nez Perce-Clearwater identified that terrestrial invasive species affected less than 10 percent of an HUC12 subwatershed in 94 of 220 subwatersheds and affected 20 to 25 percent of a subwatershed in 69 subwatersheds. However, 57 subwatersheds out of 220 were identified as having an invasive species footprint on over 25 percent of a subwatershed.

Current Invasive Plant Infestations

Invasive plant inventories for the Nez Perce-Clearwater record 80 different invasive plant species, occupying approximately 394,040 acres, or approximately 10 percent of the Nez Perce-Clearwater. Table 104 lists a few the more notable species and amount of infested acres.

A majority of recorded infestations on the Nez Perce-Clearwater are associated with past disturbances. Approximately 46 percent of the current inventoried invasive plant infestations occur within ½ mile of major transportation routes (system roads and trails). Approximately 14 percent of the inventoried infestations on the Nez Perce-Clearwater are within 50 feet of major system roads and trails.

Some landscapes are more susceptible to invasion than others due to the productivity of the sites and the similarity of environmental conditions from where the plant originated. The degree of susceptibility of a location can affect the rate of spread and the extent or size of the infestation. Invasive plant species, including those that are formally designated by states as noxious weeds, have disrupted natural processes on nearly 100 million acres in the United States and are spreading at an estimated rate of 14 percent per year (U.S. Department of Agriculture 2001a). Invasive weeds are spreading within National Forest System lands at a rate of 8 to 12 percent per year (U.S. Department of Agriculture 1998a).

Additional inventory and monitoring are needed to determine the actual rate of spread on the Nez Perce-Clearwater. Existing information suggests that the rate of spread is greater on the drier, low elevation plant communities. Cheatgrass (*Bromus tectorum*), along with other annual brome grasses, ventenata (*Ventenata dubia*), and medusa head (*Taeniatherum caput-medusae*) have become dominant in some of the low elevation bunchgrass communities.

Many roadless and wilderness areas remain relatively weed free because of healthy undisturbed native plant communities where few mechanisms exist to spread invasive species. Early detection and treatment of invasive plant species in these relatively weed free areas is a management priority.

Some invasive plants have become well-established and continue to increase in dominance within native plant communities. Expansion in some areas is out-pacing containment and control efforts. New infestations along roads and trails, both on National Forest System lands and on adjacent state and private lands, are occurring. Invasive plant species that have the ability to infest and impact large areas, listed in Table 104, are of particular concern.

Table 104. Invasive plant species common name and scientific name and infested acres on the Nez Perce-Clearwater.

Common Name	Scientific Name	Infested Acres
Spotted knapweed	*Centaurea stoebe ssp. micranthos*	160,623
Rush skeletonweed	*Chondrilla juncea*	17,900
Yellow star-thistle	*Centaurea solstitialis*	106,177
Meadow hawkweed	*Hieracium caespitosum*	19,699
Orange hawkweed	*Hieracium aurantiacum*	3,652
Common crupina	*Crupina vulgaris*	14,630
Dalmatian toadflax	*Linaria dalmatica*	1,760
Scotch thistle	*Onopordum acanthium*	6,715

Data Source: Forest Service Natural Resources Management database, accessed March 2021.

Spotted knapweed is by far the most rapidly spreading invasive species on the Nez Perce-Clearwater. This aggressive plant functions primarily as a pioneer species on disturbed sites, although it has also evolved the capability to invade already occupied sites. Knapweed's extremely aggressive character is compounded by its long-lived seed. Yellow star-thistle, like many destructive weeds, can produce several thousand seeds per plant, many of which may remain alive and dormant in the soil for several years.

Some landscapes are more susceptible to invasive species invasion than others due to the similarity of environmental conditions in the area where the invading plant originated and the productivity of the site being invaded. The dry, low-elevation grasslands and open pine timber stands of the Salmon River and Clearwater River canyons are particularly prone to invasive weed establishment. These drier habitats are often similar in climate to that of the native range of the invasive weeds. This susceptibility can affect the rate of spread and the extent or size of infestations.

The introduction of invasive weeds has highly altered grassland steppe communities within the South Fork Clearwater Subbasin. Annual grasses and other invasive weeds are well established at low elevations. Fire behavior and soil productivity may change in response to these altered plant communities (U.S. Department of Agriculture 1998b).

The occurrence of invasive species within the Salmon River Canyon, including the Frank Church-River of No Return Wilderness, is of concern to managers and wilderness users due to the potential adverse ecological effects of these invaders (U.S. Department of Agriculture 2007g). Invasive plants threaten every aspect of ecosystem health and productivity in forests and rangelands and on public and private lands (U.S. Department of Agriculture 1998b). Many invasive plants are aggressive and can invade new areas at an alarming rate because of explosive seed production and physiological adaptations to disturbed or droughty sites. Aggressive invasive species, such as purple loosestrife, yellow star-thistle, rush skeletonweed, and spotted knapweed, are capable of outcompeting native plants and altering ecosystem conditions and processes.

Invasive plants are also a growing concern in the Selway-Bitterroot Wilderness and surrounding areas. Without adequate control measures, invasive plants will continue to expand into new areas and the number of new species will increase. Invasive plants threaten wilderness values in the Selway-Bitterroot Wilderness, namely native plant communities and natural ecosystems. Invasive species are a threat to the flora and fauna associated with or dependent upon the native plant communities being displaced; in addition, physical regimes, such as those associated with fire and hydrology may be altered. These natural functions and features of the landscape are a cornerstone of wilderness values (U.S. Department of Agriculture 2009c).

Over an 8-year period (FY 2015-2022), a total of 77,616 acres of invasive plants were treated on National Forest Systems lands on the Nez Perce-Clearwater (Project record citation and footnote), averaging approximately 9,700 acres per year. Specific treatment levels vary depending on program funding levels and project priorities. Treatments are primarily chemical herbicide applications but also included manual, mechanical, and biological controls. There has been no aerial application of herbicides on the Nez Perce-Clearwater. Treatments were accomplished by Forest Service personnel, through contract specifications, and through participating agreements with county weed districts and other partners. Given the limited funding levels, the Nez Perce-Clearwater has developed a management strategy that gives priority to prevention and the early detection and rapid response tactic. Secondary priorities for treatment include areas disturbed by road maintenance or construction, wildland fire, and vegetation management and fuels treatment projects; pathway routes such as roadsides and recreation sites; and areas with specific funds designated for invasive species treatments.

Mechanisms for the spread of invasive species are road maintenance equipment, log haul trucks, all-terrain or off-highway vehicles, passenger cars and trucks, and livestock. Seeds of many species are also wind or animal dispersed (wildlife and livestock). Roads, trails, and rivers have been identified as the primary conduits or pathways for invasive plant establishment and spread (Interior Columbia Basin Ecosystem Management Project 1997). Managers face a continued threat from potential new invasive species. The use of recreational vehicles and watercraft, riding and pack stock, livestock grazing, and fire suppression activities may exacerbate the spread of potential new invasive species. The threat of aquatic invasive species has become more of a concern on the Nez Perce-Clearwater in the last decade. Although there were no detections of Dreissenid mussels in the 2020 monitoring season, there have been consistent detections of Asian clams (*Corbicula fluminea*) throughout the Snake River from the Twin Falls, Idaho area downriver to Lewiston, Idaho. The Nez Perce-Clearwater is highly susceptible to the introduction of this species. Many endemic gastropods are found in the major river systems, particularly in the Salmon River. The sheer number of endemic aquatic species within the planning area is notable and exemplary within the western United States and are highly susceptible to impacts from increases in aquatic invasive species. The spread of aquatic invasive species can occur through various pathways including discharging ballast water, moving watercraft between water bodies without removing invasive plants and animals, and releasing bait into water bodies.

Invasive species cause undesirable ecological impacts. Species arrived in this country with few or no natural pathogens or controlling agents, such as insects, increase in density and out-compete native species. Terrestrial and aquatic invasive species are capable of successfully expanding their populations into new ecosystems and can create lasting negative impacts to native plant communities. Impacts from noxious weeds can be exacerbated by fire, native pests, weather events, human actions, and environmental change (U.S. Department of Agriculture 2013a).

Disturbance is widely recognized as a primary influence on plant community composition and is frequently implicated in the spread of invasive weeds (Hobbs and Humphries 1995). Disturbance is defined as “any relatively discrete event in time that disrupts ecosystem, community, or population structure and changes resources, substrate availability, or the physical environment” (White and Picket 1985). Parks et al. (2005) examined the patterns of invasive plant diversity in northwest mountain ecoregions and found an overwhelming importance of disturbance in facilitating the establishment of non-native plants. Disturbances can occur as a result of natural events, such as wildfire, floods, wind events, and animal disturbances. Disturbance can also result from human activities, such as construction of roads and trails, timber harvest and fuels treatments, site preparation, prescribed fire, livestock grazing, and off-road use of all-terrain vehicles and utility vehicles. Fire suppression efforts can also result in disturbances by clearing vegetation and exposing mineral soils. Fire-line disturbances create suitable conditions for many non-native species to become established (Parks et al. 2005).

At local scales, invasive species composition and abundance are generally highest in and around disturbed patches, corridors, and edges, such as riparian corridors, transportation corridors, and fuel treatments (Benninger-Traux et al. 1992, Gelbard and Belnap 2003, Larson 2003). Buckley et al. (2003) found that features common in timber harvest areas, such as skid trails, landings, and haul roads are likely to support populations of non-native plants. Their research also suggests that haul roads, skid trails, and main forest routes serve as primary conduits for entry of introduced species into the interior of managed stands. At regional or landscape scales, composition and abundance of non-native invasive plants tend to be lower in protected or undeveloped areas than in human-dominated landscapes or landscapes fragmented by human use (Barton and Crispin 2003). Although, natural disturbance can be a major contributor to increases in invasive species abundance, most of today's invasive plant problems arise from past and present human activities (Hobbs and Humphries 1995).

It is Forest Service Policy (FSH 2109.14-53) that post-treatment evaluation be conducted for all projects involving pesticides. Treatment efficacy data transcends into the overall program performance outcome measure. The objective of the treatment effectiveness monitoring is to evaluate performance by measuring the changes in the characteristics of the infestation as a result of treatment activities. By monitoring the treatment results over time, a measure of overall programmatic treatment efficacy can be determined and an adaptive management process can be used in subsequent treatment activities.

National Invasive Species Program and Budget Guidance requires monitoring treatment effectiveness of 50 percent of acres treated each fiscal year. For example, if 1000 acres were treated in the current fiscal year then 500 acres of any treatment must be monitored for effectiveness. This is documented in the annual accomplishment report.

For the time period 2015 to 2022, the Nez Perce-Clearwater monitored approximately 74,000 acres, or 9,250 average acres annually. Treatment was successful in killing most of the target species population. The efficacy for treatments was on average 89 percent for mechanical/physical treatments and 83 percent for herbicide application treatments. Overall, 76 percent of the treated acres were restored during eight year time period. An area treated against invasive species has been 'restored' when the targeted invasive species was controlled or eradicated directly as a result of the treatment activity.

Environmental Consequences

Effects Common to All Alternatives

Management Direction under All Alternatives

Management under all alternatives would aim to slow the introductions and spread of new invaders, as well as prevent existing invasive species from establishing new non-infested areas. The Nez Perce-Clearwater would continue to manage invasive species with the most effective options in conjunction with partners. The Nez Perce-Clearwater would continue to conduct weed treatments with the most effective options as they become available and to implement mitigations, such as using the weed free forage program and enforcing vehicle and equipment washing and inspections for contract work.

Forest Service Manual 2900 – Invasive Species Management – sets National Forest System policy, responsibilities, and direction for the prevention, detection, control, and restoration of the effects from aquatic and terrestrial invasive species, including vertebrates, invertebrates, plants, and pathogens. This invasive species systems approach is also outlined in the Forest Service National Strategic Framework for Invasive Species Management (U.S. Department of Agriculture 2013a). Forests must initiate, coordinate, and sustain actions to prevent, control, and eliminate priority infestations of invasive species in aquatic and terrestrial areas of the National Forest System using an integrated pest management approach, and collaborate with stakeholders to implement cooperative invasive species management activities in accordance with law and policy. All National Forest System invasive species management activities will be conducted within the following strategic objectives:

Prevention is a proactive approach taken to manage all aquatic and terrestrial areas within the National Forest System in a manner to protect native species and ecosystems from the introduction, establishment, and spread of invasive species. Prevention can also include actions to design public-use facilities to reduce accidental spread of invasive species and actions to educate and raise awareness with internal and external audiences about the invasive species threat and respective management solutions. Prevention measures include cleaning and drying watercraft and equipment between watersheds, washing vehicles and equipment upon entering a project area, establishing weed-free staging areas for emergency and daily operations, and potentially closing infested areas to travel. In addition, the Nez Perce-Clearwater enforces the Regional Noxious Weed Order, which prohibits possessing, storing, and transporting straw, hay, grain, seed, or other forage or mulch products without documentation that it is certified as weed free by a state certification process that meets or exceeds the North American Weed Free Forage standards or similar standards. The Nez Perce-Clearwater provides education and outreach on prevention practices through the Play Clean Go, Clean Drain Dry, Don't Move Firewood, and Idaho Weed Awareness Campaigns.

Early detection and rapid response are important components of invasive species management for the Nez Perce-Clearwater and its collaborating partners. Early discovery and identification of newly arrived invasive species before they become widespread is critical to their eradication or control. Rapid response once a new invasive species is discovered is the most effective method for managing a newly arrived species. The Idaho State Department of Agriculture's annual monitoring program includes surveys and sample collection for invasive plants, snails, clams, mussels, and crayfish. The Idaho State Department of Agriculture and its partners continue to monitor Idaho waterways for various listed aquatic invasive species. To date, no evidence of Quagga mussels (*Dreissena bugensis*) or zebra mussels (*D. polymorpha*) has been found in Idaho or anywhere in the Columbia River Basin. The Nez Perce-Clearwater has been participating in a National Forest pilot program using mobile applications to involve the public in early detection of high priority invasive species.

Control and Management to actively reduce or eliminate invasive weed populations is required for an integrated pest management approach. This may include manual, mechanical, biological, and chemical ground-based herbicide applications. All treatment measures used on the Nez Perce-Clearwater have been reviewed and approved through site specific National Environmental Policy Act analysis. Invasive weed infestations have been reduced significantly by these integrated weed management techniques. However, despite these coordinated weed management efforts, invasive species infestations and the threat of introduction persists on the Nez Perce-Clearwater. In addition, climate studies indicate there may be generally warmer and drier conditions across the region. If this change occurs, there is a risk of higher severity wildfires, which may result in increased bare soil following a wildfire event. The combination of warmer and drier climate and higher severity wildfires may favor the proliferation of invasive weeds. The amount of weed infested acres to be treated each year by various methods is largely dependent upon annual funding availability.

Restoration is a strategy to pro-actively manage aquatic and terrestrial areas within the National Forest System to increase the ability of those areas to be self-sustaining, resistant, and resilient to the establishment of invasive species. Seeding temporary or closed roads to reduce the potential for introduction and expansion of invasive species infestations is an example of this strategy and has been occurring on the Nez Perce-Clearwater for many years. Desirable non-native mixes of grasses and forbs have been used in the past, but native grasses and forbs have been used more frequently in recent years.

Organizational Collaboration with other agencies, researchers, landowners, and interested groups increases the management effectiveness against invasive species infestations impacting or threatening Nez Perce-Clearwater resources. Cooperative weed management areas are organizations that coordinate noxious weed management goals and resources across jurisdictional boundaries. Cooperative weed management areas provide the mechanism that allows federal, state and local agencies, along with other stakeholders and landowners to set common objectives and priorities for the prevention and management of invasive weeds. The Nez Perce-Clearwater participates in five cooperative weed management areas – Palouse, Clearwater Basin, Upper Clearwater, Frank Church, and Salmon River. The Nez Perce-Clearwater also coordinates with the Idaho State Department of Agriculture in several of the agency's invasive species programs, such as the statewide aquatic invasive species management and control program focused on protecting the integrity of the state's water bodies from the biological degradation caused by aquatic plants and pests. Additionally, the Nez Perce-Clearwater works with the Nez Perce Tribe Bio-Control Center, which specializes in rearing and providing insect "agents" to help control or manage targeted invasive plants.

Invasive species management activities on the Nez Perce-Clearwater are guided by conditions and constraints of specific Environmental Impact Statements or Environmental Assessments for management and treatment, including:

- Nez Perce National Forest Noxious Weed Control Program Environmental Assessment (U.S. Department of Agriculture 1988c)
- Nez Perce National Forest Noxious Weed Treatment Biological Opinion (U.S. Department of Commerce 2009)
- Frank Church-River of No Return Wilderness Noxious Weed Treatments Final Supplemental Environmental Impact Statement (U.S. Department of Agriculture 2007g)
- Selway-Bitterroot Wilderness Invasive Plants Management Project Final Environmental Impact Statement (U.S. Department of Agriculture 2009c)
- North Fork Clearwater Ranger District Noxious Weed Treatment Environmental Assessment (U.S. Department of Agriculture 2005)
- Palouse Ranger District Noxious Weed Control Environmental Assessment (U.S. Department of Agriculture 2000b)
- Lochsa and Powell Ranger Districts Invasive Weeds Environmental Assessment (U.S. Department of Agriculture 2007b)
- Gospel-Hump Wilderness Invasive Plant Management Environmental Assessment (U.S. Department of Agriculture 2017a)

Per Forest Service policy found in Forest Service Manual 2900, it is required to determine the risk of introducing, establishing, or spreading invasive species associated with any proposed action as an integral component of project planning and analysis and, where necessary, provide for alternatives or mitigation measures to reduce or eliminate that risk prior to project approval.

Effects Common to All Alternatives

Invasive plant species would continue to have a presence on the Nez Perce-Clearwater landscape under all alternatives. Some species may contract in density as new treatment and biological options become available, while other weeds would expand in range and density. Some invasive species have become almost “naturalized” to vegetation communities on the Nez Perce-Clearwater, and some level of their presence would persist under all alternatives. Other invasive species have become well-established and continue to increase in dominance within native plant communities.

Invasive species have substantially increased across the Nez Perce-Clearwater over the last several decades, with a present infestation level of approximately 394,040 acres. Assuming the national average annual rate of spread of 8 to 12 percent per year (U.S. Department of Agriculture 1998a) applies, the Nez Perce-Clearwater could expect to encounter an increase in invasive plant infestations of approximately 31,000 to 47,000 acres per year.

Climate Change

Climate change is likely to result in differing responses among invasive plant species due to differences in their ecological and life history characteristics. As reported in the Northern Rockies Adaptation Partnership Vulnerability Assessment (Halofsky, Peterson, et al. 2018a), climate change could result in either range expansion or contraction of an invasive weed. For example, modeling indicates that leafy spurge may contract, and spotted knapweed may shift in range. Invasive weeds are generally adaptable, capable of relatively rapid genetic change, and many have life history strategies which can enhance their ability to invade new areas in response to changes in ecosystem conditions. Warmer temperatures and associated drier conditions, more severe or frequent droughts, and more favorable conditions for wildfire may increase the ability of invasive plants to establish and out-compete native plants. These changes may provide more opportunities for invasive weeds to gain an advantage over native species and spread within and beyond the project area boundaries. This potential effect is common to all alternatives.

The success of invasive plants in native plant communities is highly influenced by a variety of factors including temperature, precipitation, soil disturbance, and plant density (Pauchard et al. 2009, Poorter and Navas 2003, Eschtruth and Battles 2009). Temperature shifts can alter invasive weed dynamics. The greatest effect to plant communities from climate change rises from shifts in maximum and minimum temperatures rather than from change in annual mean temperatures (Stachowicz et al. 2002). These changes can give invasive species an early season start, resulting in increased growth and recruitment relative to native species (Traill et al. 2010).

The effects of climate change on invasive weed distributions are likely to be complex (Crimmins et al. 2011). Some studies predict a shift in the range of some invasive weed species to higher latitudes or higher elevations (Chen et al. 2011). Pauchard et al. (2009) suggest that the threat posed to high-elevation biodiversity by invasive plant species is likely to increase because of globalization and climate change. Other studies, such as Harsch and Lambers (2015), suggest that distribution shifts in response to recent climate change could occur in either an upward or downward direction.

Changing climate may affect other natural processes, which in turn may influence invasive weed populations and potential spread. Climate change may influence the effects of wildfire in a variety of ways, including increased fire intensity. Increased fire intensity may result in an increase in bare soil vulnerable to the establishment of invasive plant species. Other disturbances or shifts in historical patterns may be affected by climate change and, in turn, affect the spread of invasive species. As the agency responds to climate change by new, different, or more land and vegetation management actions, those disturbances could provide suitable conditions for invasive plants.

Increased Public Use and Mobility

Public uses on National Forest System lands are expected to grow substantially over the next several decades (Cordell 2012). Pressures on undeveloped, natural land for recreation purposes due to growth in the United States' population will be moderate to high throughout most of the west (Bosworth 2004). The potential for invasive species being introduced and spread by recreation and motorized travel is also expected to increase.

In addition, rapidly increasing global transportation is facilitating the distribution of exotic species among continents well beyond their native range (U.S. Department of Agriculture 2013a). Anderson et al. (2015) found that tourism is indeed a pathway for spread of non-native species across the globe. Since most invasive species in the United States originated in other countries, it is imperative that ways to minimize the global spread of invasive species are explored (Federal Interagency Committee for the Management of Noxious and Exotic Weeds 2003). As recreational uses of the forests increase and visitors come from distant locations, the risk of new invasive species being introduced to the forest is high. Since managers may not be familiar with identifying new species, new invasive species may go undetected for long periods. Once established, invasive species frequently have long lag times before they begin to exhibit dramatic effects. Introduced species that initially escaped many decades ago are only now being recognized as invasive (Federal Interagency Committee for the Management of Noxious and Exotic Weeds 2003).

Globalization is likely to increase within Idaho as the population of the state continues to grow. Globalization is defined as the free movement of goods, capital, services, people, technology, and information. It facilitates and intensifies the spread of invasive weed species (Meyerson and Mooney 2007). As a result, the extent and density of invasive plant infestations, as well as the number of invasive plant species, has the potential to increase on National Forest System lands within the plan area as commodity and recreational uses increase with a growing population.

Effects to No Action Alternative

Management Direction Under the Current Forest Plans

The 1987 Nez Perce and Clearwater Forest Plans, as amended, are the existing management direction being used by the Nez Perce-Clearwater to address non-native invasive plant species. This direction represents the No Action Alternative and is the baseline to which the action alternatives are compared.

The 1987 Forest Plan for the Nez Perce National Forest (U.S. Department of Agriculture 1987b) includes a forestwide objective under the Range section to emphasize noxious weed control. A forestwide standard under the Range section outlined the following weed control direction:

- Implement a weed control program to confine present infestations and prevent establishment of new areas of noxious weeds;
- The national forest will favor biological control for noxious weeds that have effective host insects;
- Where biological control is not effective, a combination of hand grubbing and spot application of herbicides will be used;
- This program will be coordinated with county, state, and other federal agencies; and

- All National Environmental Policy Act requirements will be completed prior to using any herbicide.

Additional Nez Perce National Forest Plan direction requires coordination with Idaho County on rights-of-way, road maintenance, law enforcement, noxious weed control, and other activities to produce mutual benefits. Management areas specific standards for range management include treating noxious weed infestations that threaten adjacent lands and emphasizing biological methods to control noxious weeds in allotments within the Rapid River Wild and Scenic River. The plan also outlined a projected noxious weed control output of 250 acres per year in the Range section.

The 1987 Forest Plan for the Clearwater National Forest (U.S. Department of Agriculture 1987a) includes a forestwide objective under the Range section to inventory, map, and complete an activity schedule for significant noxious weeds during the first planning period (10 years), with the focus on livestock grazing allotments. A forestwide standard specified that noxious weeds were to be controlled on a case-by-case basis if their presence conflicted with the range resource or become detrimental to other resources and uses. The plan also projected noxious weed treatment on 380 acres annually, with 300 acres occurring within range allotments and 80 acres along the recreational portion of the Middle Fork Clearwater Wild and Scenic River corridor.

The Clearwater National Forest Plan also identified the research needs to determine the autecology of specific noxious weeds and develop and evaluate probable biological control methods of those weeds. A noxious weed situation report was included as Appendix N in the Forest Plan and outlined existing condition and management guidance.

In 1995, the Chief of the Forest Service amended the Nez Perce and Clearwater Forest Plans to implement an interim strategy for managing anadromous fish-producing watersheds on National Forest System lands. The amendment included management direction for riparian areas (RA-3) to apply herbicides, pesticides, and other toxicants and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on listed anadromous fish.

Effects of the No Action Alternative

At the time the 1987 forest plans were developed, the extent and magnitude of ecological issues that invasive species would create for the Nez Perce-Clearwater were unforeseeable. The direction in the 1987 forest plans is very limited and primarily focuses on the control of noxious weeds. While an Integrated Weed Management approach exists as national Forest Service direction, it is not addressed in the current forest plans. Brief general statements about cooperating with other agencies and landowners are provided. Direction to improve the level of cooperation with adjacent landowners and sustain cooperative weed management programs is not provided. Under the No Action Alternative, the targeted amount of invasive species treatment acres is very low and focused primarily on livestock grazing allotments.

Despite the lack of specificity for invasive species management direction in the 1987 forest plans, they encompass current practices and are considered appropriate to address invasive plant species while being flexible to budget constraints. Prioritizing treatment areas and control strategies have been effective only to the extent that funding and resources have been available to implement them. There is still a trend of increasing weed introduction and spread given limited resources for prevention and treatment. Neither of the current plans contain direction related to aquatic invasive species.

Decisions for individual invasive weed environmental assessments and environmental impact statements provide more current guidance for invasive weed management on the Nez Perce-Clearwater and would continue to be available to treat infestations. These decisions included adaptive management strategies to determine where, when, and how to treat sites, considering such factors as weed species, treatment prioritization, and ecological importance of the site.

Effects Common to Action Alternatives

To develop a land management plan consistent with maintaining ecological sustainability, the plan must include plan components, including standards or guidelines, designed to maintain, restore, or promote the ecological integrity of terrestrial, riparian, and aquatic ecosystems; maintain the diversity of plant and animal communities; and support the persistence of native species within the plan area. (FSH 1909.12, Chapter 20, Section 23.1). To maintain or improve ecological integrity at the landscape scale, land management plans should include plan components that provide for opportunities for partnerships to support restoring ecological conditions at the appropriate geographic scale (FSH 1909.12, Chapter 20, Section 23.11b (5)(a)(6).

The Nez Perce-Clearwater Land Management Plan includes the following goals to emphasize the Nez Perce-Clearwater's intent to continue working with partners using an all lands approach to invasive species management:

- FW-GL-INV-01. The Nez Perce-Clearwater actively participates in Cooperative Weed Management Areas, which are used to determine weed treatment priorities, projects, budgets, and annual programs. Public awareness is promoted using various forms of outreach through the Cooperative Weed Management Areas.
- FW-GL-INV-02. The Nez Perce-Clearwater works with federal, state, and county agencies, tribes, non-government organizations, permittees, and adjacent landowners to support integrated pest management, including invasive species prevention, early detection, and rapid response, control and containment, restoration and rehabilitation, and inventory and monitoring activities.

Diversity of Ecosystems

As directed by the 2012 Planning Rule, land management plans must include plan components, including standards or guidelines, to maintain or restore the diversity of ecosystems and habitat types throughout the plan area. In doing so, the plan must include plan components to maintain or restore key characteristics associated with terrestrial and aquatic ecosystem types and rare aquatic and terrestrial plant and animal communities (36 CFR 219.9(a)(2)). To develop the Land Management Plan consistent with maintaining ecosystem diversity, the plan must include plan components, including standards or guidelines, designed to maintain, restore, or promote ecosystem diversity and habitat types. The diversity of terrestrial, riparian, and aquatic ecosystems and habitats is fundamental to providing ecological conditions that support the abundance, distribution, and long-term persistence of native species and diversity of plant and animal communities.

Invasive species pose a potential serious threat to the diversity, integrity, and health of native plant communities. The Nez Perce-Clearwater contains a mosaic of forest, grassland, meadows and shrubland vegetation. The Land Management Plan includes six desired conditions that promote meadows, grasslands, and shrublands health and support native plant communities within the planning area (FW-DC-GS-01 to 06). The desired conditions also emphasize invasive plant species either are not present or occur with low cover.

The Land Management Plan recognizes the importance of invasive species management by including a desired condition specific to invasive species (FW-DC-INV-01). It guides future forest management to trend towards a forest condition where invasive species either are not present or occur at low levels to allow watersheds, vegetation communities, and aquatic ecosystems to retain their inherent resilience and resistance to respond and adjust to disturbances. Plant communities retain their historic diversity and provision of values to fauna. Objective FW-OBJ-INV-01 describes the intent for treating 6,000 acres annually to contain or reduce non-native invasive plant density, infestation area, or occurrence, with emphasis given to new invader species. This is a substantial increase in treatment area compared to the existing 1987 forest plans that proposed 250 and 380 acres per decade, primarily in range allotments, and is more aligned with the current treatment acres. Treatments may include manual, mechanical, biological, and chemical ground-based herbicide applications. Treatments will primarily occur in Management Area 3 where 50 percent of the known invasive species infestations occur.

Soil Disturbance

Based on Forest Inventory and Analysis surveys, there is an estimated 3 percent bare ground in forested areas and an estimated 14 percent in non-forested areas. Ground cover and soil disturbance can exacerbate the spread and establishment of invasive plant species. Ground disturbing activities, such as timber harvest, fuels treatments, prescribed burning, road construction and reconstruction, and uncharacteristic wildfire events have created favorable conditions for invasive plant establishment by clearing vegetation and exposing mineral soils. Recreational activities also have the potential to cause ground disturbance, especially around trailheads, trails, campgrounds, and other developed and dispersed recreation sites.

To reduce the probability of establishment or expansion of invasive weeds, the Land Management Plan includes guideline FW-GDL-INV-01, which specifies that management activities prone to significant soil disturbance or exposure should be planned and implemented with design features to address the potential spread of invasive weeds. Guideline FW-GDL-SOIL-02 specifies that project activities should provide sufficient effective ground cover, such as litter, fine, and coarse wood material, or vegetation with a post-implementation target of 85 percent aerial extent of an activity area to retain soil moisture, support soil development, provide nutrients, and reduce soil erosion. The depth and distribution of organic matter should reflect the amounts that occur for the local ecological type and natural wildland fire regime. The Land Management Plan also includes a guideline to address invasive weed management as part of post-fire habitat restoration (FW-GDL-INV-03).

Livestock grazing can create soil disturbance that enhances germination and establishment of invasive species. There are approximately 612,766 acres of active grazing allotments on the Nez Perce-Clearwater. Localized areas where congregation occur, such as supplement locations, fence lines, and watering sites and water developments can contribute to reduced ground cover and can become potentially susceptible to invasive plant establishment. To allow forage plants to maintain vigor, root development, and soil cover, guideline FW-GDL-GRZ-03 specifies that general upland forage utilization should not exceed 35 to 55 percent. Proposed guideline FW-GDL-ARGRZ-01 establishes minimum end of season stubble heights of 10 to 15 centimeters (four to six inches) along the greenline for low gradient streams.

Pathways for Invasive Specie Spread

Land management plans should consider stressors, such as invasive species when developing integrated plan components (36 CFR 219.8 (a)(1)(iv)). A stressor is a factor that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological process in a manner that may impair its ecological integrity. The presence and distribution of non-desirable invasive species affects composition, and the rate of invasion by invasive species affects function and ecological processes. If the rate is too quick, the ecosystem can lose the ability to adapt to changes imposed by the stressor.

Domestic livestock have the potential to transport and spread invasive weed seed. Guideline FW-GDL-INV-01, specifies that permittees would be required to implement invasive plant prevention measures associated with livestock grazing. Management approaches recommended in Appendix 4 of the Land

Management Plan may include confining livestock to a weed free pasture before entering allotments on National Forest System lands, cleaning permittee-owned equipment used in managing livestock, and feeding saddle horses used for allotment management weed free hay before entering National Forest System lands.

The threat of aquatic invasive species has become more of a concern on the Nez Perce-Clearwater in the last decade. The spread of aquatic invasive species can occur through various pathways including discharging ballast water, moving watercraft between water bodies without removing invasive plants and animals, and releasing bait into water bodies. To highlight the intent to continue working with partners and to address aquatic invasive species, the Nez Perce-Clearwater Land Management Plan includes goal FW-GL-WTR-01, emphasizing that the Nez Perce-Clearwater works with appropriate agencies to control the expansion of aquatic invasive species. The current 1987 forest plans do not contain specific standards or guidelines related to aquatic invasive species. Under the Action Alternatives, proposed desired condition FW-DC-INV-01 seeks to limit the establishment of invasive species to aquatic ecosystems. To move towards this desired condition, prevention measures for aquatic species should be designed and implemented at the project level. These activities could include, but are not limited to, proactive measures to avoid accidental introduction, transporting water across drainage boundaries for fire suppression, constructing stream fords, operating equipment in a riparian area and near a water course, and the use of pumps and sumps for fire suppression, or construction related dewatering activities. To prevent the spread of invasive species**,** standard FW-STD-WTR-05 requires that **w**hen drafting water, pumps, charged hoses, and drafted water shall not be backflushed or discharged into stream channels, wetlands, or other water bodies.

Wildfire suppression vehicles and equipment used during fire suppression activities can act as pathways for invasive species spread. To prevent the introduction of non-native species, guideline FW-GDL-INV-02 stipulates equipment operated by Forest Service employees and agency-authorized personnel that comes in contact with a water body should be inspected and cleaned for aquatic invasive species prior to use in a water body or when moving between subbasins (HUC08) during non-emergency operation, including pumps used to draft water from water bodies, water tenders, and helicopter buckets. Additionally, the National Invasive Species Council and Wildland Fire Leadership Council Memorandum (U.S. Department of the Interior 2022a) outlined direction for multiple federal agencies to provide support and resources to the integration and coordination of wildland fire and invasive species management efforts. Also, Forest Service direction requires all fire suppression activities to follow protocols outlined in the Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations (National Wildfire Coordinating Group 2017a), the Northern Rockies Coordinating Group Supplemental (Northern Rockies Coordination Group 2018b), and the Northern Rockies Coordinating Group Directive on Aquatic Invasive Species Protocols (Northern Rockies Coordination Group 2018a). Fire operations would also follow industry standards for invasive species decontamination, such as vehicle washing.

The Management approaches outlined in Appendix 4 of the Land Management Plan provide more information on organizational collaboration and invasive species management strategies, including invasive species prevention, early detection and rapid response, control and containment, restoration and rehabilitation, and inventory and monitoring activities.

As outlined in Appendix 3, monitoring includes the evaluation of trends in invasive species infestation number, size, and density; the effect of invasive species infestations on native vegetation and other resources the effect of treatments on target weeds; the effect of treatments on desirable vegetation; and effectiveness of treatments as implemented. Long-term monitoring of invasive species abundance and distribution provides information on infestation dynamics. By monitoring treatment results over time, a measure of overall programmatic treatment efficacy can be determined, and an adaptive management process can be used in subsequent treatment activities.

Effects that Vary by Action Alternative

As directed by the 2012 Planning Rule, land management plans must contain plan components, including standards or guidelines, that maintain or restore the composition, structure, ecological processes, and connectivity of plan area ecosystems in a manner that promotes their ecological integrity (36 CFR 219.8(a) and 219.9(a)(1)), taking into account stressors, such as invasive species (36 CFR 219.8 (a)(1)(iv)). Land management plans should also include plan components designed to limit the ability of stressors to impact ecosystem integrity, such as mitigating stressors associated with forest and rangeland management. Examples include equipment impacts on soils and water or movement of invasive species via vehicles and foot travel (FSH 1909.12, Chapter 20, Section 23.11b (4)(b)(2)). The effects of management activities on the potential for invasive plant establishment and spread under the various alternatives can be categorized in two ways: a) the potential for soil disturbance, and b) the potential increase of pathways for invasive species dispersal.

Soil Disturbance

Action Alternatives vary in the number of planned activities that have the potential to cause project level soil disturbance that can exacerbate the spread and establishment of invasive plant species. Future activities which may result in soil disturbance on a relatively large scale within the Nez Perce-Clearwater include timber harvest and fuels treatments, wildfire suppression activities, prescribed fire, and new road construction. Activities resulting in soil disturbance which are in the vicinity of established invasive weed populations are particularly prone to weed invasion.

Timber harvest and fuels treatment activities, including site preparation actions, often result in some level soil disturbance during project implementation. Soil disturbance primarily occurs at landings, skid trails, and temporary roads. In addition, road construction and reconstruction needed to facilitate timber harvest activities also cause soil disturbance. Standards, guidelines, contract specifications, and project design measures would be implemented to minimize the amount of soil disturbance following these activities, but some amount of soil disturbance and bare soil is unavoidable. The direct correlation between timber harvest and fuels treatment objectives and associated soil disturbance and potential for invasive species to establish in those areas was used to differentiate effects between alternatives.

Prescribed fire also has the potential to cause soil disturbance by removing ground cover and forest floor. Depending on fire severity, prescribed fires can cause changes in biological, chemical, or physical properties. High severity burn areas have been shown to be more prone to invasion by weeds than lower severity burns.

Table 105 provides a comparison of projected soil disturbance due to timber harvest and fuels treatment activities and projected prescribed fire by alternative. Alternatives W and X have the highest potential for soil disturbance from vegetation management activities. Alternative Y and the Preferred Alternative have a higher probability of increasing soil disturbance compared to the No Action Alternative. Alternative Z is comparable to the No Action Alternative for ground disturbance potential.

Table 105. Projected soil disturbance acres from vegetation management activities by alternative.

Acres	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Timber harvest and fuels treatment average annual acres	4,300	12,600	14,000	7,500	3,700	8,825–10,000
Prescribed fire average annual acres	5,560	7,345	8,330	8,020	6,450	6,800

Even though the amount of ground disturbance varies by alternative, all Action Alternatives include guideline FW-GDL-INV-01, which specifies that management activities prone to significant soil disturbance or exposure should be planned and implemented with design features to address the potential spread of invasive weeds. Additionally, to prevent expansion of invasive plant species, guideline FW-GDL-FIRE-02 requires planned ignitions in areas highly susceptible to weed invasion to be planned and implemented with design features to address the spread of invasive species.

Pathways for Invasive Species Spread

Alternatives vary in the projected number of activities that could result in added mechanisms for invasive plant spread, including use of equipment and truck traffic associated with timber harvest and fuels treatment activities and recreational vehicular travel. Motorized travel and use across the Nez Perce-Clearwater are determined by travel plan direction and site-specific project analysis and, therefore, do not vary across alternatives. However, land allocations that find motorized travel unsuitable, such as recommended wilderness, do vary across alternatives. Changes in recreation opportunity spectrum classifications for motorized and non-motorized suitability could lead to shifts in the risk that motorized travel poses to invasive species spread. Table 106 displays the percentage of the Nez Perce-Clearwater in non-motorized and motorized summer recreation opportunity spectrum category.

Table 106. Percentage of plan area in summer recreation opportunity spectrum (ROS) categories by alternative and potential risk of invasive species spread from recreational travel.

Plan Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Percentage of Forest in Non-Motorized ROS Category	55	53	42	56	57	45
Percentage of Forest in Motorized ROS Category	45	47	58	44	43	55
Risk of invasive species spread from recreational travel[1]	Baseline	Higher	Highest	Lesser	Lesser	Higher

[1]Depicts the risk of opportunity for recreation travel on open roads and trails to serve as a pathway for weed spread.

Recreational vehicular travel would continue to be a pathway for invasive species spread along open roads and trails. As noted in Table 106, Alternatives W and X and the Preferred Alternative propose a higher percentage of the Nez Perce-Clearwater in the motorized summer recreation opportunity spectrum category compared to the No Action Alternative. As a result of more land allocation where motorized travel is suitable, these alternatives pose a greater risk of invasive plant spread. Alternatives Y and Z propose a lesser percentage compared to the No Action Alternative.

The transport of harvest equipment onto the Nez Perce-Clearwater, the use of that equipment during harvest activities, and log haul truck traffic have contributed to the introduction and spread of invasive plant seed. Contract specifications help prevent introduction of invasive species to units from outside or within the National Forest System lands by requiring cleaning of equipment. Other best management practices to prevent establishment of infestations include pre- and post-implementation invasive species, treatment of haul routes, and dispersing native plant seed on disturbed areas after implementation. As noted in

Table 105, the No Action Alternative and Alternatives Y and Z propose the least amount of vegetation treatment activity acres but could contribute a moderate amount of pathways for weed transport associated with timber harvest and fuels treatment activities. The Preferred Alternative has a higher timber harvest and fuels treatment objective, therefore has a higher potential for invasive species spread. Alternatives X and W would have the highest potential for invasive species spread associated with timber harvest and fuels treatment and a greater risk associated with equipment and log haul trucks transporting weed seed.

Vegetation management, such as timber harvest, prescribed fire, and wildfire that occurs in allotments can provide transitory forage that would be available for livestock grazing. As more transitory forage becomes available, livestock have the tendency to distribute themselves throughout the allotment, potentially spreading invasive plant seed into previously weed free areas. Since the potential risk of this impact occurring correlates to the amount of transitory forage area produced, the level of risk for invasive species spread is the same as outlined above for vegetation management activities.

Cumulative Effects

Invasive species spread without regard to administrative boundaries. As such, the cumulative effects of Nez Perce-Clearwater invasive species management under any alternative, including the No Action Alternative, may negatively or beneficially impact adjacent federal, state, and private lands depending upon the specific site treatment or lack thereof. Invasive species management and site-specific conditions on adjacent lands also have the potential to influence the rate and extent of introduction and spread of invasive species to Nez Perce-Clearwater lands. Under all alternatives, coordination with state and local agencies and communication with the public would continue to combat the spread of undesirable non-native invasive species.

Portions of the Nez Perce-Clearwater adjoin other national forests, each having its own forest plan (or land management plan). The Nez Perce-Clearwater is also intermixed with lands of other ownerships, including other federal, state, and private lands. Some of these entities implement their own resource management plans or are tiering to specific county resource management plans. Management plans from other federal, state, county agencies are summarized in Table 107. Actions, strategies, and prioritization of treatments under these management plans, in conjunction with the Nez Perce-Clearwater Land Management Plan, cumulatively affect the introduction and expansion of invasive species at the landscape scale.

Table 107. Summary of cumulative effects to invasive species from other resource management plans.

Resource Plan	Description and Summary of Effects
Adjacent National Forest Land Management Plans (U.S. Department of Agriculture 2010d, 1987d, 2015c)	Land management plans for National Forest System lands adjacent to the Nez Perce-Clearwater include the Payette, Wallowa-Whitman, Bitterroot, Lolo, and Idaho Panhandle National Forests. All plans address invasive species management and are consistent across all national forests due to law, regulation, and policy, and plan components are relatively consistent and compatible with overall direction.
Bureau of Land Management Cottonwood Resource Management Plan (U.S. Department of the Interior 2009)	Bureau of Land Management lands near the Nez Perce-Clearwater are managed by the Cottonwood field office. The Cottonwood Resource Management Plan contains components related to invasive species and would be complementary to the plan components proposed in the revised Land Management Plan.

Resource Plan	Description and Summary of Effects
Nez Perce Tribe Integrated Resource Management Plan (Tribe 2023)	The protection and restoration of native vegetation communities and control of noxious, invasive, or otherwise deleterious non-native plant species are high priorities. This Plan includes desired conditions that would be complementary to the plan components proposed in the revised Land Management Plan.
The Idaho Forest Action Plan Resource Assessment and Resource Strategy (Idaho Department of Lands 2020)	Identifies invasive plants as a threat and emphasizes collaboration with partners. This plan is complementary to the revised Land Management Plan related to management of invasive species.
Idaho Invasive Species Strategic Plan 2022-2026 (Idaho State Department of Agriculture 2021)	The plan sets three goals to 1) prevent the introduction of new invasive species to Idaho, 2) limit the spread of existing invasive species in Idaho, and 3) abate ecological and economic impacts that result from invasive species populations in Idaho. This plan is complementary to the Nez Perce-Clearwater Land Management Plan.
Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b)	This plan describes a variety of vegetation and aquatic conditions and threats related to habitat for specific wildlife species. This plan would likely result in the preservation of these habitats on state lands, specifically within wildlife management areas. This plan is complementary to the revised Land Management Plan related to management of invasive plant and aquatic species.
Soil and Water Conservation Districts Programs	The Districts are committed participants in Cooperative Weed Management. Areas Districts have active programs to prevent introductions of new invasive species, prevent the spread of invasive species, and reduce the impacts caused by invasive species.
County Resource Management Plans	County plans generally aim to maintain native vegetation communities and reduce noxious weeds. For example, goals for invasive weed management within Idaho County are 1) prevent invasion, 2) limit existing invasions, and 3) abate ecological and economic impacts.

There are several regional and statewide organizations involved in the management of noxious weeds and invasive species across Idaho. Organizations such as Idaho Noxious Weed Control Association (INWCA), Idaho Association of Noxious Weed Control Superintendents (IANWCS), Idaho State Noxious Weed Advisory Board, Idaho Invasive Species Council (IISC), the Columbia River Basin (CRB) Aquatic Invasive Species team, Western Weed Coordinating Committee (WWCC), Western Regional Panel (WRP) on Nuisance Species, Pacific Northwest Economic Region (PNWER), and Western Governors' Association (WGA) all work together to provide cohesive invasive species management.

Cooperative Weed Management Areas (CWMA) form the basic local unit for cooperation in invasive weed management actions in the State of Idaho. CWMAs are organizations that integrate noxious weed management goals and resources across jurisdictional boundaries. CWMAs provide the mechanism that allows federal, state and local agencies, along with other stakeholders and landowners to set common goals and priorities for the prevention and management of invasive weeds. Portions of the Nez Perce-Clearwater occur within the Palouse, Clearwater Basin, Upper Clearwater, Frank Church, and Salmon River CWMAs.

The Nez Perce-Clearwater also coordinates with the Idaho State Department of Agriculture in several of the agency's invasive species programs, such as the statewide aquatic invasive species management and control program focused on protecting the integrity of the state's water bodies from the biological degradation caused by aquatic plants and pests. Additionally, the Nez Perce-Clearwater works with the Nez Perce Tribe Bio-Control Center, which specializes in rearing and providing insect "agents" to help control or manage targeted invasive plants. Most counties within the plan area have agreements with the Nez Perce-Clearwater that coordinate noxious weed treatments, as well as provide a mechanism for which the Nez Perce-Clearwater can financially fund county weed control efforts on National Forest System lands.

Effects to Invasive Species from Management of Other Resources

Timber Harvest and Fuels Treatment Management

Healthy, resilient landscapes have a greater capacity to survive natural disturbances and large-scale threats to ecological sustainability, especially under changing and uncertain future environmental conditions, such as those driven by changing climate and increasing human uses (as found in Forest Service Manual 2020).

Vegetation management activities are proposed under the Action Alternatives to move current forest conditions to a more healthy, resilient landscape as described in the Forestlands desired conditions. Timber harvest and fuels treatments are most likely to occur on lands identified as suitable for timber production. All alternatives have varying amounts of land suitable for timber production and varying amounts of proposed timber harvest that have the potential to cause soil disturbance and act as a pathway for spread of invasive species.

Slash treatments, such as burning, yarding, or crushing unmerchantable material, is necessary for timber harvest to be an effective fuel treatment in ecosystems with mixed-severity fire regimes, but as noted by Martinson et al. (2008), adding surface disturbance to canopy removal might result in even greater potential for invasion by non-native plants. Slash pile burning associated with timber harvest and fuels treatments is prone to invasion by non-native species because of the intense soil heating on a small scale (Korb et al. 2004).

Most of the non-native species found following harvest and fuel treatments in Ponderosa pine forests, such as common mullein (*Verbascum thapsus*), lambsquarters (*Chenopodium album*), and prickly lettuce (*Lactuca serriola*), are not considered a threat to native plant communities (Zouhar et al. 2008). Martinson et al. (2008) referenced a study which observed increases in many non-native species following harvest and fuel treatments may not be problematic in the long-term since the species are usually transient members of recently disturbed communities.

Disturbance to ground cover and soil can exacerbate the spread and establishment of invasive plant species. To reduce the probability of establishment or expansion of invasive weeds, the Land Management Plan includes guideline FW-GDL-INV-01, which specifies that management activities prone to significant soil disturbance or exposure should be planned and implemented with design features to address the potential spread of invasive weeds.

Contract specifications help prevent introduction of invasive species to units from outside or within the National Forest System lands by requiring cleaning of equipment. Other best management practices to prevent establishment of infestations include pre- and post-implementation invasive species treatment of haul routes and dispersing native plant seed on disturbed areas after implementation.

Wildland Fire Management

Fire has long played a role in shaping the vegetation of the Nez Perce-Clearwater. The resiliency of much of the forest is dependent upon fire as a frequent disturbance process. Fire, although it is a natural and desired ecological process, can have a detrimental impact to the ecosystem post-fire, depending on the occurrence of invasive species infestations pre-fire. Fire can result in an increase in non-native species diversity and cover, whether it is a prescribed burn or a wildfire (Zouhar et al. 2008).

Wildfires would occur in the future under all alternatives, although uncertainty exists as to extent and location. Weather and climatic factors along with fuels conditions would affect intensity and spread of a fire event. Effects of wildfire on invasive species spread potential is the same across alternatives.

All alternatives project a varying among of prescribed fire. There is potential for establishment and spread of invasive plant species within burned areas, depending largely upon site-specific conditions, such as fire location, vegetation types that were burned, presence of weed infestations pre-fire, potential pathways, and fire characteristics. Disturbance to ground cover and soil can exacerbate the spread and establishment of invasive plant species. To reduce the probability of establishment or expansion of invasive weeds, the Land Management Plan includes guideline FW-GDL-INV-01, which specifies that management activities prone to significant soil disturbance or exposure should be planned and implemented with design features to address the potential spread of invasive weeds. Additionally, to prevent expansion of invasive plant species, guideline FW-GDL-FIRE-02 requires that planned ignitions in areas highly susceptible to weed invasion should be planned and implemented with design features to address the spread of invasive species, including the implementation of national and regional guidelines to prevent invasive species transport on wildland fire mobile equipment.

Wildfire suppression efforts can also create soil disturbance, increasing the potential for establishment of invasive plant species. Wildfire suppression efforts often involve constructing control lines and requiring staging areas for fire equipment and fire camps. Large influxes of firefighters and equipment from out of the immediate area can transport undesirable seed. Control lines are usually dug down to bare mineral soil and can provide sites that are very vulnerable to weed establishment and spread. While there are many weed prevention and control measures that are required by Forest Service policy (as found in Forest Service Manual 2081) that are associated with the management of wildfires and prescribe fires, there is an increased risk of weed invasions and introductions in burned areas. Since it is nearly impossible to predict the extent and location of future wildfires, quantifying the extent of soil disturbance or invasive species spread is problematic.

Wildfire suppression vehicles and equipment used during fire suppression activities can act as pathways for invasive species spread. To prevent the introduction of non-native species, guideline FW-GDL-INV-02 stipulates equipment operated by Forest Service employees and agency-authorized personnel that comes in contact with a water body should be inspected and cleaned for aquatic invasive species prior to use in a water body or when moving between subbasins (HUC08) during non-emergency operation, including pumps used to draft water from water bodies, water tenders, and helicopter buckets. To prevent the spread of invasive species**,** standard FW-STD-WTR-05 requires that when drafting water, pumps, charged hoses, and drafted water shall not be backflushed or discharged into stream channels, wetlands, or other water bodies.

Additionally, all suppression activities would follow protocols outlined in the Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations (National Wildfire Coordinating Group 2017a), the Northern Rockies Coordinating Group Supplemental (Northern Rockies Coordination Group 2018b), and the Northern Rockies Coordinating Group Directive on Aquatic Invasive Species Protocols (Northern Rockies Coordination Group 2018b).

Fire operations would follow industry standards for invasive species decontamination, such as vehicle washing. Rehabilitation efforts after fire suppression operations would help to mitigate many impacts to water resources. Standard FW-STD-SOIL-02 requires impaired soil function created through management activities, including fire suppression, shall be rehabilitated to reestablish soil function to the appropriate site potential. In addition, guideline FW-GDL-RMZ-07 requires restoration of fire suppression activities in riparian management zones and guideline FW-GDL-INV-03 specifies that measures should be used to address invasive weed management when rehabilitating areas burned by wildfire and affected by wildfire suppression. The National Invasive Species Council and Wildland Fire Leadership Council Memorandum (U.S. Department of the Interior 2022a) outlined direction for multiple federal agencies to provide support and resources to the integration and coordination of wildland fire and invasive species management efforts. Effective management of the invasive species and wildfire problem requires increased attention to coordination of invasive species and wildland fire management on the landscape before, during, and after fires. Coordinated strategic planning and leadership across federal agencies and partners help to better identify and address policy needs, budget allocations, operations, response, and monitoring. One strategy encourages the investment in additional resources and capacity to enhance early, aggressive invasive plant management as a preventative measure to sustain resilient and resistant native plant communities and natural wildfire processes and patterns including through interagency and non-federal partnerships.

Meadows, Grasslands, and Shrublands Management

The Nez Perce-Clearwater contains a mosaic of forest, grassland, meadows and shrubland vegetation. Under the Action Alternatives, the meadows, grasslands, and shrublands plan components support native plant communities within the planning area. The Land Management Plan includes six desired conditions that promote meadows, grasslands, and shrublands health (FW-DC-GS-01 to 06). The desired conditions emphasize invasive plant species either are not present or occur with low cover.

Disturbance to ground cover and soil can exacerbate the spread and establishment of invasive plant species. Restoration activities outlined in objective FW-OBJ-SOIL-01 in the soil resource section and objective FW-OBJ-WTR-05 in the water resources section of the Land Management Plan could cause ground disturbance in the short-term but would provide improved conditions in the long-term. To reduce the probability of establishment or expansion of invasive weeds, the Land Management Plan includes guideline FW-GDL-INV-01, which specifies that management activities prone to significant soil disturbance or exposure should be planned and implemented with design features to address the potential spread of invasive weeds. Guideline FW-GDL-SOIL-02 specifies that project activities should provide sufficient effective ground cover, such as litter, fine, and coarse wood material, or vegetation with a post-implementation target of 85 percent aerial extent of an activity area to retain soil moisture, support soil development, provide nutrients, and reduce soil erosion. The depth and distribution of organic matter should reflect the amounts that occur for the local ecological type and natural wildland fire regime. The effects from soil resource management on invasive species establishment would be beneficial for all Action Alternatives.

Aquatic Ecosystems Management

Disturbance to ground cover and soil can exacerbate the spread and establishment of invasive plant species. Restoration activities outlined in the objectives in the water resources section of the Land Management Plan, especially objectives FW-OBJ-WTR-02 and FW-OBJ-WTR-05, could cause ground disturbance in the short-term, but would provide improved conditions in the long-term. To reduce the probability of establishment or expansion of invasive weeds, the Land Management Plan includes guideline FW-GDL-INV-01, which specifies that management activities prone to significant soil disturbance or exposure should be planned and implemented with design features to address the potential spread of invasive weeds. The effects from aquatic ecosystems management on invasive species establishment would be beneficial for all Action Alternatives.

With the action alternatives, the use of herbicides, pesticides, and other toxicants and chemicals would be used within riparian management zones only when the activity does not retard attainment of aquatic and riparian desired conditions (FW-RMZ-STD-03). Further, desired condition FW-DC-TE-02 emphasizes that peatlands, including fens and bogs, have the necessary soil, hydrologic, water chemistry, and vegetative conditions to provide for continued development and resilience to changes in climate and other stressors. These components may limit the treatment methods for some invasive plants in riparian areas and near groundwater dependent ecosystems; for example, hand pulling may be required instead of herbicide use. The herbicides selected for use in these areas would be those that would not alter water chemistry.

Wildlife Management

A variety of wildlife species are known to transport plant seeds or propagules and, thereby, act as pathways for invasive plant species spread. Big game animals can inadvertently transport weed seeds in their fur and hooves, especially during muddy conditions. An increase in big game habitat may, in turn, have a greater potential for weed spread by wildlife.

The wildlife section in the Land Management Plan includes desired condition FW-DC-WLMU-06 that promotes that elk habitat quality is not degraded by invasive species and an objective to treat 500 acres of invasive weeds in elk habitat every 5 years (MA1-OBJ-WLMU-01).

Tribal Trust Responsibilities

The Nez Perce Tribe has ancestral and treaty-reserved rights to uses and resources on the Nez Perce-Clearwater. Indian treaty rights are property rights held by the sovereign Indian tribes who signed the treaties. Under the Nez Perce Treaty of 1855 and subsequent treaties, the Nez Perce Tribe was reserved separate reservation lands, but also retained certain rights to hunt, fish, graze, and gather on the lands ceded to the United States. These rights retained on ceded lands are known as “off-reservation treaty rights” or “other reserved rights.”

Invasive species pose a potential serious threat to the diversity, integrity, and health of native plant communities that are of tribal importance. Invasive plants can reduce the abundance and health of culturally important native plants by invading sacred landscapes, displacing native plants in traditional gathering sites, and stunting or reducing native plant growth or development (Pfeiffer, 2007).

The Land Management Plan includes desired conditions promoting vegetative conditions that provide a sustainable diversity of habitats necessary to provide plant and animal species that are of tribal importance (FW-DC-TT-01) and emphasizing that culturally important botanical species are present and vigorous in quantities that are harvestable and accessible to Nez Perce tribal members (FW-DC-TT-03). Plan components in the terrestrial ecosystems; meadows, grasslands, and shrublands; livestock grazing; and aquatic and riparian livestock grazing sections emphasize the need to support native plant communities and include standards and guidelines to protect important botanical species.

Tribal trust responsibilities could make invasive species treatments more complex. Maintaining tribal trust responsibilities could constrain treatments in particular locations, especially in meadow and riparian areas. The Nez Perce-Clearwater works closely with the Nez Perce Tribe to cooperatively treat invasive species in meadows where known populations of plant species important to the Nez Perce Tribe are present.

Cultural Resource Management

Cultural Resource Management allows for most treatments of invasive species but could require limiting some types of treatment when needing to protect particular physical sites or to preserve ethnobotanical knowledge. Alternative methods of treatment may need to be used but would be determined at the site-specific project level.

Recreation Management

Recreational activities, including non-motorized use, are pathways for potential seed establishment and dispersal. Recreational areas receive concentrated and frequent use, which can increase the potential for ground disturbance. Frequently, infestations are found around trailheads, trails, campgrounds, and other developed and dispersed recreation sites. These seed sources pose a risk of further spread into wilderness and undeveloped lands. Areas located immediately adjacent to and surrounding developed areas tend to experience the most disturbance, while the peripheries of these areas are less disturbed and less likely to be favorable for invasive species establishment and persistence. Generally, wilderness areas and large unroaded lands are less likely to contain invasive weeds due to less widespread public access, especially via motorized means. However, these large unroaded areas are still vulnerable to weed infestation and spread from recreational uses.

In all alternatives, invasive weed prevention measures and public education would be emphasized, including informational signage at trailheads and campgrounds and enforcement of weed free hay requirements for pack and saddle stock. In the Action Alternatives, desired condition FW-DC-ED-01 in the Public Information, Interpretation, and Education section of the Land Management Plan promotes interpretive and educational opportunities that focus on relevant themes, including invasive species.

Access Management

In all alternatives, public motorized and non-motorized travel would continue to be a pathway for invasive species spread along open roads and trails. Motorized travel and use across the Forest are determined by travel plan direction and site-specific project analysis and, therefore, do not vary across alternatives. There are approximately 3,900 miles of system roads and 2,300 miles of trails open to motorized use. There are approximately 3,200 miles of non-motorized trail, primarily used for hiking and horseback riding. About 1,300 miles of these trails are located inside designated wilderness areas.

Roads which are closed or decommissioned would be at risk of invasion by invasive plants until disturbed soils are re-vegetated. Seeding of obliterated roads with native plant seed would continue under all alternatives as they are included in contract specifications.

System Road Management

Maintenance, reconstruction, and construction of forest system roads can contribute to the introduction, establishment, and spread of invasive plant species. New construction of roadways into previously undisturbed plant communities not only creates a suitable seedbed, but in itself acts as an entry point for the seed source. Gravel pits can oftentimes become infested with invasive plants if not routinely checked and treated. Weed seeds can be spread far from the site of origin when gravel is used for road surfacing or other purposes. This potential for invasive plant spread associated with road management activities would generally be the same under all alternatives. There is a potential of increased road work and road use associated with timber harvest and fuels treatments that vary by alternative. Existing weed prevention measures, including cleaning of contracted and government owned road equipment and inspection and treatment of gravel pits, would continue under all alternatives. Gravel pits and main road corridors would continue to be a priority for weed inventory and treatment.

Livestock Grazing Management

Domestic livestock have the potential to transport and spread invasive weed seed, similarly to big game wildlife. Seeds can be spread through livestock feces, fleeces, and hooves, and many can pass through an animal's digestive system and retain the ability to germinate (Belsky and Gelbard 2000).

Areas of livestock concentration, including salting grounds, fence lines, corrals, and water developments, are potential sites for invasive species invasion due to localized soil disturbance. The potential risk of invasive species invasion and establishment due to livestock grazing is the same for all alternatives. Permittees are encouraged in the Annual Operating Instructions to report any new infestations that are found.

In the long term, under the Action Alternatives, livestock grazing management would improve due to plan components associated with the grasslands, meadows, and shrublands; aquatic ecosystems livestock grazing; and the livestock grazing sections of the Land Management Plan. Improved management promotes the enhancement of desirable native plant communities.

Energy and Minerals Management

Energy and minerals activities often cause removal of vegetation and ground disturbance. Additionally, vehicles and equipment can transport undesirable seed to the site. Placer mining and suction dredge mining equipment have the potential to introduce aquatic invasive species.

All energy and mineral management activities on National Forest System lands are required to meet applicable environmental protection measures as required by law, regulation, and policy. Proposed energy and mineral activities require approval of a plan of operations, an environmental analysis, and application of best management practices, including those found in the Manual of Best Management Practices for the Mining Industry in Idaho (Idaho Department of Lands 1992).

Plan components that are common across all Action Alternatives provide direction for restoring mining sites after activities are completed. FW-STD-EM-01 requires new mineral and energy management activities to only be authorized when the associated reclamation plan includes provisions to return disturbed areas to a state of site condition comparable to pre-mineral activity. Any mining activities occurring within riparian management zones require a reclamation plan and bond for full restoration of the site after activities are completed (FW-STD-AREM-01), limitation of new ground disturbance, and removal of roads (FW- GDL-AREM-02).

Proposed desired condition FW-DC-INV-01 seeks to limit the establishment of invasive species to aquatic ecosystems. To move towards this desired condition, prevention measures for aquatic invasive species should be designed and implemented at the project level, such as requiring cleaning and drying of watercraft and equipment before entering a site.

Summary of Environmental Consequences

Table 108 and Table 109 summarize invasive species consequences due to potential soil disturbance potential pathways for invasive plant spread by alternative.

Table 108. Invasive plant summary of consequences due to potential soil disturbance by alternative.

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Timber harvest and fuels treatment average annual acres	4,300	12,600	14,000	7,500	3,700	8,825–10,000
Projected Average Annual Prescribed Fire Acres	14,317	7,345	8,332	8,017	6,451	6,799
Acres of active livestock grazing allotments	612,766	612,766	612,766	612,766	612,766	612,766

Table 109. Invasive plant summary of consequences due to potential pathways for invasive plant spread by alternative.

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Percentage of Forest in summer motorized ROS category	45	47	58	44	43	55
Recreation travel[1]	Baseline	Higher	Highest	Lesser	Lesser	Higher
Timber harvest and fuels treatment average annual acres	4,300	12,600	14,000	7,500	3,700	8,825–10,000
Risk of spread to transitory range due livestock grazing	Moderate	Highest	Highest	Moderate	Moderate	High

[1]Depicts the risk of opportunity for recreation travel to serve as a pathway based on open roads and trails.

Conclusion

As directed by the 2012 Planning Rule, the Nez Perce-Clearwater Land Management Plan includes plan components for integrated resource management to provide for ecosystem services and multiple uses (36 CFR 219.10(a)), while providing plan components that limit the introduction and expansion of invasive species.

Invasive species will continue to have a presence on the Nez Perce-Clearwater landscape. Management under all alternatives would attempt to slow the spread of invasive species and introductions of new invaders. All alternatives provide prevention measures to limit invasive species from establishing into new non-infested areas. Management under all alternatives would continue to follow integrated pest management outlined under Forest Service Manual 2900, which sets forth Forest Service policy, responsibilities, and direction for the prevention, detection, control, and restoration of effects from aquatic and terrestrial invasive species.

The Action Alternatives improve upon the 1987 forest plans for management of non-native invasive species by formalizing current, effective invasive species management practices include plan components that stress the need for management of aquatic invasive species. All alternatives would retain a priority for invasive species management; although the Action Alternatives propose plan components that better emphasize certain aspects of the invasive species management program and offer a more aggressive infestation treatment level. Invasive species under all alternatives would continue to be influenced by changing climates, increased public use, and globalization.

To maintain or improve ecological integrity at the landscape scale, the Land Management Plan includes plan components that provide for opportunities for partnerships to support restoring ecological conditions at the appropriate geographic scale (FSH 1909.12, Chapter 20, Section 23.11b (5)(a)(6). Coordination and collaboration with county weed management officials, other agencies, neighboring national forests, private landowners, and interested groups and individuals would be facilitated through active participation in various cooperative weed management areas, participating agreements, and other initiatives.

3.2.6 Soils Resources

This section addresses soil resource management. Soils are an integral part of ecosystems due to their function in ecological processes and the above and below ground interaction of biological organisms. Since it can take 800 to 1,000 years for one inch of soil to form, it is very important to minimize impacts to the soil resource. The National Forest Management Act states that management activities on National Forest System lands will not produce substantial and permanent impairment of soil productivity. The objectives of current national direction outlined in Forest Service Manual 2500 Chapter 2550 for soils on National Forest System lands are 1) to maintain or restore soil quality and 2) to manage resource uses and soil resources to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity.

Over time, diverse lithology, structure, and climate have resulted in a spatially complex pattern of landforms and soils across the Nez Perce-Clearwater that respond differently to management actions. Most management activities and natural disturbance processes can affect soil resources to varied extents depending on site productivity and recovery. Impacts or signs of stress include surface and subsurface erosion, compaction, lack of ground cover, scarcity of coarse woody debris, high burn severity, or mass movement.

Future management actions could impact or restore the soil resource. By working with the site constraints, management can maintain and, where necessary, restore long-term soil quality, function, and productivity. Soil impairment can be moderated within acceptable limits to ensure sufficient soil recovery and regrowth of vegetation. Soils that are productive and functioning properly are resilient to natural disturbance and human caused stressors, while providing for long-term ecological sustainability.

Comments received since the proposed action and draft environmental impact statement were published have been used where appropriate to improve the Land Management Plan and have helped inform this final environmental impact statement. Multiple minor changes were made for the final environmental impact statement; all changes are within the scope of the draft environmental impact statement analysis and address issues that the public had an opportunity to comment on. With respect to soil resources, there were changes to the soil plan components that were driven from commenters and internal Forest Service suggestions. Also, as a result of public input, an additional alternative was developed called the Preferred Alternative. Analysis of the Preferred Alternative for soil resources is similar to all action alternatives.

Changes Between Draft and Final

Comments received since the proposed action and draft environmental impact statement were published have been used where appropriate to improve the Land Management Plan and have helped inform this final environmental impact statement. Multiple minor changes were made in the final environmental impact statement; all changes are within the scope of the draft environmental impact statement analysis and address issues that the public had an opportunity to comment on. As a result of public input, an additional alternative was developed, called the Preferred Alternative. Analysis of the Preferred Alternative for soils resources is similar to the other action alternatives.

Relevant Laws, Regulations, and Policy

Federal Laws

Multiple-Use, Sustained-Yield Act of 1960 (P.L. 86-517, 74 Stat. 215: 16 U.S.C. 528-531): indicates that a high-level of annual or regular periodic output of renewable resources will be produced on national forest lands while also specifying that "coordinated management of resources will be utilized without impairment of the productivity of the land."

National Forest Management Act (NFMA) of 1976 (16 USC 1604) stipulates to:

- "ensure…evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land" 16 USC 1600, Section 6 (g)(3)(C).
- "ensure that timber will be harvested from National Forest System lands only where- (i) soil, slope, or other watershed conditions will not be irreversibly damaged…" 16 USC 1604 (g)(3)(E).
- "ensure that clearcutting, seed tree cutting, shelterwood cutting, and other cuts designed to regenerate and even-aged stand of timber will be used as a cutting method on National Forest System lands only where…. (v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources" 16 USC 1604 (g)(3)(F).

Forest and Rangelands Renewable Resources Planning Act of 1974: This act provides for maintenance of land productivity and the need to protect and improve soil and water resources.

National Forest Management Act of 1976: This act directs soils to be managed for sustained soil productivity.

Agency Regulations

36 CFR 219.8: requires land management plans to include components to maintain or restore soil productivity, including guidance to reduce soil erosion and sedimentation and to maintain or restore ecosystem integrity (36 CFR 219.8(a)(2)(ii)).

36 CFR 219.19: highlights the importance of soil development, retention, stabilization, and formation in definitions of ecosystem functions and ecosystem services.

36 CFR 219.12: requires monitoring to ensure that management does not substantially and permanently impair the productivity of the land (36 CFR 219.12(a)(5)(viii)).

Policy

Forest Service Manual, Chapter 2550 for Soil Management: directs land managers to "coordinate validation studies of soil quality criteria and indicators with Forest Service Research and Development staff to ensure soil quality measurements are appropriate to protect soil productivity." Six different soil functions are described: soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and the capacity to filter and buffer environmental contaminants.

Forest Service Manual Northern Region Supplement 2550-2014-1 (U.S. Department of Agriculture 2014o): Regionally, Chapter 2550 was supplemented most recently in 2014 and includes definitions and thresholds for soil monitoring of soil quality related to local conditions. It outlines soil indicators related to disturbance along with thresholds by which disturbance could be severe enough to adversely affect forest growth.

Forest Service Handbook 2509.22: Operationally, the Forest Service mitigates actions using a series of design criteria in projects following standard best management practices, which mirrors many state practices. These practices correspond with more recently produced National Core Best Management Practices (U.S. Department of Agriculture 2012b).

State and Local Laws

Idaho Forest Practices Act of 1974, as amended (Title 38, chapter 13, Idaho Code): The Idaho Forest Practices Act was created to assure the continuous growing and harvesting of forest tree species and to protect and maintain the forest soil, air, water resources, and wildlife and aquatic habitat. The Idaho Department of Lands administers the law and monitors forest activities for compliance. Forest management practices on federal, state, and private lands in Idaho must meet or exceed the requirements of the Idaho Forest Practices Act and complementary administrative rules (IDAPA 20.02.01).

State and Local Plans

Soil and Water Conservation Districts are organized by county. Their efforts are guided by five-year plans containing goals, priority projects, and activities. The five-year plans are associated with management actions on the Nez Perce-Clearwater. However, relevant practices regarding soil management on National Forest System lands are covered by either project mitigations or standard Forest Service best management practices.

Methodology

Spatial and Temporal Scale

This programmatic Land Management Plan analysis focuses on broad scale estimated effects related to soil productivity on National Forest System lands. The analysis area for soils includes all the lands within the boundary of the Nez Perce-Clearwater. This area represents where changes may occur as a direct result of Forest Service management actions. The analysis assumes a time period of roughly 15 years, the life of the plan.

Past, Present, and Future Activities used in the Analysis

Management and public use activities that have affected the soil resource include timber harvest and associated skid trails, landings, temporary roads, and site preparation; fuels reduction activities; prescribed burning; livestock grazing; mining; construction of roads, trails, administration sites, and developed recreation sites; wildfire suppression operations; dispersed camping; introduction of invasive plant species; invasive plant treatment; and off-road motor vehicle use.

Methods and Assumptions

Best available science was used to determine effects of implementing the Land Management Plan to the soil resource. Literature sources that were the most recent, peer-reviewed, and local in scope or directly applicable to the local ecosystem were selected. Uncertainty and conflicting literature were acknowledged and interpreted when applicable.

This analysis takes a programmatic look at the outcomes that may result from implementing the proposed management direction for each alternative over the life of the Land Management Plan. When estimating the effects at the programmatic Land Management Plan level, it is assumed that the types of resource management activities allowed under the action alternatives are reasonably foreseeable future actions to achieve the Forest Service mission. Since future activities' locations are not known at the programmatic Land Management Plan level, specific spatial and temporal effects to soil productivity and function cannot be determined. Therefore, impacts of potential management actions are considered as indirect impacts to soil productivity and function. Cumulative effects from adjacent management of other Forest Service units and state and private entities would not measurably impact soil productivity for this programmatic analysis.

Scientific Uncertainty and Controversy

Soil productivity relies on complex chemical, physical, and climatic factors that interact within the soil. These factors regulate the soil environment that sustains soil microbes and nourishes plants. For any given site and soil, a change in a key soil variable, such as compaction, soil loss, and nutrient availability, impacts potential soil productivity. The rebound after disturbance, such as from erosion or tractor compaction, would depend on climatic context for rebuilding organic matter and soil properties. Soil disturbance on dry sites recover slower than wet sites since rainfall accelerates regrowth of soil microbes and vegetation. This varied site recovery complicates using soil disturbance criteria.

The Northern Region Supplement FSM 2500-2014-1 (U.S. Department of Agriculture 2014o) set policy that the national forest does not create detrimental soil conditions on more than 15 percent of an activity area. The 15 percent threshold was largely based on the collective judgment of soil researchers, academics, and field practitioners and the accepted inability to detect changes in productivity less than 15 percent using current monitoring methods (Powers 1990). The thought was a decline of at least 15 percent was needed to detect a decrease in productivity (Powers 1990). However, the Forest Service does not tolerate productivity declines up to this level but rather recognizes problems with detection limits. The policy does allow for professional judgment by soil scientists to factor in soil type and site recovery.

The Forest Service also initiated a cooperative research project called the North American Long-Term Soil Productivity Study in the early 1990s to better understand soil disturbance impacts on productivity, including understanding site recovery. The study analyzes the effects of soil disturbance intensity against tree seedling growth and investigates the efficacy of soil disturbance proxy for soil productivity. The five- and ten-year results were published in the 2000s (Page-Dumroese and Jurgensen 2006, Fleming et al. 2006, Sanchez et al. 2006). The ongoing Long-Term Soil Productivity Study provides the best available science to resource professionals. At ten years, no observed reduction in tree growth was detected as a result of compaction or organic matter removal in plots with soils generally similar to those found on the Nez Perce-Clearwater (Powers et al. 2005). These results provide short-term insight and involve many site- and soil-specific factors. Forthcoming long-term results, now 25 years on, will provide better information on harvest practice's effects to soil productivity.

The lack of long-term study results and the acknowledgment that soil types recover at different rates to disturbance creates controversy on the judgment of "irreversible damage" as defined in the National Forest Management Act. The National Forest Management Act states to "insure [sic] that timber will be harvested from National Forest System lands only where soil, slope, or other watershed conditions will not be irreversibly damaged." Irreversible commitments of resources equate to the consumption or destruction of nonrenewable resources, such as minerals or cultural resources, or the degradation of resources, such as soil productivity, which can be renewed only over long periods.

Irreversible and irretrievable commitments of resources are defined in Forest Service Handbook 1909.15. Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period, such as the temporary loss of timber productivity in forested areas that are kept clear for use as a powerline right-of-way or a road. The decisions made in Land Management Plan do not represent actual irreversible and irretrievable commitments of resources. This is because forest planning identifies what kinds and levels of activities are appropriate in different parts of the forest; it does not make project decisions. Ground-disturbing activities cannot occur without further site-specific analyses or project decision documents. Soil personnel would continue to use professional judgment to assess conditions and prescribe treatments to recover soil productivity.

Indicators and Measures

The Land Management Plan analysis compares alternatives that vary the time period and levels to complete similar types of management treatments to move towards desired conditions. Management treatments would primarily impact soils by generating soil disturbance from the mechanical equipment needed to conduct forestry operations.

The following indicators most contrast the affects from the alternatives:

- soil productivity and function, measured by proposed timber harvest acres and proposed soil restoration acres,
- protection of sensitive soils, measured by qualitative assessment of plan components.

The Forest Service defines soil productivity as the capacity to sustain plant communities. Since soil productivity is difficult to measure and varies according to seral stage and site, the Forest Service uses soil disturbance criteria to evaluate soil productivity. These disturbance criteria provide benchmark values that relate to the capacity for soils to function, otherwise called soil quality. If disturbance intensity exceeds established thresholds, then the disturbance is considered detrimental and long-term soil productivity could be potentially impaired. Detrimental soil disturbance is defined by the intensity of compaction, rutting, displacement, severe burning, surface erosion, and mass failure (U.S. Department of Agriculture 2014o). These conditions apply where the Forest Service intends to maintain a productive land base.

Management actions can impact soils by causing soil disturbance or recovery. The capacity of soils can be couched in functional terms: soil biology, soil hydrology, nutrient cycling, carbon storage, filtering and buffering, and the ability to resist erosion and support structures, both from natural and engineering terms. These soil functions become important when restoring soil.

Alternatives were compared using proposed timber harvest objectives and the estimated proportional soil disturbance associated with the activity. Calculations assumed 15 percent detrimental soil disturbance, the high range of disturbance per acre based on Forest Monitoring (Bergstrom 2018). For soil restoration calculations, detrimental soil disturbance rates were used in addition to a 2 percent factor to account for legacy soil impacts within timber harvest units for a net restoration of 17 percent per acre.

Sensitive soils on the Nez Perce-Clearwater have attributes that make them particularly vulnerable to ground disturbance or susceptible to mass movement. Sensitive soil types include grussic soils, hydric wetland soils, severely burned soils, soils with a volcanic ash layer, soils with high erosion potential, and soils prone to mass movement. Management actions can be mitigated on these soil types either by avoidance, incorporation of best management practices, or by limiting the level of soil disturbance from mechanical operations.

Affected Environment

Soil is the primary medium for regulating the movement and storage of energy and water and for regulating cycles and availability of plant nutrients (Quigley et al. 1996). Soils have biological, chemical, and physical properties that are fundamental to the productivity of forest ecosystems and play an integral role in the hydrological behavior of watersheds (Neary et al. 1999). Other resource values, such as water quality and quantity, wildlife habitat, and biomass production are often dependent on and closely related to properly functioning and productive soils. Soils also provide a variety of ecosystem services, such as providing physical support, sequestering carbon, storing and regulating water, cycling nutrients, regulating temperatures, decomposing and filtering waste and toxins, and supporting life (Dominati et al. 2010). It can take hundreds to thousands of years for a soil to develop; therefore, protecting and restoring the soil resource is critical to sustaining ecological processes and functions so that desired ecosystem services are provided in perpetuity.

It can take thousands of years for a soil to develop. Although there are many different soil types, each soil, and its associated properties, is the result of the interaction of the same five factors. These factors are the effect of climate on the parent material, the kinds of plants and organisms living in the soil, the relief of the land, the physical and chemical composition of the parent material, and the length of time it took for the soil to form. Within short distances, the combination of these factors varies, and, consequently, the soils that form differ in fertility, productivity, and physical and chemical characteristics. In mountainous areas, topography and elevation exert strong controls on soil development and productivity. The orographic effects increase moisture to higher elevations while cold temperatures dampen biologic activity. The dissected slopes create microclimates that advance soil formation in concave draws and decrease outward with increasing exposure to sunlight.

The Nez Perce-Clearwater has a wide diversity of soil types from the minimally developed, nutrient poor soil, and rock complexes of the steep mountain slopes and ridges to the deep, fertile soils of the lower valleys. The diverse and productive soils of the Nez Perce-Clearwater are described, characterized, and classified in local soil surveys — Clearwater National Forest Land System Inventory (Wilson et al. 1983), Custom Soil Resource Report for Clearwater National Forest, Idaho (U.S. Department of Agriculture 2014p), and Soil Survey of Nez Perce National Forest Area (U.S. Department of Agriculture and Natural Resources Conservation Service 2007). Data is available digitally through web soil survey (U.S. Department of Agriculture and Natural Resources Conservation Service 2007).

Geologic Time and Parent Material

Most soils on the Nez Perce-Clearwater were formed during the Holocene geological epoch, about 10,000 years ago. The bedrock in the area, which provides soil parent materials upon weathering, was emplaced over much longer periods of time.

The belt supergroup rocks of the Precambrian age (more than 600 million years old) were laid down in a seabed and subsequently metamorphosed. These rocks are mostly schist, gneiss, and quartzite. Metasedimentary rocks form sandy loam, loam, and silt loam textured soils.

The Seven Devils Volcanics were extruded in the southwestern part of the Nez Perce National Forest and are of the Permian and Triassic Age (208 to 286 million years old). These volcanics are intensely folded and faulted metamorphosed rhyolitic rock flows associated with shale and limestone. Rhyolitic rocks are mostly hard, well-fractured andesite. Soil derived from rhyolitic rocks is loamy and contains many hard, angular rock fragments. Subsoil clay accumulations are associated with rhyolitic rocks.

The Idaho batholith granitics intruded into the Belt rocks during the late Cretaceous period (66 to 110 million years ago). The intrusion formed the area’s mountain ranges and resulted in much faulting. Most of these rocks are quartz monzonite, granodiorite, and granite. These rocks weather to sandy loam or loamy sand or to sand. The Belt rock bordering the Batholith was altered and deformed by the intense heat and pressure of the intruding magma. These changed rocks metamorphosed into a variety of mica schists and gneiss and can be found bordering the granitic rocks of the Batholith. More granite and other fine-grained igneous rock were intruded into the existing belt and batholith rocks during early Tertiary time (60 million years ago) and Eocene time (45 to 55 million years ago).

Miocene basalt flows (13 to 25 million years old) overlie portions of the western part of the Clearwater National Forest and the western and southwestern corner of the Nez Perce National Forest. Basalt is a hard, commonly well-fractured bedrock. Soil derived from basalt is loam to clay loam and contains many hard, angular or subangular rock fragments. Soil with subsoil clay accumulations is associated with basalt.

Approximately 100,000 years ago, the climate cooled. Mountain cap and alpine cirque glaciation began sculpting the higher elevations of the Clearwater and Bitterroot Mountains. Most of the high mountain lakes were formed by alpine cirque glaciers during this period. As the climate warmed, the alpine glaciers receded and disappeared around 10,000 years ago.

The active geology across the Nez Perce-Clearwater has facilitated over-steepened slopes that are prone to failure and sediment transport. Wildfire advanced geomorphology by rejuvenating fans and advancing slope formation. The landscape-scale fire events, in particular, explain most of the sediment transport to streams during the Holocene (Kirchner et al. 2001).

Most soils have surface layers formed in loess that has been influenced by volcanic ash. The most significant and influential layer of this loess was deposited on the Nez Perce-Clearwater approximately 6,700 years ago by the eruption of Mount Mazama, or Crater Lake, in Oregon. Additional loess that has been influenced by volcanic ash was deposited by eruptions of Mount Saint Helens and Glacier Peak. These ash deposits range from over 36 inches thick in depressions to very thin deposits that may be mixed with underlying materials on steep southerly aspects at lower elevations to no deposits remaining on the most southerly end of the Nez Perce-Clearwater. The ash deposits produced highly productive soils with excellent water-holding characteristics (Geist and Cochran 1990).

Soil productivity and function

The productivity and function of soil are integral to overall ecological integrity. Human activities or natural events can alter or damage the valuable benefits soil provide. To maintain or improve soil resilience, it is important to use soil ecological knowledge in the management and restoration of the soil resource (Heneghan et al. 2008). Limiting the loss of soil productivity has been the focus of soil management on the Nez Perce-Clearwater since the 1980s. Since 1999, physical soil disturbance has been the focus of soil management on National Forest System lands. With the shift of national policy in 2010, there is now a greater focus on managing National Forest System lands to maintain soil ecological functions as a foundation of planning management actions instead of only focusing on soil disturbance as a proxy for maintaining productivity (Pouyat et al. 2020). The 2012 Planning Rule requires forest plans to include plan components to maintain or restore terrestrial ecosystems, while also providing for ecosystem services and multiple uses.

The Forest Service defines soil productivity as the inherent capacity of the soil resource to support appropriate site-specific biological resource management objectives, which includes the growth of specified plants, plant communities, or a sequence of plant communities to support multiple land uses (U.S. Department of Agriculture 2010b). Since soil productivity is difficult to measure and varies according to seral stage and site, the Forest Service uses soil disturbance criteria to evaluate soil productivity. These disturbance criteria provide benchmark values that relate to the capacity for soils to function, otherwise called soil quality. If disturbance intensity exceeds established thresholds, then the disturbance is considered detrimental and long-term soil productivity could be potentially impaired. Detrimental soil disturbance is defined by the intensity of compaction, rutting, displacement, severe burning, surface erosion, and mass failure (U.S. Department of Agriculture 2014o). Dynamic soil characteristics may be indicators of impaired productivity. Compaction may restrict plant rooting, lower water-holding capacity, and decrease infiltration. Loss of surface soil through displacement and mixing may decrease soil productivity. Displacement occurs during temporary road construction, excavation of skid trails and landings, and displacement of soils during ground-based harvest. Areas with ground disturbance may become more favorable for weed invasion, which can reduce overall soil productivity and quality.

Forest Service Manual 2500, Chapter 2550 defines soil function as any ecological service, role, or task that soil performs, such as soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and filtering and buffering. These functions support the delivery of ecosystem services. To provide multiple uses and ecosystem services in perpetuity, these six soil functions need to be active and effectively working (Pouyat et al. 2020).

Soil biology is the presence of roots, fungi, and microorganisms in the upper sections of the soil. Diversity of soil biology is beneficial because a complex process of decomposition and nutrient cycling requires a varied set of microorganisms. Also, several organisms are involved in creating and maintaining the soil structure important to water dynamics in soil. Most soil organisms cannot grow outside of soil, so it is necessary to preserve healthy and diverse soil ecosystems to preserve beneficial microorganisms. An increase of invasive species; loss, compaction, or alteration of topsoil layers; and major changes in ground and canopy cover can affect soil biological function.

Soil hydrology is the ability of the soil to absorb, store, and transmit water, both vertically and horizontally. Soil hydrology is extremely important because ecosystem productivity is typically limited by water. Soil can regulate the drainage, flow, and storage of water and solutes, including nitrogen, phosphorus, pesticides, and other nutrients and compounds dissolved in the water. Changes in soil bulk density, soil chemistry, soil structure, soil pores, and ground cover can alter soil hydrology. The main impacts to soil hydrology are compaction, erosion, loss of vegetation cover, loss of ash cap, and hydrophobicity from severe burns.

Nutrient cycling is a supporting ecosystem service and is defined as the movement and exchange of organic and inorganic matter back into the production of living matter. Soil stores moderate the release of and cycles nutrients and other elements. During these biogeochemical processes, analogous to the water cycle, nutrients can be transformed into plant available forms held in the soil or lost to atmosphere or water. Decomposition by soil organisms is at the center of the transformation and cycling of nutrients through the environment. Decomposition liberates carbon and nutrients from the complex material making up life forms and puts them back into biological circulation, becoming available to plants and other organisms. Decomposition also degrades compounds in soil that would be pollutants if they entered ground or surface water. Soil compaction and loss or alteration of organic matter and topsoil can disrupt nutrient cycling.

Carbon storage is a regulating ecosystem service and is defined as the ability of the soil to store carbon. About 23 percent of forest carbon stocks in the Nez Perce-Clearwater are stored in the soil carbon contained in organic material to a depth of 1 meter, excluding roots (Hoang et al. 2019). Organic compounds enter the soil system when plants and animals die and leave their residue in or on the soil. Immediately, soil organisms begin consuming the organic matter; extracting energy and nutrients; and releasing water, heat, and carbon dioxide back into the atmosphere. Thus, if no new plant residue is added to the soil, soil organic matter will gradually disappear. If plant residue is added to the soil at a faster rate than soil organisms can convert it to carbon dioxide, carbon will gradually be removed from the atmosphere and sequestered in the soil. Maintaining organic matter inputs and limiting soil compaction and erosion help to maintain or increase net soil carbon storage.

Soil stability and support are regulating ecosystem services and necessary for anchoring plants, trees, and buildings. Soil is flexible, in that it can be dug, and stable, in the sense that it can withstand wind and water erosion. Inherent soil properties, like soil texture and particle size distribution, play a major role in physical stability. Soil has a porous structure to allow passage of air and water, withstand erosive forces, and provide a medium for plant roots. Management impacts affecting soil stability, and support are those that increase the risk of surface and subsurface erosion, mass movement, and loss of organic matter, including large wood material.

Filtering and buffering by soil are a regulating ecosystem service. The minerals and microbes in soil are responsible for filtering, buffering, purifying, degrading, immobilizing, and detoxifying organic and inorganic materials, including industrial and municipal by-products and atmospheric deposits. Wetlands soils especially function as filters. This function can be impacted by chemical pollutants and industrial contamination at localized sites on the more managed and publicly used portions of the Nez Perce-Clearwater.

Since soil function is difficult to measure in the field, associated indicators that can be readily observed are instead measured. These factors include disturbance to surface organic matter and topsoil. Most management activities affect surface organic matter that can rebound relatively quickly as surface leaf litter and roots in the soil rebuild organic matter stocks. In contrast, the mineral topsoil could be considered a summation of a site's potential to support growth based on bedrock, terrain, climate, and rate of soil development. When management activities displace or remove portions of the topsoil, this impact involves a longer-term recovery than disturbance. These consequences can vary depending on the soil depth and the place in the landscape. Other indicators include soil surface structure, plant species, root growth, mass wasting, and soil compaction.

For additional information, see Management Approaches: Soil Productivity and Function in Appendix 4 of the Land Management Plan.

Natural and Historic Disturbances

Common landscape-scale natural disturbances to soils in terrestrial ecosystems are wildfire, floods, and storms. These natural disturbances act independently and together in affecting surface erosion and landslide processes. Storm events can uproot trees exposing soils to erosion processes. Floods can rapidly remove and replace soils along slopes and in riparian areas. Wildfires combust surface organic matter and forest canopies that are the source of forest duff, creating conditions where bare soil is vulnerable to runoff and soil erosion. Wildfire is common across the Nez Perce-Clearwater, with several largescale events occurring between 1910 and 1934 and more recently in 2012, 2015, and 2017.

High intensity rainfall, along with winter and spring saturating storm events following the fires of the early 1900s, produced high rates of soil erosion. Brushfields along the steep breaklands of the Lochsa River serve as legacy markers of those historic fires.

The natural range of variation for these post fire mass wasting events is diverse, but extremes are relatively rare. Typical patterns for runoff events that trigger mass wasting failure occur roughly every 20 years, although two spring saturating events have occurred in the last 5 years.

Notable human-influenced disturbances include intensive mining in the late 1800s that included hot broadcast burning and hydraulic mining and extensive sheep grazing in which over two million sheep and goats grazed from 1911 to 1953. In more recent history, timber harvest and road construction from 1960 to 1990 created substantial amounts of ground disturbance, which is still evident on the landscape.

Soil Resource Condition and Monitoring

Most soils on the Nez Perce-Clearwater are in a natural condition, particularly in designated wilderness and inventoried roadless areas, which cover approximately 54 percent of the Nez Perce-Clearwater. Soil productivity has been altered to varying degrees where past land use has occurred. These human-caused stressors include timber harvest and associated skid trails, landings, temporary roads, and site preparation; fuels reduction activities; prescribed burning; livestock grazing; mining; construction of roads, trails, administrative sites, and developed recreation sites; wildfire suppression operations; dispersed camping; introduction of invasive plant species; invasive plant treatment; and off-road motor vehicle use.

The greatest impacts to the soil resource have resulted from log yarding and temporary road construction associated with timber harvest. Yarding actions compact and displace soil from skidding logs using ground-based equipment or skyline systems. Road building and landing construction removes surface soil. In addition, actions associated with timber harvest include reduced ground cover, altered vegetative conditions, decreased infiltration rates, increased runoff and surface erosion rates, and diminished site productivity, depending on the intensity and efficacy of operations. While these impacts have not been eliminated in current practices, the Forest Service has decreased these types of effects noticeably through the use of best management practices.

It is estimated that detrimentally disturbed soils occur on approximately 30,000 to 50,000 acres on the more managed portion of the Nez Perce-Clearwater. Detrimental effects on soils are not always permanent with regards to soil function and vegetation re-growth and depend primarily on soil texture, parent material, aspect, and the level of disturbance. Although recovery time is typically between 30 and 70 years (Froehlich and McNabb 1983, Froehlich et al. 1985, Dykstra and Curran 2002), loss of ash in areas where the ash augments the growing environment could see longer recovery rates. As discussed in (Williamson and Neilsen 2000), forest management has changed in the last few decades due to the development of new technologies, as well as a better understanding of the ecological impacts of management actions.

Soil monitoring on the Nez Perce-Clearwater has primarily targeted timber harvest operations. Monitoring ensures management actions maintain site productivity by limiting detrimental soil disturbance and complies with the Clearwater National Forest Plan (U.S. Department of Agriculture 1987a), the Nez Perce National Forest Plan (U.S. Department of Agriculture 1987b), and the Northern Region Supplement FSM 2500-2014-1 (U.S. Department of Agriculture 2014o).

In 2008, a field review was conducted on four timber sales on the Clearwater National Forest that covered a variety of soil types and logging systems (Archer 2008). Results found that soil conditions following timber harvest depended on the harvest system used and the subsequent site preparation of slash materials. Skyline yarding resulted in the least detrimental soil disturbance compared to tractor systems. For tractor yarded units, soil moisture, the type of site preparation, and operator efficacy were the biggest factors in soil disturbance. Skyline harvest led to a 0 to 7 percent detrimental soil disturbance, with most of the disturbance from severe burning during site preparation following harvest. Tractor harvest led to 8 to 22 percent detrimental disturbance after harvest and site preparation activities. Site preparation treatment disturbance was from broadcast burning or excavator piling and follow-up pile burning.

In 2009, post-harvest soil surveys on the Clearwater National Forest were conducted on 11 ground-based harvest units and 10 skyline units; all surveys were harvested during the summer under dry conditions (Reeves et al. 2011). Results showed skyline systems led to 1 percent detrimental soil, while ground based harvest systems led to approximately 13 percent detrimental soil disturbance.

Between 2011 and 2017, post-activity soil disturbance was monitored on 140 activity units associated with 24 timber sales on the Nez Perce-Clearwater (Bergstrom 2018). This effort resulted in approximately 3,200 acres being assessed using the national soil disturbance monitoring protocol (Page-Dumroese and Jurgensen 2006). Analysis of the over 11,000 monitoring points resulted in a mean detrimental soil disturbance of 7 percent, with a range of 0 to 37 percent. In addition to determining the amount of soil disturbance, estimates of the areal density of coarse woody debris were carried out in the same activity units.

Some of the monitoring conducted from 2011 to 2017 collected data specific to the type of logging system used for harvest. Post-harvest soil disturbance monitoring occurred on 45 units that were logged using ground-based equipment and on 19 skyline units. Results showed that detrimental soil disturbance ranged from 0 to 10 percent using skyline harvest systems and 0 to 29 percent using ground-based systems. Mean values for detrimental soil disturbance associated with ground-based systems and skyline systems were 9 percent and 3 percent, respectively. Ground based harvest units with 0 percent detrimental soil disturbance were harvested over snow or the units were small, requiring only one pass with skidding equipment. Ground based harvest units with a higher percentage of detrimental soil disturbance often included soil impairment from previous harvest entries.

Regional direction (U.S. Department of Agriculture 2014o) for organic material recommends following guidelines outlined in Graham et al. (1994), which recommends maintaining between 7 to 33 tons per acre of coarse wood material depending on habitat type, moisture regime, and aspect. Post activity monitoring from 2011 to 2017 found coarse wood levels were overall low, with 33 percent of the harvest units meeting minimum coarse wood thresholds. Overall monitoring showed an average of 7 tons per acre and ranged from 0 to 55 tons per acre. Although Keane et al. (2013) found the methods to calculate coarse wood material imperfect, the monitoring data indicates a trend of coarse wood levels below recommended amounts following post-harvest and site preparation activities. Notably, units with previous harvest were low in coarse wood material to begin with, primarily due to historic slash disposal methods. In the past, slash material was removed with high intensity broadcast burning or piled with bulldozers, taking all organic matter and topsoil with it.

Based on Forest Service data collected through Forest Inventory and Analysis (FIA), current forestwide coarse wood material is within the ranges prescribed for each potential vegetation type (Table 110). The desired condition ranges were calculated using the coarse woody debris recommendations by habitat types in Graham et al. (1994) and correlated to potential vegetation type.

Table 110. Existing coarse wood material (in tons per acre) forestwide, by potential vegetation type.

Potential Vegetation Type	Desired Condition	Existing Condition[1]
Warm Dry	7-15	10
Warm Moist	17-33	17
Cool Moist	9-18	13
Cold	7-24	9

[1]Estimates are expressed within a 90 percent confidence level.

Data Source: Forest Inventory and Analysis data collected 2011 to 2017.

Soil productivity relies on soil organic matter, which is influenced by wildland fire, harvest activities, decomposition, and accumulation rates. The organic component of soil is a large reserve of nutrients and carbon and is the primary site for microbial activity. Forest soil organic matter influences many critical ecosystem processes, including the formation of soil structure. Soil organic matter is also the primary location for nutrient recycling and humus formation, which enhances nutrients, water storage, and overall fertility. Soil organic matter depends on inputs of biomass, such as vegetative litter and fine woody debris, to build and maintain the surface soil horizons, support soil biota, enhance water-holding capacity, and prevent surface erosion. Much of the nutrient capital on soils on the Nez Perce-Clearwater depends on forest floor, coarse wood debris, and organic matter in the topsoil.

The impacts from forest management continue to be offset by best management practices that either avoid or minimize the intensity of timber harvest operations. Additionally, over the past 20 years, active restoration of soils has facilitated a more rapid recovery of soil function. Since the early 2000s, the Nez Perce-Clearwater has actively restored temporary roads associated with timber harvest units. Restoration actions include decompacting soils, recontouring slopes, and adding organic matter to improve soil conditions and accelerate recovery. Beginning in 2012, due to the success of the Nez Perce-Clearwater system road decommissioning program, several timber harvest projects included design measures to restore detrimental soil disturbance on skid trails and landings, in addition to temporary roads. The design measures required treatment methods similar to those used in the Nez Perce-Clearwater system road decommissioning program.

Decommissioning of system roads started on the Nez Perce-Clearwater in the mid-1990s. On the Clearwater National Forest, road decommissioning projects were routinely monitored, and treatment techniques improved over time by using adaptive management. Methods have been shown to improve soil structure and soil porosity based on road decommissioning monitoring on the Clearwater National Forest. Local research by Lloyd et al. (2013) found similar techniques improved infiltration rates and soil bulk densities to values similar to never-roaded areas at 1, 5, and 10 years following decommissioning. In this same study and timeframe, soil organic matter, total carbon, and nitrogen pools and processes increased to levels similar to never-roaded surfaces. Across a range of sites, a Clearwater Forest Plan Monitoring Report (U.S. Department of Agriculture 2009d) documented an increase in vegetative cover from 18 percent the year after decommissioning to 64 percent 10 years after decommissioning. Since the mid-1990s, the Nez Perce-Clearwater's watershed restoration program has obliterated hundreds of miles of historic harvest-related skid trails and non-system roads. Between 2005 and 2018, the Nez Perce-Clearwater treated approximately 840 acres within harvest units, while approximately 14,000 acres of legacy non-system roads, such as jammer roads, were treated outside of harvest units.

Sensitive Soils

Disturbance from wildfire and anthropogenic land management can have a disproportionate effect on soils, resulting in poor recovery. Sensitive soils have characteristics that vary from higher susceptibility to compaction, being prone to soil erosion after loss of ground cover, and having the majority of nutrient base stored in the topsoil. The soils and conditions listed below outline most of the sensitive soils and conditions found across the Nez Perce-Clearwater.

Granitic Soils

Grussic soils weather from granitic bedrock that produces many fine, gravel-sized particles of weakly consolidated rock. Approximately half the Nez Perce-Clearwater has granitic bedrock. However, weathered grussic soil occurs on roughly four percent of the Clearwater National Forest, equaling 165,000 acres, based on Clearwater landtype information (Wilson et al. 1983). Particles from the weathered rock are easily crushed between fingers demonstrating the erodible nature. Bared or disturbed subsoils where this grussic soil is exposed easily erode and are highly susceptible to mass wasting. Once exposed, the loose substrate does not revegetate readily. The loose aggregate produces extremely well drained conditions but results in droughty soils and poor fertility. Thus, the surface organic layers on grussic soils have higher proportional fertility than typical forest soils.

Hydric Soils

The National Technical Committee for Hydric Soils defines hydric conditions as formed under saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (U.S. Department of Agriculture 2018j). These soils either saturate or inundate long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. Hydric soils are a primary indicator of wetlands and are used to assess compliance with Executive Orders 11988 and 11990, directives relative to the management and disposition of floodplains and wetlands. Hydric soils occur across the Nez Perce-Clearwater in floodplains, wetlands, meadows, and adjacent to isolated springs and seeps. These wet conditions are more prone to rutting and compaction from equipment.

Severely Burned Soils

Wildfire, natural fuels prescribed burning, and site preparation burns following timber operations have the potential to severely burn soils. These soils have higher sensitivity to ground disturbance because of the change in soil biological and physical properties. Soil burn severity is the effect of a fire on ground surface characteristics, including char depth, organic matter loss, and altered color and structure (DeBano et al. 1998). Soils with high burn severity become more vulnerable to compaction due to loss of soil structure and can erode more readily from lack of soil cover and reduced ability to infiltrate rainfall.

Severely burned soils are identified using the Field Guide for Mapping Post-Fire Soil Burn Severity (Parsons et al. 2010). Recovery of severely burned soils depends on the inherent productivity of a site and is based on factors such as soil type, available water, and adequate temperature for growth. Wildfires typically result in 4 to 10 percent high soil burn severity, while prescribed fires generally create less burn severity because burning often occurs during cooler and more moist conditions (U.S. Department of Agriculture 2013b). Soils recover more slowly where severely burned. A western Montana study showed high burn severity areas revegetated within 10 years compared to quicker rates in areas with low and moderately severe burns (Lewis et al. 2017).

Site preparation of timber harvest units typically includes broadcast burning or excavator piling and follow-up pile burning. Site preparation burns range from 1 to 3 percent severely burned soil based on Clearwater National Forest monitoring (Archer 2008). Detrimental soil conditions within burn pile scars can persist for several decades due the concentrated heating (Jiménez Esquilín et al. 2008, Rhoades and Fornwalt 2015).

Mass Movement Soils

Soil mass movement is defined as the detachment and downslope movement of soil or the surface mantle in the form of debris slides or avalanches or deep-seated rotational failures or slumps (U.S. Department of Agriculture 2014o). Landslide is the general term used to describe mass movement events including slides, slumps, soil creep, debris flows, topples, and falls of soil and rock. Landslides most likely re-occur in the same location because of geologic bedrock orientation and contacts. In the steep topography so prominent in the river country of the Nez Perce-Clearwater, soil mass movement is a natural disturbance process. However, periodic, sufficient-sized storms have the potential to induce mass movement in areas that received stand replacing burns (Meyer 2001), as well as unburned areas when sufficiently saturated

(McClelland et al. 1997). Warm weather fronts during winter and spring can quickly melt snow that supersaturates slopes, causing subsequent failure. During these conditions, concave hollows concentrate moisture that can produce debris flows (Wondzell and King 2003).

Currently, potential mass failure is described as landslide prone in the 1987 Nez Perce and Clearwater National Forest Plans. The Nez Perce National Forest defines landslide prone as areas with slopes steeper than 60 percent and with mapped landslide deposit landtypes (U.S. Department of Agriculture 2007a). The Clearwater National Forest defines landslide prone terrain (U.S. Department of Agriculture 2007a) based on a slope break of 55 percent and the landtype 50 series, which are slump and earthflow landtypes (Wilson et al. 1983). Together, landslide prone areas were mapped on approximately 857,000 acres, covering approximately 22 percent of the Nez Perce-Clearwater.

Because such a coarse filter was used to predict landslide potential, areas with proposed harvest and prescribed burn activities are field surveyed to verify risk and determine actual extent of mass movement potential. Characteristics of unstable slopes include wetland areas and moist seeps situated on slopes; hydrophytic vegetation, indicating saturated soil conditions during at least a portion of the year; slumps, soil creep, hummocky or benched surfaces, especially below crescent-shaped headwalls; headwall scarps, tension cracks, curved or buttressed tree boles; and back-rotated, jack-strawed, pistol-butted, or leaning trees.

During storm and flood events in 1995 and 1996, over 860 landslides occurred across the Clearwater National Forest. Most landslides were triggered by a heavy rainfall season with rain-on-snow events. Over half of the landslides documented were associated with roads. Based on a review of the landslides, McClelland et al. (1997) identified five factors to assess landslide potential: geologic parent material, elevation, aspect, slope angle, and landform. The highest landslide prone erosion potential occurs on border zone metamorphic parent materials; less than 2,000 to 4,000 feet elevations; south and southwest aspects; greater than 56 percent slope angles; and mass wasted slopes and breakland landforms.

Highly Erosive Soils

Soils that have a high or very high erosion potential are also considered sensitive. Soil erosion hazard potential is classified by landtype and subdivided by erosion type, which includes surface erosion, mass wasting, and subsurface erosion. Surface erosion follows disturbance events that remove groundcover, such as wildland fire or after timber harvest. Landtypes help distinguish which areas are predisposed to higher erosion risk. Landtypes are given ratings of low, moderate, high, and very high depending on characteristics such as parent material, slope, aspect, and landform. As the rating increases the potential risk of erosion also increases. Soil erosion affects soil quality, function, and productivity and can be delivered to streams, affecting water quality and fish habitat. Landtypes and associated erosion hazard ratings were mapped across the Nez Perce-Clearwater, minus wilderness areas. Table 111 shows the percentage of the mapped areas occurring on landtypes with high or very high erosion hazard potential by erosion type. Using the landtype mapping, 17 percent of the Nez Perce-Clearwater has conditions that could potentially have high and very high erosion hazard. Roughly 24 percent of the Nez Perce-Clearwater has subsoils that could have high or very high erosion hazard when bared during road construction. It should be noted that erosion hazard is minor when these soils have natural forest ground cover.

Table 111. Percent of mapped landtypes with high or very high erosion hazard potential, by erosion type and evaluation for rating.

Erosion Type	Evaluation for rating	Percent Mapped Area
Surface erosion potential	Considers raindrop splash and overland flow erosion on soils bared of vegetation but retain the root mat and soil structure. This potential is used for predicting surface erosion following wildland fires. The presence of the Mazama volcanic ash cap plays an important role in surface erosion potential since this material is extremely permeable, has a high-water holding capacity, and is seldom associated with overland flow.	17
Mass wasting potential	Considers the relative potential for mass soil movement caused by gravitational forces. It involves the movement of regolith as a coherent mass along a slippage plane created due to subsurface water concentration.	22
Subsurface erosion potential	Considers raindrop splash and overland flow erosion where the subsoil has been exposed or where the surface soil has been severely disturbed and mixed with the subsoil.	24

Data Source: (Wilson et al. 1983, U.S. Department of Agriculture 2007a).

Erosion hazard mapping has advanced since the initial efforts in the 1980s. At the project level, managers can now spatially determine erosion hazard rates and amounts. The landtypes provide a broad view context, whereby actual risk depends more on slope, groundcover, soil type, and the storm event (Wondzell and King 2003, Elliot 2013).

Ash Cap Soils

Soil with a surficial volcanic ash deposit, or ash cap, is another group of sensitive soils and are instrumental to the high productivity of the Nez Perce-Clearwater. Using forest mapping, ash soils cover approximately 825,000 acres, or 20 percent of the Nez Perce-Clearwater, and increase in depth to the north and west. Ash occurs from 1,000 to 5,900 feet in elevation (Kimsey Jr 2006).

Volcanic ash is composed of angular shards of glass. If these angular pieces remain undisturbed, they settle and become interlocked forming a very cohesive layer that is resistant to weathering. These soils are characterized by a low bulk density, high water holding capacity, and high cation exchange capacity that can lead to a concentration of nutrients.

The primary ash topsoil was laid down 7,700 years ago by volcanic eruptions from Mount Mazama and to a lesser degree, recent eruptions from Mount Saint Helens and Glacier Peak (McDaniel et al. 2018). The original deposit was 1 to 2 feet thick, with most accumulation either in depressions or areas protected from erosion (Wilson et al. 1983). Much of the ash has either eroded away or mixed with topsoil. Ash becomes rare on many steep southerly aspects or on high elevation areas that have experienced historic, high intensity wildfires (Wilson et al. 1983). Where present, volcanic ash has increased soil productivity due to high water holding capacity and resistance to erosion.

The ash deposited on the Nez Perce-Clearwater tends to have fine particles forming loam and silt loam textured soils. The high-water holding capacity is arguably the most important feature of the ash cap locally. The ash was deposited over rocky and sandy coarse textured soils with relatively low water holding capacities in north and central Idaho and, therefore, the majority of the plant-available water in this landscape is held in the ash cap. The presence of thick ash can sustain growing conditions beyond what otherwise the climate would limit.

Soil surface layers formed in ash and loess are an excellent medium for plant growth. Soils with the thickest loess surface layers tend to be the most productive. An ash-influenced surface layer resists erosion when undisturbed but, once bared and compacted, can have higher risk for soil loss. Ash caps are extremely susceptible to decreased soil quality due to compaction, erosion, and soil mixing (Page-Dumroese et al. 2007). Ashy soils do not recover from compaction as quickly as other soil types. Since volcanic ash is not replaced, the effects of erosional losses of the ash cap can be permanent.

Shallow and Infertile Soils

Shallow soils have a depth less than 20 inches deep and are susceptible to erosion and detrimental effects from management actions because of inherently low fertility due to carrying much of the productive capacity in the thin topsoil. These soils generally have weak development, relatively little organic matter, and, therefore, have low nutrient levels. Soil displacement and loss disproportionately affects productivity. Furthermore, shallow soils have higher erosion risk since runoff can concentrate laterally along the interface between the bedrock layer and soil material.

The existing forest plan Standard 5 in the Clearwater Forest Plan calls attention to potential erosion and productivity loss on shallow infertile soils and compacted till in the Powell area. The latter case is a concern because of raised water tables where transpiration decreases from tree removal. The higher water table could exacerbate soil piping, sloughing, and overall erosion loss.

The over-steepened slopes common on the Nez Perce-Clearwater produce many areas with shallow, nutrient poor soils. These soils tend to be on south facing slopes, along steep breaklands that adjoin streams and rivers, and along alpine ridges and glacial carved side slopes. Soil mapping underestimates these shallow soils at 152,000 acres, largely because mapping is poor in the steep, rocky wilderness areas where soils have higher glacial influence and rock outcrop.

Environmental Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carry out any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications, or longer-term environmental consequences, of managing the Nez Perce-Clearwater under this programmatic framework.

The environmental consequences analysis for the soils resource focuses on timber harvest associated activities that have measurable impacts to soils over the next planning cycle on National Forest System lands within the administrative boundary of the Nez Perce-Clearwater. Other management activities, such as livestock grazing, dispersed camping, invasive plant treatment, prescribed fire, fuels treatments, and fire suppression operations, can also cause ground disturbance and detrimentally impact soils. The scale of the disturbance is small enough and distributed such that comparisons between the alternatives would only be slight. Thus, the effects of these activities are only discussed in the Effects to Soil Resource from Other Resources.

Effects Common to All Alternatives

The potential impacts from climate change to soil resources would be the same for all alternatives. Changes in climate, coupled with an increase in the frequency and severity of extreme weather events, have had, and will continue to have, direct and cascading indirect effects on soil formation and associated productivity rates, as well as physical, chemical, and biological processes (Pouyat et al. 2020). Shifts in precipitation patterns, temperature increases and variability, and increases in atmospheric carbon dioxide (CO_2) concentrations affect plant productivity, flooding, nutrient cycling, and biological populations. Changing conditions that result from a warming climate, such as increased wildfire potential and invasive species expansion, will have an impact on soil function, long-term ecological sustainability, and the ability to provide ecosystem services. Increasing air temperature, through its influence on soil moisture, is expected to cause gradual changes in the abundance and distribution of tree, shrub, and grass species, with more drought tolerant species becoming more competitive (Halofsky, Peterson, et al. 2018a). Climatic changes are expected to differentially affect tree species and their distribution on the landscape, as well as some of the pathogens that act upon them (Keane et al. 2018). There is also significant concern that climate change effects combined with altered disturbance regimes caused by fire exclusion will change ecosystems (Hessburg et al. 2005).

The relationship between soil and anthropogenic climate change is twofold. First, climate change may affect the soil resource and how it functions. Second, soil can either store or release greenhouse gases, thereby potentially influencing climate change. The potential impacts of climate change on the forest soil resource are not well known at this time. Warmer and wetter winters may result in large areas of reduced trafficability for winter harvest operations, a common soil protection practice on the Nez Perce-Clearwater. Increased frequency and severity of summer droughts could threaten effective vegetation cover through increased wildfire, insect and disease activity, and spread of non-native plants (Halofsky, Peterson, et al. 2018a, b). Soil erosion is tied to many forces on the landscape that are affected by climate change. In mountainous areas, wildfire and precipitation interact to affect erosion rates. Frequency of wildfire, precipitation in the form of rain rather than snow, and intense precipitation events are expected to increase a combination that will lead to greater erosion and more landslides (Halofsky, Peterson, et al. 2018b). Expansion of invasive species may also reduce soil biota diversity.

Literature suggests that opportunities may exist to manage the soil carbon pool (Harmon and Marks 2002, Johnson and Curtis 2001, Yanai et al. 2003). However, predicted soil carbon response to anthropogenic climate change is extremely uncertain at this time (Friedlingstein et al. 2006, Todd-Brown et al. 2013). Carbon sequestration will be increasingly difficult if wildfires, insect outbreaks, and perhaps plant disease increase as expected, especially in the western part of the Northern Rockies. At the same time, managing forests for carbon sequestration is likely to become more important in response to national policies on carbon emissions (Halofsky, Peterson, et al. 2018a).

Effects of the No Action Alternative

Since the Nez Perce and Clearwater National Forests administratively combined in 2012, it has been difficult to provide consistent soil management administration across the combined Nez Perce-Clearwater because the direction from the two forest plans differed. This inconsistency mainly impacts forest management planning and implementation. The two plans also do not have the same avoidance mitigation for sensitive soils. This is particularly poignant on excluding landslide prone areas. The plans similarly do not have adequate criteria for conserving organic materials after timber harvest and fuels treatments. Current planning efforts rely on contemporary studies for recommendations on coarse wood retention. Finally, both 1987 plans do not clearly articulate restoration activities that have evolved since the 1980s. Rather, the Plans focus on avoidance and minimization and not on active reclamation to maintain and improve existing soil conditions.

Soil impacts from timber harvest operations may not noticeably differ between the Nez Perce and Clearwater since implementation uses common contract language and best management practices. However, plan differences can influence decisions on where and how to conduct forest management between the two national forests. One example is that the Clearwater National Forest has more flexibility when managing past harvest areas with extensive past disturbance. On the Nez Perce portion, the forest plan caps detrimental soil disturbance at 20 percent, while the Clearwater National Forest relies on the Northern Region Supplement 2500-2014-1 (U.S. Department of Agriculture 2014o). To ensure compliance with Standard 1 in the Clearwater National Forest Plan, the forest limits the amount of detrimental soil disturbance to 15 percent of an activity area, consistent with the Northern Region

Supplement FSM 2500-2014-1. The Northern Region Supplement FSM 2500-2014-1 allows for improving soil condition when existing soil disturbance exceeds 15 percent areal coverage (U.S. Department of Agriculture 2014o).

Timber harvest and associated actions would continue as the management activity that produces the highest amount and level of ground disturbance. Timber harvest and associated actions can remove or modify ground cover and surface organic material; remove or modify topsoil or the volcanic ash layer through soil erosion, displacement, compaction, rutting, mixing, or severe burning; expose or mix subsoil; and increase mass movement potential. Since there is no requirement for soil restoration, detrimental soil disturbance from historic activities would remain. Restoring soils after timber harvest occurs on some projects but is not required.

Soil restoration outside of timber harvest units is conducted through the watershed restoration program, primarily as non-system road decommissioning. This activity would still occur under the No Action Alternative as long as the Nez Perce-Clearwater continues to prioritize watershed restoration activities.

Soil productivity and function

The primary management strategy over the last few decades is limiting activities that detrimentally disturb soils. Since timber harvest and associated activities tend to create the most soil disturbance, it is the focus of the soils effects analysis. On both national forests, detrimental soil disturbance is calculated using the national soil disturbance monitoring protocol (Page-Dumroese et al. 2009b, a).

Standard 1 in the Clearwater National Forest Plan requires bulk density measures, which have high costs in time and money. Since 1999, the Clearwater has used soil detrimental disturbance, as defined in the Northern Region Supplement FSM 2500-2014-1 (U.S. Department of Agriculture 2014o), as a proxy and limits the amount of detrimental soil disturbance to 15 percent of an activity area. In areas already exceeding 15 percent, detrimental soil disturbance and ground disturbing activities are allowed if treatments restore soil and leave a net improvement in soil quality.

The Nez Perce National Forest Plan Standard 2 limits detrimental soil disturbance to 20 percent of an activity area using similar indicators as those described in the Northern Region Supplement FSM 2500-2014-1 (U.S. Department of Agriculture 2014o). However, this has become problematic, as it is less restrictive than the regional guidance and it does not offer the ability to conduct ground disturbing actions on areas over 20 percent even if soil restoration is included. Site specific amendments to the Nez Perce Plan have occurred to enter areas exceeding 20 percent detrimental soil disturbance, thus allowing for multiple resource objectives while showing an upward trend in net soil conditions through soil restoration.

Additional issues relate to the need to harvest timber in areas with legacy soil disturbance. Over the last planning cycle, due to forest succession, silviculture has increasingly proposed treating stands previously harvested in the 1950s and 1960s. Because historic harvest methods created higher soil disturbance, the effects to soil productivity persist. In many instances, the summation effects of proposed harvest and existing detrimental soil disturbance becomes difficult to remediate to levels compliant with either the Clearwater or Nez Perce 1987 plans. Some timber sale projects have included soil restoration to achieve a net decrease of detrimentally disturbed soil to meet forest plan standards. Unfortunately, post-harvest surveys using the national soil disturbance monitoring protocol (Page-Dumroese et al. 2009b, a) indicate that the restored soils are still technically considered determinately disturbed by definition. For example, a temporary road that was uncompacted, fully recontoured, and overlaid with organic material receives the same detrimental disturbance rating as a road not treated, despite the treatment having improved soil functions. In this example, the restored temporary road is far more productive than the untreated road.

Other current soil management not included in the existing forest plans but included as design features in projects to meet the intent of the standards include:

- Avoidance of ground disturbance or removal of trees on landslide prone areas, which includes areas over 55 to 60 percent slope, as defined in an earlier forest plan revision process (U.S. Department of Agriculture 2007a) and as required by PACFISH and INFISH.
- Limitation of ground-based harvest systems to slopes less than 35 percent, unless exempted by field review by a soil scientist.
- Retention of downed wood material as recommended by Graham et al. (1994).
- Utilization of timber sale contract provisions, national core best management practices, regional soil and water conservation practices, and adherence to Idaho Forest Practices Act guidance.

Plan direction does not provide contemporary environmental controls that reflect changes in logging systems. For example, the soil standards in both 1987 plans do not designate slope steepness. Instead, project design measures require operations limit ground-based equipment to less than 35 percent except for short pitches. The measure is conservative and does not consider new equipment technology and logging systems updates. Potentially ground-based harvest could operate on steeper slopes without the adverse soil effects reflective of past dated equipment.

Finally, the Land Management Plan direction does not include adequate criteria for maintaining soil organic matter. Soil organic matter is extremely important in regulating soil function for plant nutrition and water (Jurgensen et al. 1997). In these primarily montane soils, the forest floor and thin topsoil makes up a large proportion of the productive capacity. Page-Dumroese and Jurgensen (2006) outlined the variable amounts of nitrogen and carbon – two essential elements for productivity – in habitats that cover the Nez Perce-Clearwater. Their work underscores the importance while also giving baselines for these important nutrients. Similarly, research was completed during the last planning cycle that gives explicit ranges for coarse wood debris (Graham et al. 1994). These recommendations acknowledge the strong above ground and below ground connections between ecto- and endo-mycorrhizae for tree and understory growth (Harvey et al. 1987, Perry et al. 1989). These recommendations endure due to the long-term work that went into describing these ranges and the re-enforcement by more recent research of explicit connections across tree fungal networks.

Protection of sensitive soils

The Nez Perce National Forest has a general plan component to avoid erosion while the Clearwater National Forest has four specific plan components to address damage to ash soils and soil loss from erosive conditions and unstable environments. These discrepancies complicate compliance across the Nez Perce-Clearwater for sensitive soils. One of the most important conditions that causes confusion is landslide prone. The action alternatives would standardize this approach and would provide better over-arching protection.

Effects Common to Action Alternatives

Desired conditions in the Land Management Plan provide a vision of the future landscape and serve to focus management attention by describing the specific desired ecological characteristics of soil resources within the plan area towards which management of the land and resources would be directed. Standards and guidelines are designed to protect soil resources when conducting activities that might affect them.

Because desired conditions, standards, and guidelines for soil resources do not vary between action alternatives, any differences in the indirect effects to soil resources would be based on variation of the action alternatives for the soil resources objectives and projected amounts of other land management activities.

The effects analysis evaluates the relative ability of the proposed action alternatives to improve or decrease soil productivity and function. Many land management activities carried out on the national forest have the potential to adversely affect soil resources to some degree. The plan components within the soil resource section of the Land Management Plan are consistent across all action alternatives. Additionally, the Land Management Plan includes a monitoring plan that would track the effectiveness of implementing the Land Management Plan and a management approaches section that offers possible strategies the Nez Perce-Clearwater could undertake to maintain or make progress towards achieving the desired conditions described in the Land Management Plan.

The effects analysis primarily focuses on management activities that occur in the more managed portion of the Nez Perce-Clearwater, which is delineated as Management Area 3 and covers 1,240,340 acres under the Preferred Alternative resulting in approximately 30 percent of the Nez Perce-Clearwater. Management Area 3 is described as the "front country" and consists of the areas with roads, trails, and structures, as well as evidence of past and ongoing activities designed to actively manage the area. The rest of the Nez Perce-Clearwater is split into Management Areas 1 and 2 lands where more natural ecological and disturbance processes occur, and soil resources are generally considered to be within the natural range of variation. Management Area 1, consisting of approximately 1,231,638 acres for the Preferred Alternative, contains designated wilderness, designated wild and scenic rivers, and National Historic Landmark areas. Management Area 2 encompasses approximately 1,467,078 acres for the Preferred Alternative and includes lands within Idaho Roadless Areas, recommended wilderness areas, suitable wild and scenic rivers, parts of the Gospel-Hump Geographic Area, and proposed and designated research natural areas.

The objectives of current national direction on National Forest System lands are 1) to maintain or restore soil quality and 2) to manage resource uses and soil resources to sustain ecological processes and function so that desired ecosystem services are provided in perpetuity (U.S. Department of Agriculture 2014o). The Nez Perce-Clearwater proposes to focus soil management on these objectives and move away from the current disturbance tracking as described in the No Action alternative. The Nez Perce-Clearwater plans to continue using soil resource information for designing projects since soils give vital information on vegetation growth. The action alternatives would continue to rely on soils resource specialists for project planning. The engagement of soils specialists in projects would ensure soil management objectives. The Nez Perce-Clearwater would continue stewarding soils resource layers as part of the national cooperative soil survey.

The 2012 Planning Rule requires Land Management Plans to include plan components to maintain or restore soils and soil productivity, including guidance to reduce soil erosion and sedimentation (36 CFR 219.8(a)(2)(ii). This requirement supports long term ecological sustainability.

All the action alternatives propose the following desired conditions based on the understanding of natural disturbance regimes and ecosystem processes:

- FW-DC-SOIL-01. Soil productivity and function contribute to the long-term resilience of ecosystems.

- FW-DC-SOIL-02. Soil organic matter and downed woody material support healthy microbial populations, protect soil from surface erosion, facilitate soil moisture retention, provide nutrients, and maintain soil development and biochemical processes.
- FW-DC-SOIL-03. Volcanic ash-influenced soils are intact and retain unique properties, including high soil porosity and high water and nutrient holding capacity.

These desired conditions emphasize the important role soils have in promoting a resilient and diverse ecosystem that supports ecological integrity as well as addressing the requirements of the 2012 Planning Rule.

Soil management traditionally involves avoiding risks for soil erosion and physical impairment from machine operations. The action alternatives would carry forward and expand sideboards that mitigate impacts. Proposed standards and guidelines were developed to limit impacts on sensitive soils, reduce the amount of new soil disturbance, increase the amount of restoration of impaired soils, and provide thresholds for ground cover and coarse wood material. Through standard FW-STD-SOIL-03, project specific best management practices and design features shall be incorporated into land management activities as a principal mechanism for protecting soil resources. The proposed desired conditions, standards, and guidelines are common to all action alternatives. The soil resource plan components do not apply to intensively developed sites, such as mines, developed recreation sites, administrative sites, rock quarries, trails, or system roads (U.S. Department of Agriculture 2014o).

Soil productivity and function

Timber harvest and associated actions such as temporary road, skid trail, and landing construction would continue as the management activity that produces the highest amount and level of ground disturbance over the next planning period. Most of the timber harvest would occur on lands designated as suitable for timber production in the Land Management Plan. These activities occur primarily in Management Area 3 and small portions of Management Area 2. The exact location of future timber harvest will depend on road access and site-specific forest conditions. However, uncertain disturbance events, such as insect and disease outbreaks or wildfire, would also influence location and extent of harvest.

The Nez Perce-Clearwater proposes that all land management activities be designed and implemented in a manner that maintains soil function and productivity (FW-STD-SOIL-01). The Plan focuses on outcomes to achieve this standard through a mix of mitigation that includes avoidance, logging systems design, retaining sufficient organic matter and coarse wood on the soil surface, and actively reclaiming past and current impaired soils on skid trails, log landings, and temporary roads.

In absence of numerical standards, Appendix 4 - Management Approaches and Possible Actions outlines methods to assess compliance, including but not limited to the use of the numerical thresholds and definitions provided in Northern Region Supplement FSM 2500-2014-1. Appendix 4 also outlines qualitative measures to better assess recovery of soil function from restoration actions. These analysis measures provide a means to quantify the combined effects of limiting disturbance with active restoration.

Damage to soils would be limited by:

- Using existing disturbed areas where practical (MA2 & MA3-GDL-SOIL-02), which would be restored after use.
- Treating areas of impaired soil function from past management activities to restore long-term soil productivity and function (MA2 & MA3-GDL-SOIL-03).
- Decommissioning temporary roads to restore soil function (MA2 & MA3-GDL-SOIL-05).

- Rehabilitating soil function created through future management activities to maintain long-term soil productivity (FW-STD-SOIL-02).

With the emphasis on restoring soil disturbance at a site, the strategy could reinforce best practices through operators that improve post-harvest results. Forest monitoring and reports show that conditions after timber harvest and fuels reduction can weigh heaviest on operator skill (Page-Dumroese et al. 2010). Furthermore, the Nez Perce-Clearwater's use of restoration measures has evolved over 25 years of decommissioning roads. The Nez Perce-Clearwater's proven restoration practices, together with the encouragement of operator best practices, could increase soil recovery rates, restoring vital soil functions to their inherent range of variability. For example, decompacting soils, removing ruts, recontouring slopes, and adding organic matter can reestablish soil functions, including soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and filtering and buffering.

Although not currently a forest plan standard, the Nez Perce-Clearwater has limited ground-based harvest systems to slopes less than 35 percent unless exempted by a soil scientist. Over the last 20 years, ever improving timber sale contract provisions and best management practices have been developed to minimize the impacts from ground-based harvest systems. Concurrently, advances in machine technology have led to the creation of equipment that is less ground disturbing. Tracked machines have lower ground pressures than wheeled machines and self-leveling cabs shift the overall center of gravity, thereby improving weight distribution over the track (Cambi et al. 2015, Visser and Stampfer 2015). Given similar soil and environmental conditions, activities accomplished with modern tracked machinery are expected to cause less extensive and intense soil disturbance than those accomplished with traditional wheeled machinery.

Using limitations like those described in the Idaho Forest Practices Act best management practices handbook (University of Idaho Extension Office 2015), the Nez Perce-Clearwater proposes guideline MA2 and MA3-GDL-SOIL-01, which includes the following:

- Ground-based equipment used for vegetation management should only operate on slopes less than 45 percent to protect soil quality.
- Log skidding equipment should only operate on slopes less than 35 percent to limit detrimental soil disturbance.
- Exceptions can be authorized where soil, slope, and equipment are determined appropriate to maintain soil functions.

Despite these environmental controls, harvest actions could still leave levels of detrimental soil disturbance. To initiate recovery of impaired soils created from timber harvest, the Nez Perce-Clearwater proposes active restoration of newly created impaired soils on 555 to 2,100 acres annually (FW-STD-SOIL-02) and 75 to 280 acres of soils impaired from past management activities (FW-OBJ-SOIL-01, MA2 and MA3-GDL-SOIL-03), depending on alternative. This soil restoration would occur either within or adjacent to timber harvest units. Calculations assumed a 15 percent creation and restoration of detrimental soil disturbance for every acre of timber harvest proposed. Estimated soil restoration acres of soils impaired from past management activities were calculated using a 2 percent factor for every acre of timber harvest proposed. Actual restoration acres would depend on the timber harvest area, the extent of existing soil disturbance, and the degree harvest activities impair soils. Other soil improvements would be achieved through FW-OBJ-WTR-05 and FW-OBJ-RMZ-01. The No Action Alternative does not have this level of soil restoration integrated in the timber harvest program, allowing for approximately 15 acres of impaired soil to be left on the landscape for every 100 acres of harvest.

The Nez Perce-Clearwater restoration strategy would address legacy impacts from past forest management when conducting forest treatments. Future management activities are expected to re-enter previously harvested stands in their second rotation. Old yarding templates and landing areas not used by current timber sales would be reclaimed as part of a net improvement approach. This strategy follows current policy in the Northern Region Supplement FSM 2500-2014-1 (U.S. Department of Agriculture 2014o) to have management actions leave the soil with an increased rate of recovery upon completion of the activities where existing conditions exceed 15 percent detrimental soil disturbance.

The action alternatives all incorporate thresholds for managing organic matter and maintaining sufficient groundcover to control erosion. Currently, analysis relies on published findings for managing forest residues such as down wood, slash, and forest floor. Forest management and public use activities often disturb or remove ground cover and organic material. This condition allows for erosion where soils are friable or where storm flows can concentrate. Although overland flow and surface erosion are rare in Rocky Mountain forests (Wondzell and King 2003), evaluation of Nez Perce-Clearwater soil data shows most of the plan area has soils easily eroded if ground cover or the forest floor is removed on steep or compacted surfaces. Cover is important since vegetation and forest litter intercept rainfall and slow runoff to allow rainfall to infiltrate into the soil. As determined through use of Disturbed WEPP, a soil erosion model amended for forested environments, soil erosion rarely occurs if groundcover exceeds 85 percent cover (Elliot et al. 1999). Guideline FW-GDL-SOIL-02 establishes a post-implementation ground cover target of 85 percent aerial extent to retain soil moisture, support soil development, provide nutrients, and reduce soil erosion. Ground cover consists of vegetation, litter, fine organic matter, coarse woody material, and rock fragments larger than three-fourths inch in diameter in contact with the soil surface. Guideline FW-GDL-SOIL-02 allows for differential depth and distribution of organic matter depending on the local ecological type and fire regime. This also allows for situations when bare mineral soil is warranted for regenerating early species such as Western larch.

The retention of coarse woody debris, which is material greater than 3 inches in diameter, is essential to maintaining soil organic matter, soil productivity, and sustainable forest ecosystems (Graham et al. 1994). Coarse woody material greater than 12 inches in diameter is preferred. It is implied that larger logs would decay into brown cubicle rot and have proportionally larger contributions to soil wood. In early work by Harvey et al.(1987), almost 57 percent of the ecto-mycorrhizae distribution in this soil wood was derived from downed logs. Guideline MA2 and MA3-GDL-FOR-01 outlines ranges of coarse wood material levels that should be maintained or restored by potential vegetation type. Ranges vary from 7 to 15 tons per acre in warm dry forests to as much as 17 to 33 tons in warm moist forests. It is recognized that management of organic matter for soil function and productivity can conflict with fuel hazard objectives. The coarse wood ranges identified in guideline MA2 and MA3-GDL-FOR-01 fall within the optimum ranges prescribed by Brown et al. (2003) to balance fuels and soils needs.

The continued trend of increased wildfire frequency, along with more emphasis on prescribed burning for restorative purposes, is expected. Future fires may burn through recovering areas that experienced moderate or severe wildfire. Burning through past fire areas that have “jackstrawed” dead trees could produce heat that penetrates deeper into the soil because of longer burn durations. There is concern that this heating can sterilize soils and impede forest growth. Research has shown that despite this heating, reburn rarely sterilizes soil; rather, recovery is controlled by fire severity, tree overstory level, soil texture, and the timing of the burn (Neary et al. 1999, Hebel et al. 2009, Smith et al. 2017). Fire re-organizes the soil community where generalist species dominate early on (Egerton-Warburton et al. 2005, Jiménez Esquilín et al. 2008, Reazin et al. 2016). With time, the soil microbe community evolves in complexity and the soil condition improves as vegetation recolonizes the site and organic matter stocks rebuild.

With projected increased wildfire, fire suppression activities could impact soils from the creation of mechanical fire lines and excavation of safety zones. Fire suppression rehabilitation measures can improve soil and vegetation recovery. The Nez Perce-Clearwater Land Management Plan addresses this critical rehabilitation period by including fire suppression activities in standard FW-STD-SOIL-02, which directs re-establishment of soil function according to site potential. See the management approaches in Appendix 4 of the Land Management Plan.

Protection of sensitive soils

The Land Management Plan would address sensitive soils at the project level through a combination of avoidance and mitigation, depending on the circumstance. The protections rely on soil expertise and incorporation of design measures and best management practices as required by FW-STD-SOIL-03. However, two primary soil types stand out to an extent that the Nez Perce-Clearwater proposes sideboards for management. The first case is for mass movement areas while the second is for conducting salvage timber harvest after wildfire.

The Nez Perce-Clearwater contains over 800,000 acres of lands prone to mass movement. In order to reduce the likelihood of management activities originating from mass movement, the Nez Perce-Clearwater proposes guideline FW-GDL-SOIL-01 – to maintain soil stability, ground-disturbing management activities should not occur on field verified mass movement areas. Vegetation management activities may be authorized to provide long-term slope stability.

The avoidance strategy for active management in mass movement areas comes with some caveats. Avoidance of lands with mass movement potential could lead to higher rates of instability in the long-term when factoring in fire potential. Fire exclusion has created dense vegetation that is departed from natural conditions. Future fire could burn with increased severity that could increase the mass movement potential. For example, in Ponderosa pine stands that are adapted to frequent low-intensity fire, the fire exclusion and restrictions of timber harvest on potential mass movement slopes have resulted in stands highly departed from natural conditions. Legacy trees that survived historic fires and provided slope stability are now overcrowded by fire intolerant species. Further, without frequent fire, forest floor layers are deeper than normal and tree roots have grown up into these layers.

Once a wildfire burns through these stands, there is a high likelihood that most of the trees would not survive, resulting in a higher risk for mass movement due to loss of live tree rooting. Thinning of trees in Ponderosa pine stands and initiating low to mixed severity underburns could make the stand more resilient to wildfire and provide slope stability in the long-term. Appendix 4 of the Land Management Plan includes management approaches and potential design measures that could be used for vegetation treatments in areas with high mass movement potential.

The Nez Perce-Clearwater also acknowledges the risks associated with road and trail construction on landslide prone areas. To address this risk, the Nez Perce-Clearwater proposes guidelines that limit the construction of new and relocated roads and trails on lands with high mass movement potential (FW-GDL-ARINF-04 and FW-GDL-ARREC-04) and a guideline that provides direction on routing road drainage away from potentially unstable hillslopes (FW-GDL-ARINF-09).

Salvage harvest operations that occur after wildfire have the potential to detrimentally disturb soils and cause long-term impairment. Because salvage harvest occurs on soils that have already been impacted by wildfire, soils are less resilient to additional impacts from ground disturbance. This is especially true in areas where soils were severely burned, altering the soil chemical, biological, and physical properties. To protect these soils, the Nez Perce-Clearwater proposes to maintain long-term soil productivity when conducting post-wildfire vegetation management activities by avoiding permanent soil impairment on soils that have verified high soil burn severity (MA2 and MA3-GDL-SOIL-04). Permanent soil impairment is defined as the detrimental changes in soil properties (physical, chemical, and biological) that result in the loss of the inherent ecological capacity or hydrologic function of the soil resource that lasts beyond a land management planning period.

Cumulative Effects

Past actions and foreseeable future actions primarily affect soils at the site location. Influence from adjacent management on private, state, or federally managed areas would have undetectable effects on site-specific soil conditions. Legacy disturbance from past and present management actions could affect the soil condition where future management activities are planned.

Effects to Soil Resource from Other Resources

Fire Management

The fire management program is diverse and impacts soils differentially. Fire effects related to prescribed fires, fuels treatments, and fire suppression operations are discussed in this section. Fire effects from site preparation after harvest activities is discussed in the Effects to Soil Resource from Timber Harvest section.

Prescribed Fire

The Nez Perce-Clearwater is characterized as fire-adapted or fire-dependent and, thus, requires periodic fire to maintain healthy, resilient conditions. Within these ecosystems, prescribed fire can help restore and sustain long-term environmental health. A prescribed fire is a planned fire intentionally ignited by fire specialists to meet management objectives. Natural fuels prescribed fire is analyzed differently than activity fuels burning for site preparation after timber harvest. Natural fuels prescribed fires are conducted at a larger scale and are used to reintroduce or maintain fire disturbance within the landscape scale natural fire regime and to meet a variety of vegetation, wildlife, and watershed desired conditions. Fire managers develop site specific burn plans that consider many factors, such as weather conditions and expected fire effects. Prescribed fires generally result in lessened fire effects than wildfire occurring under extreme weather and fuel moisture conditions.

Effects to soils from prescribed fire may be similar to wildfire. Effects would vary depending on the management objective. Underburning in drier potential vegetation types results in low and moderate burn severity that retains much of the soil ground cover. A mixed burn severity prescription in more moist potential vegetation types could lead to increased soil erosion from loss of ground cover in areas of moderate to high burn severity, although recovery generally occurs in one to three years, depending on remaining ground cover. This post-burn condition is highly variable spatially and decreases over time (Doerr et al. 2006).

Prescribed fire would promote the re-establishment of fire-adapted ecological processes. Fire can improve soil condition by creating a net increase in available nutrients, both in terms of ash residue and the higher decomposition rates after the fire. Burning increases the amount of mineral nitrogen levels for plants and soil organisms (Choromanska and DeLuca 2002, Hart et al. 2005), which is a limiting nutrient in most forest ecosystems (Binkley 1991). In drier habitats, this increase can be detected as much as 50 years after fire occurrence (McKenzie et al. 2004). Burning also increases charcoal production that conditions soils, increasing water-holding capacity and providing exchange sites for plants and soils to acquire nutrients (DeLuca and Aplet 2008).

Although there is a potential for temporary loss of ground cover and soil erosion, the effects are within the natural range of variation. The reintroduction of wildland fire provides more beneficial effects to the soil resource than negative effects.

Fuels Management

The Nez Perce-Clearwater would continue to treat fuels using a combination of mechanical thinning or masticating; machine piling and burning; hand thinning, piling, and burning; hand thinning and chipping; and underburning. The effects to soils from the use of ground based mechanized equipment can cause varying degrees of removal or modification of vegetative cover and surface organic material; removal or modification of topsoil or volcanic ash layer through soil erosion, displacement, compaction, rutting, or mixing; or exposure or mixing of subsoil. Depending on the degree of disturbance, soil quality, function, and productivity can be impaired. Burning of piles can impact soils through long duration heating at the center of the piles. These impacts can be severe enough to alter soil structure and reduce nutrients to the extent where soils and vegetation recover very slowly over time. The effect can be moderated by creating smaller piles and burning during cooler conditions.

Acknowledging that fuels treatment often requires the use of ground-based mechanical equipment and that impacts to the soil resource would be similar to those discussed in the Timber section, the same plan components would apply. See Effects to Soil Resource from Timber Harvest analysis below.

Forestlands guideline MA2 and MA3-GDL-FOR-01, specifying a minimum retention level of coarse wood material, can often conflict with the intent of fuel treatments. By maintaining coarse wood at the lower end of the range and leaving larger diameter materials, both components can be met. The intent is to create a condition that prioritizes public safety, promotes forest resilience to wildfire, and still allows for functioning ecological processes.

Another guideline regarding retaining a minimum level of soil organic matter and groundcover (FW-GDL-SOIL-02) can also conflict with the desire for reduced ground fuels. The loss of vegetation due to treating fuels is not far removed from natural processes since fire regularly removes vegetation by volatizing biomass. However, the impact may vary by site type. Areas with dense organic matter in the topsoil and that grow abundant grasses and forbs on dry sites likely experienced frequent fire. In these areas, treating fuels aligns with ecological processes and the soils have a higher proportional amount of organic matter in the mineral soils to buffer the removal of vegetation. Underburning to maintain the benefits of fuels treatment in drier habitats would have minimal impact and in some cases be beneficial.

Fire Suppression Operations

Wildland fire management consists of actions based on safety, economics, social considerations, and anticipated environmental effects. When a wildfire occurs, the first priority is the protection of human life and the safety of the public and firefighters. All alternatives would have similar direction for fire suppression operations and thus similar effects. Management strategies and methods vary depending on which management area a wildfire occurs. Wildfires occurring in locations within Management Area 1 and Management Area 2 may be managed to achieve land management plan objectives with minimal active suppression actions. In locations within Management Area 3, more active fire suppression methods are used.

Since it is nearly impossible to predict the extent and location of future wildfires, quantifying the effects to the soil resource is difficult. Wildfire suppression in Management Area 3 lands would have greater impacts than on Management Area 1 and Management Area 2 lands, as more ground disturbing methods are used. Fire suppression operations, such as the construction of machine fire lines and establishment of large fuel breaks, can cause loss of ground cover, soil compaction, rutting, or mixing of topsoil.

Depending on the extent of ground disturbance, soil erosion could occur, and soil functions could be impaired. In some instances, the creation of fuel breaks can cause equal or greater impact to soil resources than timber harvest activities. In emergency situations, equipment is used on steeper slopes than generally occurs during timber harvest operations and equipment operators may be less experienced.

Proposed Land Management Plan component FW-STD-SOIL-02 would mitigate the disturbance created by fire suppression operations. To maintain long-term soil productivity, impaired soil function created through management activities, including fire suppression, shall be rehabilitated to reestablish soil function to the appropriate site potential.

Infrastructure

Intensively developed sites such as mines, developed recreation sites, administrative sites, rock quarries, and trails or system roads (U.S. Department of Agriculture 2014o) are not considered part of the productive land base as soil quality and function are impaired. Although not evaluated for effects to soil productivity, roads can impact sensitive soils, increasing surface and subsurface soil erosion and contributing to mass failures.

The Nez Perce-Clearwater would continue to reduce the National Forest System lands road system to the levels established in current and future travel plans (Bergstrom 2018). Future road building would likely be confined to realignment or relocation, although new roads could be constructed to reach currently inaccessible areas. The road system, including miles, management level, and location, is the same for all alternatives; however, road use would vary by alternative.

Proposed guidelines limit the construction of new and relocated roads and trails on lands with high mass wasting potential (FW-GDL-ARINF-04) and riparian and wetland areas where hydric soils occur (FW-GDL-ARINF-08). Guideline FW-GDL-ARINF-09 provides direction on routing road drainage away from potentially unstable hillslopes. Guideline MA2 and MA3-GDL-SOIL-05 directs that when roads are decommissioned, soil function appropriate to site potential shall be restored using demonstrably effective methods. Appendix 4 of the Land Management Plan outlines well established methods for road decommissioning.

To reduce erosion and potential road prism failures, a series of road treatments are proposed. They include road maintenance (FW-OBJ-INF-02), road reconstruction and improvement (FW-OBJ-INF-01), and road stormproofing (FW-OBJ-CWN-02). The proposed miles of treatment vary by alternative and correspond with the estimated level of increased road use.

Invasive Species Management

The introduction and expansion of a wide range of invasive species has important impacts on soil processes, which are exacerbated by climatic changes. Invasive species lead to a decline of biodiversity and changes in organic matter composition and nutrients. Problematic species can create soil conditions that enhance flash flooding, soil erosion, and sediment loading (Pouyat et al. 2020). The proposed desired condition for invasive species is that invasive species either are not present or occur at low levels to allow watersheds, vegetation communities, and aquatic ecosystems to retain their inherent resilience and resistance to respond and adjust to disturbances. Plant communities retain their historic diversity and provision of values to fauna (FW-DC-INV-01).

Invasive plants are often treated using an integrated approach with a combination of control types that include manual, biological, cultural, and chemical methods. Manual treatment, which is essentially hand pulling, can result in localized soil disturbance as plants are removed. It is very labor intensive and costly;

thus, only a small number of acres per year could be treated using this technique. There are no effects to the soil resource from biological control methods, as there is no disturbance of ground cover or soil. Cultural methods generally involve enhancing the desirable vegetation to minimize invasive plant invasion. Planting or seeding desirable species to shade or out-compete invasive plants are common cultural treatments.

Effects from herbicide application depend on the type, extent, and amount of herbicide that is used. Chemical persistence in the soil profile depends on the soil texture, infiltration rate, chemical half-life, local climate, and the size of the treatment area. Effects of herbicide treatment to the soil resource would be localized. Applications would occur at the appropriate time of year, considering targeted species and environmental factors. Adverse impacts to soils are controlled through limits on herbicide type and application rates outlined in various National Environmental Policy Act documents.

Livestock Grazing

Soil trampling and trailing can cause soil compaction and loss of vegetation cover, which reduces soil function. Soil disturbance increases susceptibility to invasive species. Combined with the fact that livestock are transporters of invasive plant seed, invasive species could exponentially spread across allotments and surrounding areas. Salting sites are particularly disturbed due to the loss of vegetative cover, organic material, and topsoil. Salt leaching can contaminate the soil, making it difficult for vegetation to reestablish.

The Land Management Plan's soil desired conditions and the soil standards and guidelines apply to livestock grazing in addition to vegetation management activities, such as timber harvesting and fuels treatments. These standards ensure that soil function and productivity are maintained long term (FW-STD-SOIL-01 and FW-STD-SOIL-02). The management approach for Soil productivity and function in Appendix 4 of the Land Management Plan reference the methods most applicable to determining effects to the soil resource. These include biologic integrity, soil stability, and hydrologic function, which are the main groups of indicators used in the multi-agency technical reference Interpreting Indicators of Rangeland Health (Pellant et al. 2020) compiled by the Bureau of Land Management. The Land Management Plan states that best management practices would be developed at the project level (FW-STD-SOIL-03), which, in the case of livestock grazing, best management practices would be incorporated in the allotment management plans and annual operating instructions.

Impacts to the soil resource from livestock grazing are localized but tend to be highest near riparian and wetland areas, which contain sensitive hydric soils. Proposed standards and guidelines FW-GDL-GRZ-01, FW-STD-ARGRZ-01, FW-STD-ARGRZ-02, FW-GLD-ARGRZ-01, and FW-GLD-ARGRZ-03 require monitoring and adjustment of grazing practices as necessary to promote healthy riparian and wetland ecosystems.

Specific allotment management plans and annual operating instructions provide instructions to grazing permittees designed to ensure adequate riparian and upland resource protection while providing for the sustainability of forage. These plans, and the direction they contain, are site specific for each allotment and not part of this analysis. Allotment management plans identify specific management actions required by the permittee and may include entry and exit dates; pasture rotation; utilization standards; range improvement construction, reconstruction, and maintenance; salt placement; closed areas; and required monitoring.

Sustainable Recreation

Intensively developed sites, such as developed recreation sites and trails, are not considered part of the productive land base, as soil quality and function are impaired. Dispersed recreation and off-road vehicle use associated with dispersed sites can negatively impact the soil resource. The Clearwater National Forest travel plan allows for off-road travel to dispersed sites for 300 feet off National Forest System roads. The Nez Perce National Forest travel plan allows for off-road motorized travel in certain areas.

If infrastructure is insufficient for developed recreation, then recreational use may shift to dispersed recreation sites. The result of this could be additional and unregulated deleterious effects on the soil resource. Dispersed camping and day use could remove ground cover and topsoil. Down woody material could be removed for firewood use. Impacts from user-created trails to and within the dispersed area may include rutting, erosion, and loss of ground cover from trampling of vegetation, vegetation removal, and soil compaction. These disturbances reduce overall soil quality, function, and productivity. Recreational use is expected to increase in all alternatives, and with the increased use, impacts would be expected to increase. These impacts are localized and occur on less than 1 percent of the Nez Perce-Clearwater.

Timber Harvest

Timber harvest and associated actions would continue as the management activity that produces the highest amount and level of ground disturbance over the next planning period. Timber harvest and associated actions include temporary road, skid trail, and landing construction; general heavy equipment operations; and site preparation. The exact location of future timber harvest would depend largely on factors related to road access and site-specific forest conditions relative to the integrated desired conditions as outlined in the Land Management Plan. However, uncertain disturbance events, such as insect and disease outbreaks or wildfire, could also influence location and extent of harvest.

Timber harvest requires the use of machinery that can compact and displace soils (Cambi et al. 2015, Page-Dumroese et al. 2010). Timber harvest and associated actions can remove or modify ground cover and surface organic material; remove or modify topsoil or the volcanic ash layer through soil erosion, displacement, compaction, rutting, mixing, or severe burning; expose a mixed subsoil; and increase mass movement potential. These disturbances can lead to a loss of soil quality, function, and productivity. This is especially concerning when soil impairment occurs on sensitive soils, including grussic soils, soils with a volcanic ash layer, and soils with a high erosion or mass movement potential.

The intensity and extent of impacts are managed by timber sale contract provisions and best management practices. The Forest Service evaluates the effectiveness of national forest best management practices by comparing disturbance extent against soil quality thresholds. When soil disturbance surpasses these thresholds, then long-term impairment could occur and the disturbance is considered detrimental to soil quality (U.S. Department of Agriculture 2014o). Forest monitoring on the Nez Perce-Clearwater has shown that the highest soil disturbance occurs when using ground-based harvesting and skidding methods. Within an activity area, typically defined as a treatment unit, timber harvest over the next planning cycle would likely impact soils at the same disturbance intensity as over the last 15 years. Nez Perce-Clearwater soil monitoring over this period found that logging systems result in detrimental soil disturbance on a percent area basis of 8 to 29 percent for ground-based harvest systems, one to 10 percent for skyline, and less than 2 percent for helicopter yarding (Archer 2008, Reeves 2011, Bergstrom 2018).

Although timber harvest and associated actions produce the highest amount and level of ground disturbance, implementing forestlands objectives to trend towards vegetative desired conditions would result in a more resilient landscape with a higher adaptive capacity. The plan components in the forestlands section were developed to maintain or restore the composition, structure, function, and connectivity of terrestrial ecosystems that better match natural fire regimes, considering multiple spatial and temporal scales.

Timber Harvest Operations

Soil disturbance during timber harvest cannot be avoided, but it can be managed. The Nez Perce-Clearwater proposes that land management activities shall be designed and implemented in a manner that maintains soil function and productivity (FW-STD-SOIL-01) and that timber shall not be harvested on lands where soil, slope, or other watershed conditions would be irreversibly damaged, as identified in project-specific findings (FW-STD-TBR-03). Proposed standard FW-STD-SOIL-03 requires project specific best management practices and design features shall be incorporated into land management activities as a principal mechanism for protecting soil resources.

All detrimental soil disturbance areas would be targeted for soil restoration, regardless of the cause. This would be accomplished by limiting new soil disturbance through use of existing disturbed areas (MA2 & MA3-GDL-SOIL-02), which would be restored after use; treating areas of impaired soil function from past management activities in order to restore long-term soil productivity and function (MA2 & MA3-GDL-SOIL-03); decommissioning temporary roads to restore soil function (MA2 & MA3-GDL-SOIL-05); and rehabilitating impaired soil function created through future management activities in order to maintain long-term soil productivity (FW-STD-SOIL-02). These practices increase soil recovery rates by restoring vital soil functions to their inherent range of variability.

The Nez Perce-Clearwater proposes active restoration of newly created impaired soils on 555 to 2,100 acres annually (FW-STD-SOIL-02) and 75 to 280 acres of soils impaired from past management activities (FW-OBJ-SOIL-01, MA2 and MA3-GDL-SOIL-03), depending on alternative. These acres would occur primarily within or adjacent to timber harvest units. Actual restoration acres would be dependent on the amount of timber harvest implemented, the extent of existing soil disturbance, and the amount of soil impairment created through the harvest activity. Other soil improvements could be achieved through FW-OBJ-WTR-05 and FW-OBJ-RMZ-01.

The Nez Perce-Clearwater's reduction in miles of National Forest System roads has increased the reliance on temporary roads to access timber. The greatest disturbance associated with the activities is the displacement or mixing of the topsoil, including the Mazama ash cap, during excavation. Temporary roads, excavated skid trails, and landings are considered 100 percent detrimental disturbance with reduced soil productivity until elements, such as vegetative cover, organic matter levels, biologic function, and hydrologic function, are restored. Restoration following use would promote a more rapid recovery of soil structure, water infiltration, aeration, root penetrability, and soil biological activity. Demonstrably effective techniques for soil restoration include the well-established methods for road decommissioning that have been developed on the Nez Perce-Clearwater. For example, active recontouring of slopes can dramatically accelerate the recovery of soil properties, while belowground properties and processes along abandoned roads remain in a degraded state even 30 or more years after road closure and revegetation (Lloyd et al. 2013).

A recent shift in timber practices that may increase soil disturbance over the next planning period includes the use of cable assisted logging, which is a mixed ground-based and skyline system on grounds with greater than 45 percent slope. In these steep areas, cable-assisted feller bunchers harvest the trees and skyline systems yard the material to landings. Monitoring has shown mixed results ranging below and above what is typical of ground-based equipment operations. In March of 2022, the Idaho Forest Practices Act was updated. Rules specific to the use of ground-based equipment on steep slopes were updated due to technological changes in the industry which allow machinery to operate safely on steep slopes while minimizing soil disturbance (Idaho Department of Lands 2022b).

Site Preparation

Methods for reducing slash material after timber harvest include machine piling and burning or broadcast burning. Machine piling equipment can create additional ground disturbance if the equipment leaves designated skid trails. Impaired soil conditions within burn pile scars can persist for several decades due to concentrated heating (Jiménez Esquilín et al. 2008, Rhoades and Fornwalt 2015). The effect can be moderated by creating smaller piles and burning during cooler conditions.

Broadcast burning removes slash and understory vegetation to facilitate reforestation but has had negative consequences by consuming the forest floor and leaving scant groundcover. It is also used in conjunction with whole tree yarding that removes fuel even before burning.

Depending on slope, vegetation type, slash amounts, and tree retention levels, broadcast burns can produce a varying range of soil burn severities. Moderate to high severity burns consume most of the ground cover, smaller diameter down wood, and sometimes tree boles and roots. Fires that heat soils to high temperatures can volatilize organics and produce a hydrophobic layer that contributes to higher rates of runoff and more soil erosion.

Current findings from the Forest Service's long-term soil productivity study suggest that the extent of negative impacts from vegetation management activities is related to soil texture and organic matter (Page-Dumroese et al. 2010, Powers et al. 2005) but often as conflicting variables. For example, coarse-textured soils appear resistant to compaction (Gomez et al. 2002) but are also nutrient poor and particularly at risk to treatments that remove the forest floor (Page-Dumroese et al. 2010, Page-Dumroese and Jurgensen 2006). Forestry research has underscored the importance of organic matter by documenting the soil benefits of downed wood (Graham et al. 1994, Harvey et al. 1987), forest floor, and soil organic matter (Jurgensen et al. 1997). However, at this time the Nez Perce-Clearwater has no clear guidance on target levels by habitat or soil type since organic matter levels vary in step with forest succession. The Rocky Mountain Research Station has initiated studies to establish minimal necessary amounts of organic matter by habitat type. In the interim, the following proposed guidelines are used to conserve the forest floor and coarse wood levels:

FW-GDL-SOIL-02. Project activities should provide sufficient effective ground cover, such as litter, fine and coarse wood material, or vegetation with a post-implementation target of 85 percent aerial extent of an activity area to retain soil moisture, support soil development, provide nutrients, and reduce soil erosion. The depth and distribution of organic matter should reflect the amounts that occur for the local ecological type and natural fire regime.

MA2 and MA3-GDL-FOR-01. To ensure sufficient organic materials to maintain nutrient cycling and soil biology and to provide habitat structure for various terrestrial wildlife, the levels listed in Table 112 of downed coarse woody material greater than 3 inches should be retained onsite following regeneration harvest and fuels management and site preparation activities. Coarse woody material greater than 12 inches in diameter is preferred. The following amounts are recommended by Graham et al (1994) and are intended to give general direction for retention of coarse woody debris within potential vegetation type groups. If sufficient downed coarse woody material is unavailable, standing retained trees and snags may be counted toward meeting the numbers in the table below. Exceptions to vary from the ranges listed may occur in areas near administrative sites, developed recreation sites, sensitive natural resources, or historic properties. Coarse woody material should be well distributed across each treatment unit.

Table 112. Coarse woody materials to maintain by potential vegetation type (PVT) group.

PVT Group	Tons per Acre
Warm Dry	7–15

PVT Group	Tons per Acre
Warm Moist	17–33
Cool Moist	9–18
Cold	7–24

Salvage Harvest after Wildland Fire

Salvage harvest is a type of timber harvest that could occur after wildfire. The intent is to harvest dead and dying trees to recover the existing economic value or to remove hazard trees for safety purposes. Salvage harvest is addressed specifically because of potential for long-term soil impairment of soils with high burn severity. Because salvage harvest occurs on soils that have already been impacted by wildfire, soils are less resilient to additional impacts from ground disturbance. This is especially true in areas where soils were severely burned, which alters the soil chemical, biological, and physical properties. Generally, the commercial value of trees is lost in areas that have severely burned so salvage harvest is not pursued where these occur in larger areas. Issues arise in areas where there is a mosaic of moderate and high burn severity and there is a commercial component left in the moderately burned areas.

The classification of post-fire soil condition is based on fire-induced changes in physical and biological soil properties. During post-fire assessments, there has been an intentional effort to use the term "soil burn severity" to differentiate post-fire soil properties from fire effects on vegetation, such as tree mortality, and general fire effects on long-term ecosystem health (Parsons et al. 2010).

The following description for high soil burn severity is taken from Debano et al. (1998), pages 62 and 63:

"High soil heating, or deep ground char, occurs where the duff is completely consumed, and the top of the mineral soils is visibly reddish or orange on severely burned sites. The char layer can extend to a depth of 10 cm or more. Logs can be consumed, or deeply charred and deep ground char can occur under burned logs. Soil textures in the surface layers are changed and fusion evidenced by clinkers can be observed locally. All shrub stems are consumed and only the charred remains of large stubs may be visible."

To protect these soils, the Nez Perce-Clearwater proposes that, when conducting post wildfire vegetation management activities, to maintain long-term soil productivity, avoid permanent soil impairment on soils that have verified high soil burn severity (MA2 and MA3-GDL-SOIL-04). Further, guidelines FW-GDL-SOIL-02, MA2-GDL-FOR-01, and MA3-GDL-FOR-01 require maintenance of ground cover and coarse woody material. Additionally, project specific best management practices and design features shall be incorporated into land management activities as a principal mechanism for protecting soil resources (FW-STD-SOIL-03).

Aquatic Ecosystems Management

In addition to the soil restoration objectives proposed in the timber sale activity areas, the Nez Perce-Clearwater proposes 2,500 to 5,300 acres of soil and watershed improvement every 5 years (FW-OBJ-WTR-05), depending on alternative. The preferred alternative proposes to improve soil and watershed conditions on 3,000 to 4,000 acres every 5 years (FW-OBJ-WTR-05). Soil improvement activities on existing disturbed areas are expected to accelerate soil recovery and result in immediate or near-term improvement within approximately one to five years. These improvement activities would also provide support for continued long-term recovery of soil functions and productivity.

Irreversible and Irretrievable Commitments of Resources

The National Forest Management Act states that Land Management Plans must ensure timber harvest does not occur where soils will be irreversibly damaged. The analysis addressed this risk by extracting high risk areas for soil loss from suitable timber harvest areas. The soil plan components further address soil risks by providing standards and guidelines. The soils analysis above identifies and discusses sensitive soils for project planning efforts to consider for soil loss hazards to avoid leading to irreversible damage.

The National Environmental Protection Act Council of Environmental Quality regulations require the Forest Service to identify when making an irreversible and irreplaceable commitment. Since this Land Management Plan decision is not authorizing or committing to any action, the Land Management Plan cannot make any irreversible and irretrievable commitments. The Nez Perce-Clearwater would only consider these commitments on a project basis.

Summary of Consequences

The alternatives were compared using proposed timber harvest objectives and the estimated proportional soil restoration associated with the activity (Table 113). Calculations assumed a 15 percent creation and restoration of detrimental soil disturbance for every acre of timber harvest proposed. Estimated soil restoration acres of soils impaired from past management activities were calculated using a 2 percent factor for every acre of timber harvest proposed. Actual restoration acres would be dependent on the amount of timber harvest implemented, the extent of existing soil disturbance, and the amount of soil impairment created through the harvest activity.

Table 113. Summary of soil productivity and function indicators by alternative.

Measurement Indicator	No Action	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Timber harvest acres annually	3,800	12,600	14,000	7,500	3,700	8,825–10,000
Estimated annual acres[1] soil restoration of detrimental soil disturbance to comply with plan component FW-STD-SOIL-02	0	1,890	2,100	1,125	555	1,325–1,500
Estimated annual acres[2] soil restoration of soils impaired from past management activities within or adjacent to harvest units to implement objective FW-OBJ-SOIL-01 and comply with plan component MA2 and MA3-GDL-SOIL-03	0	250	280	150	75	175–200

[1]Actual restoration acres would be dependent on the amount of timber harvest implemented, the extent of existing soil disturbance, and the amount of soil impairment created through the harvest activity.

[2]Actual restoration acres would be dependent on the extent of existing soil disturbance.

Conclusion

To maintain and, where necessary, restore long-term soil quality, function, and productivity, it is important that activities causing impairment to the soil resource be managed within acceptable limits. Land-use national forest practices have affected soil functions, and these functions are intertwined, making it difficult to discuss them separately. This Land Management Plan would increase the number of environmental screens to mitigate adverse soil effects from forestry activities, as well as other management actions. Flexibility is extended to slope limits if soil desired conditions and standards are met. The new plan also expands direction by not only adding levels of protection through avoidance and minimization but by promoting active restoration to maintain long-term soil productivity. The current forest plan standards, along with current guidance at the Regional and Washington Office level, interpret the National Forest Management Act's direction for soils to manage for sustained soil productivity. The proposed Land Management Plan would continue to manage for long-term soil productivity as described in desired condition FW-DC-SOIL-01 emphasizing soil productivity and function contributes to the long-term resilience of ecosystems.

The Land Management Plan includes plan components that support the maintenance or restoration of soils and soil productivity, including guidance to reduce soil erosion and sedimentation (36 CFR 219.8(a)(2)(ii)). The plan components emphasize the important role soils have in promoting a resilient and diverse ecosystem that supports ecological integrity.

The following key points summarize the conclusions for the soils resource:

- The action alternatives contain desired conditions, standards, and guidelines that would ensure that soil functions are maintained to a greater extent than the current forest plan. The new Land Management Plan provides consistent soil direction.
- The Land Management Plan brings forward and formulizes minimization and avoidance criteria to limit soil impairment.
- There is added flexibility for ground-based slope steepness to account for advances in harvest equipment.
- The focus on outcomes involves active soil restoration. Added language on the elements of soil function and productivity would allow for better prescriptions. Additionally, there is direction to treat soils with impaired soil function from past management activities to facilitate long-term productivity.
- Adopted conservation measures of groundcover and organic materials after timber harvest, fuels treatments, and prescribed burning would limit erosion while ensuring soil function.

Management strategies that provide for ecological sustainability include mitigating the effects of stressors, maintaining or restoring ecological integrity, or incorporating adaptation strategies to reduce vulnerability. By restoring or maintaining functioning soils, ecosystems would have greater adaptive capacity to withstand stressors and recover from disturbances with minimum loss of function, especially with changing and uncertain environmental conditions and extreme weather events.

3.2.7 Water Resources

The watersheds, rivers, and streams of the Nez Perce-Clearwater provide many ecological, economic, and social benefits. Clean water is a critical resource with over 9,500 miles of perennial streams and 3,800 acres of lakes and ponds supporting high value recreation, municipal water, and habitat for unique and diverse populations of fish and wildlife. Tens of thousands of people rely on water from the national forests for drinking water, recreation, agriculture, industry, hydropower generation, and other uses. The types of water use and increased demand will affect how the Nez Perce-Clearwater manages watershed conditions that influence water quality and quantity for a variety of beneficial uses. Managing for high quality water and properly functioning watershed condition are fundamental for maintaining and restoring watershed health and ecosystem resilience.

The Water Resources section describes the affected environment, and environmental consequences of the alternatives with respect to long-term ecological, social, and economic sustainability related to watersheds and water resources. Water resources that provide ecosystem services or benefits to people and surrounding communities support economic and social sustainability. Resilient and functioning watersheds provide for ecological sustainability.

Changes Between Draft and Final Environmental Impact Statements

Comments received since the publication of the proposed action and Draft Environmental Impact Statement have been used where appropriate to improve the Land Management Plan and have helped inform this Final Environmental Impact Statement. Multiple minor changes were made in the Final Environmental Impact Statement; all changes are within the scope of the Draft Environmental Impact Statement analysis and address issues that the public had an opportunity to comment on. With respect to water resources, there were changes to the Aquatic Ecosystems plan components that were driven from commenters and internal Forest Service recommendations. Also, as a result of public input, an additional alternative was developed. The Preferred Alternative is a compilation of portions of the other alternatives analyzed in detail in the Draft Environmental Impact Statement. Analysis of the Preferred Alternative for water resources is similar to the other action alternatives.

Relevant Laws, Regulations, and Policy

The Nez Perce-Clearwater will follow all laws, regulations, and policies that relate to managing National Forest System land. The Land Management Plan is designed to supplement, not replace, direction from these sources. Other Forest Service direction, including laws, regulations, policies, executive orders, and Forest Service directives (manual and handbook), are not repeated in the Land Management Plan.

Federal Laws

Organic Administration Act of 1897: This act states that one aspect of the mission of the national forests is to "provide favorable conditions of water flow."

Department of Agriculture Organic Act of 1944: This act provides direction on the establishment and protection of water rights.

Federal Water Pollution Control Act (Clean Water Act) of 1948, as amended in 1972, 1977 and 1987: This act was revised by amendments in 1972 that gave the act its current form and spelled out programs for water quality improvements. Direction is intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Section 208 of the 1972 amendments mandates identification and control of nonpoint source pollution resulting from silvicultural activities. There are five required elements: 1) Compliance with state and other federal pollution control rules; 2) No degradation of instream water quality needed to support designated uses; 3) Control of nonpoint source water pollution using conservation or "best management practices;" 4) Federal agency leadership in controlling nonpoint sources pollution from managed lands; and 5) Rigorous criteria for controlling discharge of pollutants into the nation's waters. Section 404 establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. The 1987 amendments added Section 319 to the act, under which states are required to develop and implement programs to control nonpoint sources of pollution or rainfall runoff from farm and urban areas, as well as construction, forestry, and mining sites. Sections 303 and 305 mandate the listing and reporting of waters not meeting water quality standards that are intended to support beneficial uses of a waterbody. Section 303(d), which requires states to identify pollutant-impaired water segments and develop "total maximum daily loads" that set the maximum amount of pollution that a water body can receive without violating water quality standards.

Multiple-Use Sustained-Yield Act of 1960: Congress has affirmed the application of sustainability to the broad range of resources over which the Forest Service has responsibility. The Multiple-Use Sustained-Yield Act confirms the Forest Service's authority to manage the national forests and grasslands "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes" (16 U.S.C. 528) and does so without limiting the Forest Service's broad discretion in determining the appropriate resource emphasis or levels of use of the lands of each national forest and grassland.

Safe Drinking Water Act of 1974, as amended 1986 and 1996: The goal of the act is to assure a safe supply of drinking water. The 1996 amendment provides states with more resources and authority to enact the Safe Drinking Water Act of 1974. This amendment directs the states to identify source water protection areas for public water supplies that provide water for human consumption and that serve at least 25 people or 15 service connections for at least 60 days a year. These systems can be dependent on any type of water source, including streams, lakes, reservoirs, springs, or wells and include systems used either year-round or only seasonally.

Agricultural Improvement Act of 2018 (a.k.a. the 2018 Farm Bill), Section 8405: permanently authorizes the Forest Service to develop and maintain the Watershed Condition Framework, using the agency's existing processes and criteria.

Under the **Northwest Power Act of 1980** and the **Federal Power Act of 1920, as amended**, federal entities, specifically the Bonneville Power Administration, Federal Energy Regulatory Commission, U.S. Army Corps of Engineers, and the Bureau of Reclamation, must consider Protected Area status and restrictions when making decisions regarding hydroelectric facility permits and access to electricity from those facilities.

Executive Orders

Executive Order 11988 (May 24, 1977), as amended: This order directs federal agencies to take action on federal lands to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains. Agencies are required to avoid the direct or indirect support of development on floodplains whenever there are reasonable alternatives and evaluate the potential effects of any proposed action on floodplains.

Executive Order 11990 (May 24, 1977), as amended: This order requires federal agencies exercising statutory authority and leadership over federal lands to avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. Where practicable, direct or indirect support of new construction in wetlands must be avoided. Federal agencies are required to preserve and enhance the natural and beneficial values of wetlands.

Agency Regulations

36 CFR 219.7: Specifies that during revisions, Land Management Plans must identify watershed(s) that are a priority for maintenance or restoration (36 CFR 219.7(f)(1)(i)). Priority watersheds are identified through the Forest Service Watershed Condition Framework.

36 CFR 219.8: Requires the Chief of the Forest Service to establish requirements for national best management practices for water quality in the Forest Service Directive System (36 CFR 219.8(a)(4)) and stipulates forest plans include plan components to maintain or restore water quality (36 CFR 219.8(a)(2)(iii)), water resources (36 CFR 219.8(a)(2)(iv)), and riparian areas (36 CFR 219.8(a)(3)).

36 CFR 251.9: Authorizes the Chief of the Forest Service to enter into agreements with municipalities to restrict the use of National Forest System lands from which water is derived to protect municipal water supplies.

Policy

Forest Service Manual and Handbook Direction: Forest Service manuals and handbooks within the 2500 file code designation contain direction for watershed management. Forest Service Handbook 2509.22, Soil and Water Conservation Practices (U.S. Department of Agriculture 1988a) contains direction on developing site-specific soil and water conservation practices for use on National Forest System lands in the Northern Region and Intermountain Region to comply with direction in the Clean Water Act.

Other Federal Guidance

National Core Best Management Practices Technical Guide (U.S. Department of Agriculture 2012b) Volume 1 outlines national best practices to improve management of water quality consistent with the federal Clean Water Act and state water quality programs and to integrate water resource protection into management activities conducted across the landscape. Direction for the implementation of this program is found in Forest Service Handbook 2509.19.

Watershed Condition Framework (U.S. Department of Agriculture 2011d). The Framework is a nationally consistent, comparable, and credible process for improving the health of watersheds on national forests and grasslands. It provides the Forest Service with an outcome-based performance measure for documenting improvements to watershed condition at forest, regional, and national scales.

State and Local Laws

Idaho Department of Water Resources

Idaho Stream Channel Protection Act of 1971 (Title 42, Chapter 38, Idaho Code): This act regulates stream channel alterations between mean and high-water marks on perennial streams in Idaho. Instream activities on National Forest System lands must adhere to the rules pertaining to the act (Idaho Administrative Procedures Act [IDAPA] 37.03.07). The act requires an individual or entity to obtain a stream channel alteration permit from the Idaho Department of Water Resources before commencing a streambank or stream channel altering activity.

Idaho Department of Environmental Quality

Ground Water Quality Rule (IDAPA 58.01.11): This policy prevents contamination of ground water from all regulated and nonregulated sources of contamination to the maximum extent practical.

Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08): This rule controls and regulates the design, construction, operation, maintenance, and quality control of public drinking water systems to provide a degree of assurance that such systems are protected from contamination and maintained free from contaminants, which may injure the health of the consumer.

Environmental Protection and Health Act of 1972 (Title 39, Chapters 1 and 36): This act maintains the existing high quality of the state's ground water and satisfies existing and projected future beneficial uses, including drinking water, agricultural, industrial, and aquacultural water supplies. All ground water shall be protected as a valuable public resource against unreasonable contamination or deterioration.

Water Quality Standards (IDAPA 58.01.02), Water Quality Limited Streams: The Clean Water Act of 1972 was created "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Under section 303(d) of the act, state agencies are required to establish water quality standards and develop lists of streams that do not meet such standards. The integrated report is a consolidated listing and reporting of the state's water quality status pursuant to Sections 303(d), 305(b), and 314 of the Clean Water Act.

Water Quality Management Planning for Water Quality Limited Streams: As directed by the Clean Water Act, each state agency must develop a total maximum daily load (TMDL) for all the waters identified in the Section 303(d) list of impaired waters. A total maximum daily load determines pollutant reduction targets and usually covers a basin or subbasin. In instances where total maximum daily loads include National Forest System lands, the Forest Service is listed as a designated management agency and is relied upon for creating water quality management plans that identify strategies and actions to attain water quality standards.

State of Idaho Antidegradation Policy (IDAPA 58.01.02.051): Requires that existing beneficial uses be maintained and protected on all water bodies in the State of Idaho.

Idaho Department of Lands

Idaho Forest Practices Act of 1974, as amended (Title 38, chapter 13, Idaho Code): This act was created to assure the continuous growing and harvesting of forest tree species and to protect and maintain the forest soil, air, water resources, wildlife, and aquatic habitat. The rules pertaining to water quality and stream protections are also incorporated as best management practices within the Idaho Water Quality Standards.

State and Local Plans

Idaho Ground Water Quality Plan (Ground Water Quality Council 1996) The Plan is intended to protect ground water quality for public use and provide guidance to state agencies, local governments, and citizens to prevent ground water contamination. The Plan establishes the basis for protecting ground water now and for future generations and preventing contamination whenever possible. The plan also helps agencies develop management programs and regulations and implement ground water quality protection strategies. It is intended to work in conjunction with the Idaho State Water Plan.

Idaho State Water Quality Management Plan: The Plan is not a single plan or document but rather a compilation of the guidance and programs Idaho Department of Environmental Quality uses to implement Clean Water Act requirements. It describes how the state's water resources are managed and by what method Idaho manages water quality. The Plan follows a continuing planning process and outlines laws, rules, and guidance; water quality programs; monitoring and assessment; implementation; planning; and public involvement. https://www.deq.idaho.gov/water-quality/planning-and-administration/

Idaho Comprehensive State Water Plan (Idaho Department of Water Resources 2012): The plan includes the statewide water policy plan and associated component basin and water body plans, which cover specific geographic areas of the state. The Plan guides the development, management, and use of the state's water and related resources.

Community Source Water Protection Plans: a written plan a community develops to document its source water protection activities, which outlines the management tools the local community plans to use to protect drinking water sources.[15]

Methodology

Spatial and Temporal Scale

This programmatic Land Management Plan analysis focuses on broad scale estimated effects related to water resources on National Forest System lands. The analysis area for water resources include all the lands within the boundary of the Nez Perce-Clearwater. This area represents where changes may occur as a direct result of Forest Service management actions. The cumulative effects analysis area includes Nez Perce-Clearwater lands and adjacent jurisdictions and landowners.

The temporal scale for this analysis is the anticipated life of the Land Management Plan.

Analysis Methods and Assumptions

This analysis draws upon the best available literature citations that were found to be relevant to the ecosystems on the Nez Perce-Clearwater. Literature sources that were the most recent, peer-reviewed, and local in scope or directly applicable to the local ecosystem were selected. Uncertainty and conflicting literature were acknowledged and interpreted when applicable. Much of the best available science information (BASI) for water resources is summarized in the Northern Region Aquatic and Riparian Conservation Strategy (U.S. Department of Agriculture 2022e). The Aquatic Ecosystems and Fisheries Environmental Ecosystems Introduction provides a detailed discussion of the latest and best available science related conditions and management within riparian areas and water quality attributes, such as stream temperature and sediment.

Other sources of information used to support the analysis include Nez Perce-Clearwater geographical information systems data and geospatial data from other federal agencies and the State of Idaho. Spatial analysis used for delineating water resources used the Watershed Boundary Dataset (WBD) (U.S. Geological Survey and U.S. Department of Agriculture 2013) and the National Hydrography Dataset plus High Resolution (NHDplus HR) (U.S. Geological Survey 1999). The U.S. Fish and Wildlife Service (FWS) is the principal U.S. Federal agency tasked with providing information to the public on the status and trends of the Nation's wetlands. The FWS National Wetlands Inventory (NWI) is a publicly available resource that provides detailed information on the abundance, characteristics, and distribution of United States wetlands. See Appendix K for additional information that was used for the Final Environmental Impact Statement analysis.

The approach used in this analysis is to take a programmatic look at the outcomes that may result from implementing the proposed management direction in each alternative. For estimating the effects at the programmatic Land Management Plan level, the assumption has been made that the types of resource management activities allowed under the plan's direction are reasonably foreseeable future actions to achieve the goals and objectives. However, the specific location, design, and extent of such activities are not known at the time plans are revised. Project-level decisions are made based on site-specific analysis at the project-level basis. Therefore, the discussions within this section refer to the potential for the effect to occur and are, in many cases, only estimates. The effects analyses are useful when comparing and

[15] https://www.arcgis.com/home/webmap/viewer.html?webmap=7f060efe0339438690b91f79ff458c70&extent=-126.0742,40.6103,-101.7725,49.8065

evaluating alternatives but are not intended to be applied directly to specific locations on the Nez Perce-Clearwater.

Given that the site specificity of future activities are not known at the programmatic plan level, the potential spatial and temporal effects to water resources cannot be attributed to any specific watershed, nor can quantitative estimates of potential effects to water resources be determined, such as changes in water quantity. Broad scale estimated effects and trends related to hydrologic function and watershed processes for National Forest System lands within the project area have been qualitatively estimated. Cumulative effects to water resources are described in terms of their potential to generally affect trends on the subbasin to basin scale, across multiple land ownerships.

Reference conditions, often characterized by natural range of variation (NRV), provide a scientific basis for understanding forests, and a framework for understanding forest conditions and ecological processes prior to extensive human influence. Reference conditions provide a best estimate of a functional and sustainable system, and are a useful basis for developing desired conditions while accounting for uncertainties (for example, climate change). The range of natural variability differs across the Nez Perce-Clearwater because landscapes vary widely in geomorphology, soils, elevation, aspect, and vegetation composition, structure, and pattern.

Functional restoration focuses on the underlying processes that may be degraded, regardless of the structural condition of the ecosystem. Functionally restored ecosystem may have a different structure and composition than the historical reference condition. As contrasted with ecological restoration that tends to seek historical reference condition, the functional restoration focuses on the dynamic processes that drive structural and compositional patterns. Functional restoration is the manipulation of interactions among process, structure, and composition in a degraded ecosystem to improve its operations. Functional restoration aims to restore functions and improve structures with a long-term goal of restoring interactions between function and structure. It may be, however, that a functionally restored system will look quite different than the reference condition in terms of structure and composition and these disparities cannot be easily corrected because some threshold of degradation has been crossed or the environmental drivers, such as climate, that influenced structural and (especially) compositional development have changed (Forest Service Handbook 1909.12 section 05).

The water resources section uses the terms watershed, subwatershed, and priority watershed. In some cases, “watershed” is used generically to denote the drainage area that contributes runoff to a common point. In other cases, it refers to the hydrologic unit code (HUC) and level based on a hierarchical system (U.S. Geological Survey and U.S. Department of Agriculture 2013). Subwatersheds (Hydrologic Unit Code [HUC] 12s) typically comprise areas of approximately 10,000 to 40,000 acres and watersheds (HUC10s) drain areas of about 40,000 to 250,000 acres. Priority watersheds refer to subwatersheds that are identified for restoration emphasis through the watershed condition framework process (U.S. Department of Agriculture 2011d).

Measurement Indicators

The following indicators were used to compare and contrast differences between alternatives associated with water resources:

Watershed condition – This indicator addresses overall health of subwatersheds (HUC12) as classified through the Watershed Condition Framework program. It is measured by the number of potential Priority Watersheds improved to a better functioning condition class.

Water quality – This indicator addresses the expressed alteration of physical, chemical, and biological components of water quality. It is measured qualitatively by evaluating potential changes in sediment delivery, stream water temperature, and contaminates; as well as potential changes to the amount of streams not meeting beneficial uses and/or amount of streams classified as water quality impaired.

Water quantity – This indicator addresses changes to the natural flow regime with respect to the magnitude, duration, or timing of the natural streamflow hydrograph. It is measured qualitatively by potential changes in forested vegetation openings; hydrologic connectivity of roads to streams, and consumption of public water supply.

Riparian areas, wetlands, and floodplain function – This indicator addresses the potential for alteration of these geomorphic features and sensitive ecosystems. It is measured qualitatively by potential changes in riparian and wetland conditions and floodplain function.

Affected Environment

General Description

The Nez Perce-Clearwater contains portions of fourteen subbasins that drain primarily into the Salmon River and Clearwater River Basins and, to a lesser extent, the Snake River and Spokane River Basins (Figure 33, Table 114). All rivers and streams on the Nez Perce-Clearwater eventually drain into the Spokane and Snake Rivers, which flow into the Columbia River. The Lochsa River and Lower Selway River subbasins are completely contained within Nez Perce-Clearwater lands.

The Nez Perce-Clearwater is located primarily within the Clearwater and Salmon River basins. The Salmon River is an unregulated, free-flowing river that originates in mountain ranges in Idaho and western Montana and flows about 410 miles through central Idaho before joining with the Snake River in lower Hells Canyon. Peak flows in the Salmon River generally occur in May and June during snowmelt runoff. About 90 percent of the Salmon River Basin is comprised of federal lands, including about 77 percent National Forest System lands and 13 percent Bureau of Land Management lands. Nearly 80 percent of the land cover is forested. Key geologic features in the Salmon River Basin are the Idaho Batholith and Challis volcanics that tend to produce coarse, sandy soils that are highly erodible when weathered (King et al. 2004). The combination of these soils, steep topography, and climatic stresses gives rise to significant base surface erosion, slumping, and debris avalanche hazards (Megahan and Molitor 1975, Quigley and Arbelbide 1997a, Quigley 1997).

The Clearwater River originates in the Bitterroot Mountains at the border of Idaho and Montana and flows westward to its confluence with the Snake River at Lewiston, Idaho. Major tributaries to the Clearwater River include the Lochsa, Selway, North Fork Clearwater, South Fork Clearwater, and Potlatch Rivers. Streamflow in the Clearwater River typically peaks in May and June in response to snowmelt runoff. Highly erodible igneous rocks underlay a large part of the Clearwater River Basin (King et al. 2004). As a result, much of the basin is highly susceptible to erosion and subsequent sediment transport.

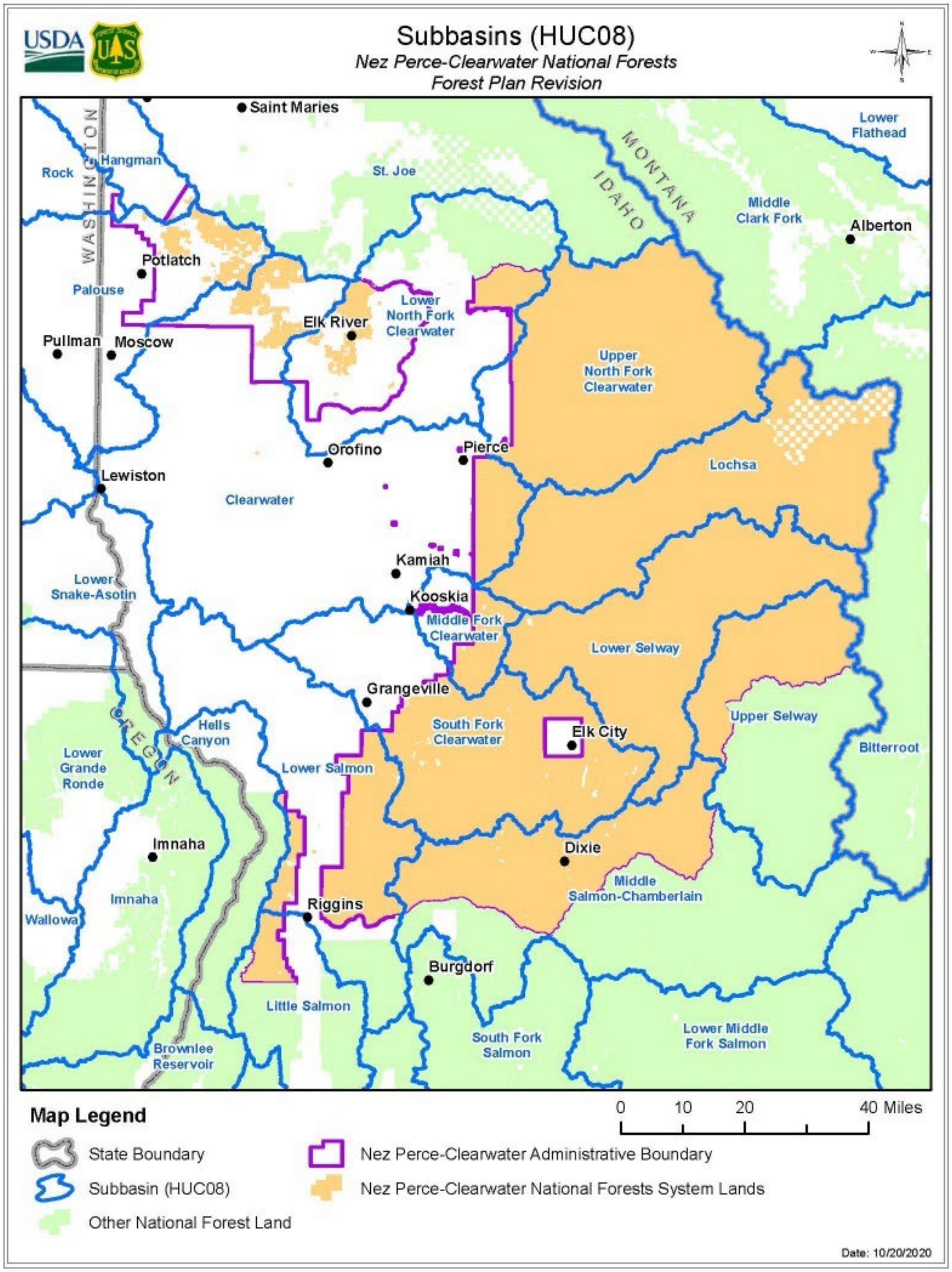


Figure 33. Subbasins (HUC08) located within the plan area

Data Source: Nez Perce-Clearwater Geographic Information System.

Table 114. Subbasins in the Nez Perce-Clearwater and associated acres

Basin	Hydrologic Unit Code (HUC08)	Subbasin	Subbasin Acres	Nez Perce-Clearwater Acres	Percent Nez Perce-Clearwater lands within subbasin
Spokane River	17010306	Hangman	443,035	9,542	2
Lower Snake River	17060108	Palouse	1,486,461	102,416	7
Lower Snake River	17060109	Rock	610,823	4,339	1
Clearwater River	17060301	Upper Selway	629,438	241,276	38
Clearwater River	17060302	Lower Selway	656,688	656,918	100
Clearwater River	17060303	Lochsa	755,727	756,059	100
Clearwater River	17060304	Middle Fork Clearwater	139,705	73,713	53
Clearwater River	17060305	South Fork Clearwater	754,025	525,688	70
Clearwater River	17060306	Clearwater	1,507,889	142,402	9
Clearwater River	17060307	Upper North Fork Clearwater	829,355	788,125	95
Clearwater River	17060308	Lower North Fork Clearwater	734,145	90,601	12
Salmon River	17060207	Middle Salmon-Chamberlain	1,095,488	412,291	38
Salmon River	17060209	Lower Salmon	755,356	226,967	30
Salmon River	17060210	Little Salmon	369,150	40,668	11

Data Source: Nez Perce-Clearwater Geographic Information System.

The combined Lochsa and Selway Rivers drain about 46 percent of the Clearwater River Basin, draining areas that are essentially 100 percent forested. The subbasins are 95 percent contained within Nez Perce-Clearwater and Bitterroot National Forest lands. Underlain by the Idaho Batholith, the Lochsa and Selway drainage basins are characterized by rock that weathers deeply to produce coarse, sandy soils; if disturbed, these soils have high erosion rates (King et al. 2004).

The terrain varies greatly across the Nez Perce-Clearwater. Breaklands have very steep, straight tributaries with high sediment delivery efficiency. Rolling uplands have gentle slopes with complex dendritic and structurally controlled drainage patterns with low sediment delivery efficiencies. Mountains are steep and dissected, with narrow valleys.

Elevation ranges from about 1,400 feet to over 8,000 feet on the higher peaks. The climate of the Nez Perce-Clearwater varies with location. Generally, the climate in the northern portion of the Nez Perce-Clearwater is maritime-influenced with a cool-to-warm temperate and dry summers. The southern portion of the Nez Perce-Clearwater is more influenced by the dry Rocky Mountain climatic patterns.

Precipitation also varies seasonally, with little occurring during the summer months. Average annual precipitation ranges from 25 inches in low elevation valleys to 60 to 80 inches at the upper elevations.

The majority of precipitation falls as snow between October and April. Due to colder average temperatures, winter precipitation above 4,000 feet falls largely as snow that may remain through late spring to early summer. Below 4,000 feet, a higher probability of winter precipitation falling as rain occurs with subsequently reduced storage duration. The transition area just above and below the 4,000-foot elevation band also defines the rain-on-snow zone, an area susceptible to rapid melting and extreme runoff events. Rain-on-snow events can occur from November through March.

Hydrology across the Nez Perce-Clearwater varies largely as a result of differences in amount and form of precipitation, such as snow versus rain, which is intrinsically linked to variations in elevation and climatic patterns. The timing of peak stream flow across the Nez Perce-Clearwater is variable, occurring from April through June depending on the drainage. Base flows occur most often in August and September, corresponding with times when instream temperatures are highest and precipitation is lowest.

Based on the U.S. Geological Survey National Hydrography Dataset, there are 4,565 miles of perennial fish bearing streams, 4,746 miles of perennial non-fish bearing streams, and 4,995 miles of intermittent streams located within the Nez Perce-Clearwater administrative boundary. According to the U.S. Fish and Wildlife Service National Wetlands Inventory (U.S. Department of the Interior 2015b), there are 3,838 acres of ponds and lakes on the Nez Perce-Clearwater. Most are located in high elevation subalpine areas and range in size from less than 1 acre to the 117-acre Fish Lake near the Montana border. All lakes that have been assessed by the Idaho Department of Environmental Quality are meeting water quality standards and supporting beneficial uses (Idaho Department of Environmental Quality 2019, State of Idaho Department of Environmental Quality 2022b).

There are nine known geothermal hots springs located on the Nez Perce-Clearwater – Cow Flats, Red River, Running Creek, Stanley, Jerry Johnson, Little Jerry Johnson, Weir Creek, Colgate, and an unnamed spring 0.5 miles east of Colgate hot springs. The Red River hot springs is the only developed site and is used for commercial purposes. The water temperatures range from 106 to 138 degrees Fahrenheit, with Cow Flats being the hottest.

There are two water regulating facilities adjacent to the Nez Perce-Clearwater. Dworshak Dam, constructed in 1972, is located two miles above the mouth of the North Fork Clearwater River. The impoundment area, Dworshak Reservoir, is 16,508 acres, of which only 670 acres occur on Nez Perce-Clearwater land. Elk River dam and Elk Creek reservoir are located near the town of Elk River. The outlet of the reservoir is less than 1,000 feet from the Nez Perce-Clearwater boundary.

Two dams occur within the Nez Perce-Clearwater, which are both classified as low hazard dams and are not currently being operated. Erickson Dam is located on Erickson Creek, which is a tributary to the South Fork of the Clearwater River. It is an earthen dam with a height of 20 feet and normal storage of 8 acre-feet. It currently has no functioning outlet controls. The closest downstream community from Erickson Dam is Elk City, Idaho, which is approximately ten miles away. Upper Bear Dam is located in the Selway-Bitterroot Wilderness on Bear Creek, which is a tributary to the Selway River. It is an earthen dam with a height of 13 feet and normal storage of 82 acre-feet. It currently has no functioning outlet controls. The closest downstream community from Upper Bear Dam is Lowell, Idaho, which is over 70 miles away.

Watershed Condition

Watershed Condition Framework

Watersheds and their ecological condition have been an increasingly important focus of public land managers in the last two decades (Reeves, Pickard, and Johnson 2016, Thomas et al. 2006, Esselman et al. 2011). Nationally, in 2011 the Forest Service introduced the Watershed Condition Framework (U.S. Department of Agriculture 2011d), a nationally consistent, comparable, and credible process for improving the health of watersheds on national forests and grasslands. The framework provides a method for classifying watershed condition at the Hydrologic Unit Code (HUC) 12 subwatershed scale and offers broad guidance to help national forests select priority watersheds.

The classification system considers 12 indicators that are surrogate variables representing the underlying ecological, hydrological, and geomorphic functions and processes that affect watershed condition. Watershed condition encompasses both aquatic and terrestrial components because water quality and aquatic habitat are inseparably related to the integrity and, therefore, the functionality of upland and riparian areas within a watershed. The approach is designed to foster integrated ecosystem-based watershed assessments, provide guidance to programs of work in watersheds that have been identified for restoration, enhance communication and coordination with external agencies and partners, and improve national-scale reporting and monitoring of program accomplishments. The watershed condition framework provides the Forest Service with an outcome-based performance measure for documenting improvements to watershed condition at forest, regional, and national scales (U.S. Department of Agriculture 2011d).

Watershed condition classification ultimately categorizes watersheds in one of three discrete classes that reflect the level of watershed functionality or integrity - 1) functioning properly, 2) functioning at risk, and 3) impaired function. In this framework, a watershed is considered in good condition if it is functioning in a manner similar to one found in natural wildland conditions (Karr and Chu 1999, Lackey 2001). This characterization would not be interpreted to mean that managed watersheds cannot be in good condition. A watershed in properly functioning condition has minimal undesirable human impact on natural, physical, or biological processes and is resilient and able to recover to the desired condition when or if disturbed by large natural disturbances or land management activities (Yount and Niemi 1990). By contrast, a watershed is classified as having impaired function when some physical, hydrological, or biological attributes indicate a degraded state. Substantial changes to the factors that caused the degraded state are commonly needed to set them on a trend or trajectory of improving conditions that sustain physical, hydrological, and biological integrity.

Watershed Conditions on the Nez Perce-Clearwater

Watershed conditions vary across the Nez Perce-Clearwater, ranging from those unaffected by direct human disturbance to those exhibiting various degrees of modification and impairment. In 2011, the Nez Perce-Clearwater completed the watershed condition classification for 220 subwatersheds. In summary, 140 subwatersheds were rated as Functioning Properly, 73 were rated as Functioning at Risk, and 7 were rated as having Impaired Function. See Appendix K for additional information related to watershed condition classification on the Nez Perce-Clearwater.

The roads and trails indicator had the highest amount of impaired function ratings, with 85 out of 220 subwatersheds classified as impaired. The roads and trails indicator takes into account road and trail density, road maintenance, proximity to water, and mass wasting potential. Sixty-three percent of subwatersheds on the Nez Perce-Clearwater were categorized as functioning at risk or impaired function for the roads and trails indicator. There are approximately 727 miles of system road located on areas identified as landslide prone. See the Aquatic Ecosystems and Fisheries Affected Environment section for a more detailed discussion of road related affects to water resources.

Most roads on the Nez Perce-Clearwater were constructed during the 1960s through the mid-1990s. Over time, maintenance levels have decreased due to reductions in funding and personnel, resulting in fewer miles of road being maintained annually and longer durations between maintenance activities for many of the roads. The rate of new road construction has slowed substantially, and new road construction is predominately limited to that needed for timber harvest access and road relocations for resource protection. A primary focus of the watershed restoration program from the late 1990s to 2010s was road decommissioning. Since 1999, a total of 1,625 miles of forest system and non-system roads have been decommissioned. See Infrastructure Section for the number of road miles decommissioned by year.

Road decommissioning has slowed in the last decade to maintain access. In 2015, a forest-level roads analysis (U.S. Department of Agriculture 2015e) was completed for the Nez Perce-Clearwater. The report provided an assessment of the road infrastructure and a set of findings and recommendations for adjustments to the Nez Perce-Clearwater transportation system.

The broad-scale Travel Analysis assessed 7,563 miles of road and identified 7,549 miles of road as “likely needed for future use”, which could be considered as an approximation of the minimum road system (U.S. Department of Agriculture 2015e). Approximately 14 miles of road, less than one percent of the road system, was identified as “not likely needed for future use” and may be considered candidates for conversion to another use, storage for future use, or removal through decommissioning. The report did note that site specific roads analysis and project level assessment would likely result in additional roads requiring storage for future use, reconstruction or relocation of the road, or additional road maintenance. The Travel Analysis acknowledged that current and projected road budgets are far from fully funding road maintenance needs. Lack of road maintenance funding may increase the risk of impacts on water quality and aquatic ecosystems, although Best Management Practices designed into projects could reduce much of this impact (U.S. Department of Agriculture 2015e).

The Travel Analysis also found that additional new road construction for local access may be needed in the future. Road construction needs would likely arise in areas where there is a need to reestablish access for vegetation management, where existing roads need to be relocated to mitigate impacts, or where access is needed for fire fuels treatments in wildland urban interface areas.

Forest roads that are maintained on an annual basis are typically those roads that have the most administrative and visitor use. Over the last 20 to 30 years, the Nez Perce-Clearwater has focused on road reconstruction and decommissioning as a primary strategy to reduce sediment delivery and potential road failures. Several roads have been relocated out of riparian areas. Culverts have been replaced and often upsized at stream crossings that were causing sediment delivery or impeding passage of aquatic organisms. More recently, additional drainage culverts have been installed, especially before and after perennial stream crossings, to drain ditches prior to entering perennial stream channels. Although there have been improvements in the overall road network, roads and stream crossings continue to cause impacts to watershed condition, riparian and wetland systems, and water quality.

Roads provide necessary motorized access for forest management, recreation, and other beneficial purposes (Gucinski et al. 2001), but they can also have detrimental effects on ecosystem function. The associated effects on watershed condition and riparian and wetland ecosystems differ based on topography, geology, slope stability, design, location, and use.

Designated wilderness and Idaho Roadless Areas cover just over 60 percent of the Nez Perce-Clearwater and natural ecological processes and disturbances dominate. Watersheds in these areas are in good condition and are functioning within the natural range of variation.

Priority Watersheds

Utilizing the Watershed Condition Framework process, in 2011 the Nez Perce-Clearwater designated four subwatersheds as priority watersheds – Upper Little Slate Creek, Upper Elk Creek, Upper Clear Creek, and Waw'aalamnime Creek (Fishing Creek). For each of these four subwatersheds, a watershed restoration action plan was developed to designate the essential projects necessary to restore the watershed to a better condition. Issues in these watersheds include exclusion of wildfire, departed vegetation conditions, road location and densities, undersized culverts, past mining impacts, riparian structure and function, invasive species, loss of soil productivity, and water quality.

In 2014, the Upper Newsome Creek and Meadow Creek subwatersheds were added to the list of designated priority watersheds. To date, all restoration work in the watershed restoration action plans has been completed in the Waw'aalamnime Creek, Upper Newsome Creek, and Meadow Creek subwatersheds. The majority of the restoration work was accomplished through partnership with the Nez Perce Tribe. Work in the Upper Elk Creek, Upper Clear Creek, and Upper Little Slate subwatersheds is ongoing. In 2023, the Musselshell Creek and Lower Crooked River subwatersheds were identified as priority watersheds.

The Agricultural Improvement Act of 2018 (a.k.a., the 2018 Farm Bill), Section 8405 permanently authorizes the Forest Service to develop and maintain the Watershed Condition Framework, using the agency's existing processes and criteria. It provides specific legislative authorization and requirements for the process, one of those being to identify for protection and restoration up to 5 priority watersheds in each National Forest.

Water Quality

Forests and grasslands often produce high-quality water. Long- term studies have shown this to be generally true in undisturbed ecosystems and for some classes of land use (Sedell et al. 2000). Other forms of land use have been found to degrade water quality to varying degrees. The most notable water quality problems found on national forests are typically sediment (turbidity and bedload), nutrients, and temperature. Measures to protect, restore, or mitigate water quality have been devised for many management practices. The Aquatic Ecosystems and Fisheries Environmental Ecosystems Introduction provides a detailed discussion of the latest and best available science related to conditions and management within riparian areas and water quality attributes, such as stream temperature and sediment.

The goal of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the nation's water." The Idaho Department of Environmental Quality uses water quality standards (Idaho Administrative Procedures Act [IDAPA] 58.01.02) to determine if Idaho's waters are being adequately protected and is responsible for ensuring that Idaho's surface, ground, and drinking water resources meet those standards. A water quality standard defines the goals that have been set for a water body by designating uses for the water, sets criteria necessary to protect those uses, and prevents degradation of water quality. A memorandum of understanding (20-MU-11046000-011) has been established to document coordination between the Idaho Department of Environmental Quality and the U.S. Forest Service in Idaho to implement the nonpoint source water quality provisions of the federal Clean Water Act for the State of Idaho (U.S. Department of Agriculture 2020c).

Beneficial Uses

Beneficial uses are the desired uses that water bodies should support, as identified in Section 100 of Idaho's water quality standards (IDAPA 58.01.02.100). Each beneficial use has a unique set of water quality requirements or criteria that must be met for the use to be supported. Most water bodies have multiple beneficial uses. A water body is considered impaired when it does not meet the water quality criteria needed to support one or more of its beneficial uses. Beneficial uses that pertain to water bodies on the Nez Perce-Clearwater include cold water aquatic life, salmonid spawning, primary contact recreation, secondary contact recreation, domestic water supply, agricultural, industrial, wildlife habitats, and aesthetics uses. See Appendix K for additional information regarding beneficial uses.

Idaho Department of Environmental Quality 303(d) and 305(b) Integrated Report

The Idaho Department of Environmental Quality 303(d) and 305(b) Integrated Report is a compilation of information regarding the water quality status of all Idaho waters and is a requirement of the Clean Water Act. Integrated reports are compiled biennially and are submitted to the U.S. Environmental Protection Agency for approval. There are two main parts to the integrated report: 1) the 305(b) list, which summarizes the current condition of all state waters, and 2) the 303(d) list, which identifies those waters that are impaired or water quality limited and for which a total maximum daily load assessment is required. Both lists are named in accordance with the sections of the Clean Water Act where they are defined. Impaired waters listed on the 303(d) list are simply a subset of those on the 305(b) list. The Integrated Report places all state water bodies into one of five primary categories, which are described in Table 115. These categories describe how a water body relates to its beneficial uses. Streams not supporting beneficial uses do not meet applicable water quality standards for their designated beneficial uses and are termed impaired or water quality limited. They are assigned Category 4 or 5 designations. Impairments in streams on the Nez Perce-Clearwater include sediment, stream temperature, *E. coli*, flow regime alterations, physical substrate habitat alterations, combined biota, and habitat bioassessments**.**

The most current U.S. Environmental Protection Agency approved report is the 2022 Idaho Department of Environmental Quality 303(d) and 305(b) Integrated Report (State of Idaho Department of Environmental Quality 2022a). Table 115 displays the amount of stream miles on the Nez Perce-Clearwater by category. Approximately 51 percent of streams are fully supporting or presumed to be fully supporting beneficial uses, 19 percent of streams have not been assessed, and 30 percent of streams are not supporting one or more beneficial uses. All assessed lakes on the Nez Perce-Clearwater are fully supporting beneficial uses. See Appendix K for more information regarding water quality.

Table 115. Integrated Report categories and miles occurring on the Nez Perce-Clearwater

Category	Description	Assessed Miles
1	Waters are wholly within a designated wilderness or Idaho roadless area and presumed to be fully supporting all beneficial uses.	1,458
2	Waters are fully supporting those beneficial uses that have been assessed	2,610
3	Waters have insufficient or no data and information to determine if beneficial uses are being attained or not.	1,505
3T	Waters are wholly or partially on Indian reservations and not subject to the state's 305(b) and 303(d) reporting requirements	6
4A	Waters do not support one or more beneficial uses but a total maximum daily load is completed and approved by the Environmental Protection Agency.	1,345
4C	Waters do not support one or more beneficial uses. Waters are those failing to meet applicable water quality standards due to other types of pollution, such as habitat or flow alteration, and, thus, a total maximum daily load is not required.	329
5	Waters do not meet applicable water quality standards for one or more beneficial uses due to one or more pollutants. These waters make up the 303(d) list and an Environmental Protection Agency approved total maximum daily load is required.	747

Data Source: Idaho Department of Environmental Quality 303(d) and 305(b) Integrated Report (State of Idaho Department of Environmental Quality 2022a)

Total Maximum Daily Load

As directed by the Clean Water Act, each state agency must develop a total maximum daily load for all waters identified on the section 303(d) list of impaired waters. Total maximum daily loads provide an approach to improving water quality so that streams and lakes can support and maintain their state-designated beneficial uses. A total maximum daily load determines pollutant reduction targets and usually covers a basin or subbasin. In instances where a total maximum daily load assessment includes National Forest System lands, the Forest Service serves as a designated management agency through governmental memoranda of understanding. The State of Idaho is the lead agency for total maximum daily load development but must get U.S. Environmental Protection Agency approval before the total maximum daily load is formalized. Total maximum daily loads for a pollutant is defined by the EPA as the sum of the waste load allocation for point sources, plus load allocation for nonpoint sources of pollution, plus a load to allow a margin of safety (40 CFR 130.2). The load allocation for nonpoint sources of pollution includes "natural" background loads and the margin of safety accounts for uncertainty. The TMDL approach is a mechanism for improving impaired waters and a process for determining tradeoffs between point and nonpoint sources. It provides a focus for future watershed management actions.

Category 4A waters do not support one or more beneficial uses but a total maximum daily load is completed and approved by the Environmental Protection Agency. Table 116 displays which subbasins have completed subbasin assessment and total maximum daily loads established for Category 4A streams. Only four of the subbasins have an associated TMDL implementation plan developed. See Appendix K for more information regarding total maximum daily loads.

Table 116. Status of subbasins in the total maximum daily load (TMDL) process.

Status	Subbasins
Completed subbasin assessment and TMDL established; no TMDL implementation plan developed	Lower Selway, Middle Salmon River–Chamberlain Creek, Lower Salmon River, Palouse River (South Fork Palouse River and

Status	Subbasins
	Palouse River tributaries), Clearwater River (Lolo Creek Tributaries), Hangman Creek, Upper North Fork Clearwater River, Lochsa River
Completed subbasin assessment and TMDL established; TMDL implementation plan completed	Clearwater River (Potlatch River), Little Salmon River, South Fork Clearwater River, Lower North Fork Clearwater

Data Source: Idaho Department of Environmental Quality Table of Subbasin Assessments, Total Maximum Daily Loads, Implementation Plans, and Five-Year Reviews; http://www.deq.idaho.gov/water-quality/surface-water/tmdls/table-of-sbas-tmdls/.

A Total Maximum Daily Load must be established and approved by Environmental Protection Agency for the 747 miles of Category 5 water bodies in the Palouse, Lochsa, Middle Fork Clearwater, Clearwater, Upper North Fork Clearwater, and Lower North Fork Clearwater rivers that are listed in the 2022 Idaho Department of Environmental Quality 303(d) and 305(b) Integrated Report (State of Idaho Department of Environmental Quality 2022b) before a TMDL implementation plan can be developed.

State of Idaho Antidegradation Policy

The State of Idaho Antidegradation Policy (IDAPA 58.01.02.051), requires that existing beneficial uses be maintained and protected on all water bodies. Under the antidegradation standard, Idaho has a three-tier policy with varying levels of protection – 1) unremarkable waters, 2) high quality waters, and 3) outstanding resource waters. All waters receive Tier I protection. Water bodies identified in the Integrated Report as fully supporting assessed uses are provided Tier II protection. Waters given Tier III protection are outstanding resource waters. The Idaho State Legislature has yet to designate any river in Idaho as an outstanding resource water. Approximately 70 percent of waterbodies on the Nez Perce-Clearwater have Tier II protection, while 30 percent of streams that are not meeting beneficial uses (Table 115) have Tier 1 protection.

Stream Channel Protection

The Idaho Stream Channel Protection Act regulates stream channel alterations between mean and high-water marks on perennial streams in Idaho. Instream activities on National Forest System lands must adhere to the rules pertaining to the act by obtaining a stream channel alteration permit from the Idaho Department of Water Resources before commencing a streambank or stream channel altering activity. A memorandum of understanding (18-MU-110156000-080) has been established to document coordination between the Idaho Department of Water Resources and the U.S. Forest Service in Idaho to implement the Idaho Stream Channel Protection Act within Idaho on lands administered by the U.S. Forest Service (U.S. Department of Agriculture 2018b).

Best Management Practices

Best management practices (BMP) are methods, measures, or practices used to address the Clean Water Act objective of maintaining and restoring the chemical, physical, and biological integrity of the nation's waters. The use of BMPs is the primary mechanism for mitigating impacts to resources from Nez Perce-Clearwater management actions. BMPs used on the Nez Perce-Clearwater come from federal and state direction. See Appendix K for additional information on BMPs, including a summary of BMP reviews for Idaho Forest Practices Act compliance and the Forest Service National Core Best Management Practice program.

Water Quantity

Watershed condition is a primary driver in determining the magnitude, frequency, and timing of runoff from a watershed. The quantity and timing of streamflow are critical components of water supply, water quality, and the ecological integrity of river systems (Hill et al. 1991). In the absence of major disturbance, stream channels are typically dynamically in balance with the stream's flow regime, which is a key determinant of the energy available for erosion, transport, and deposition of sediment within channels. Increased water yields may be associated with increased probability of peak flow events, which could lead to increased channel and bank adjustment through scour, bedload movement, or redistribution of sediment in depositional areas.

Timber harvest has occurred on the Nez Perce-Clearwater for over a century, , starting in the late 1890s on the Nex Perce (Cochrell 1970) and early 1920s on the Clearwater (Space 1981). It has long been recognized that removal of forest vegetation may alter watershed hydrologic processes. Lee Silvey, a retired Nez Perce National Forest hydrologist, is credited as being the primary author of Forest Hydrology Part II (U.S. Department of Agriculture 1974a), a seminal publication outlining the methodology for water yield analysis associated with forest vegetation manipulation. This methodology or variants of it are still widely used throughout national forests in the U.S. Forest Service Northern Region and beyond.

Best available scientific literature has converged upon a 20 percent change in forest canopy extent as commonly producing a detectable change in peak flows and/or average annual water yield(MacDonald and Stednick 2003, Grant et al. 2008, Troendle et al. 2010). It is important to note that persisting extent of cleared forest vegetation, even if it were greater than 20 percent of a watershed's area, may not reflect a departure from the naturally occurring extent of early successional vegetation in light of natural disturbance processes across the Nez Perce-Clearwater. This, in turn, suggests that hydrograph dynamics should not be characterized as departed from the natural range of variability in light of existing cleared area.

A geographic information system analysis was conducted to provide a general idea as to how much area may currently be in a cleared or open condition. Early successional forested vegetation extent, defined as size class 0 to 4.9 inches diameter at breast height, was collated for each Hydrologic Unit Code (HUC) 12 subwatershed managed by the Nez Perce-Clearwater. This exercise did not differentiate between early successional vegetation resulting from natural disturbances or past management activities. Using this simplified approach, existing cleared area for HUC12 subwatersheds across the Nez Perce-Clearwater ranges from 1 to 12 percent. It is important to note that this analysis did not account for cleared area associated with roads, which generally occupy less than three percent of a subwatershed area.

Maintaining connectivity between hillslope flow regimes and floodplains and connectivity between floodplains and stream channels allows water to be absorbed and stored, increasing the likelihood of sustaining late season flows. Productive soils and intact ground cover capture and store water, slowly releasing it to groundwater and downstream sources. This provides critical regulation of water quality, and quantity, including the attenuation of flood flows (Neary et al. 2009, Shannon et al. 2019).Beyond contributing to reductions in forest cover, road densities may affect near-surface lateral flow pathways and watershed drainage density, which can alter timing and magnitude of streamflow (Wemple and Jones 2003). Road densities range from less than 1 to 6.2 miles per square mile for the HUC12 subwatersheds and are generally higher in the more managed portion of the Nez Perce-Clearwater. Approximately 14 percent of the HUC12 subwatersheds have road densities over 3 miles per square mile and 33 percent have road densities ranging between 1 to 3 miles per square mile. Trail densities for the HUC12 subwatersheds range from 0 to 2.6 miles per square mile. Approximately 18 percent of HUC12 subwatersheds having trail densities over 1 mile per square mile.

Consumptive water rights for surface or ground water can also affect water quantity. Idaho Department of Water Resources manages water in the State of Idaho through water allocation and distribution processes. Water rights authorize the withdrawal of public water by private individuals and organizations and are enforced by the state. Water rights on the Nez Perce-Clearwater are administered by the Forest Service

Northern Region regional office in close coordination with the State of Idaho. See Appendix K for more information on water rights on the Nez Perce-Clearwater.

Riparian Areas, Wetlands, and Floodplain Function

Riparian areas, wetlands, and floodplains are the interface between terrestrial and aquatic ecosystems and are an integral part of watersheds. Consequently, the health of these areas is closely interrelated to the condition of the surrounding watershed and an indicator of overall ecosystem quality (DeBano and Schmidt 1989, Hornbeck and Kochenderfer 2000).

Patterns of riparian and wetland ecosystems vary from relatively narrow strips of land along perennial and intermittent streams in deeply incised, steep mountain valleys to meadows and adjacent wetlands within the wider floodplains of major rivers. Riparian and wetland areas are widely distributed across the Nez Perce-Clearwater and occur at all elevations. The National Wetland Inventory identifies approximately 53,465 acres of riparian and wetland area on the Nez Perce-Clearwater (U.S. Department of the Interior 2015b). Portions of the Nez Perce-Clearwater have not been fully mapped so these acres are a conservative estimate. An evaluation using geographical information system spatial information and data identified approximately 295,000 acres of riparian areas, wetlands, and floodplains on the Nez Perce-Clearwater. Although riparian ecosystems only cover approximately seven percent of the Nez Perce-Clearwater, their ecological significance within the landscape exceeds their limited distribution.

Riverine systems in the Nez Perce-Clearwater vary in steepness, width, stream flow, sediment deposition, and erosive characteristics. This becomes readily apparent as one moves downstream from narrow head-water streams to lower gradient streams with wider floodplains. The natural functions that are associated with a particular floodplain depend in part on its location within this continuum. Floodplains have been shaped, and continue to be shaped, by dynamic physical and biological processes driven by climate, the hydrologic cycle, erosion and deposition, extreme natural events, and other forces.

Floodplain functions, such as flood water storage and conveyance, protection of water quality, and groundwater recharge, are hydrologically important components of a watershed. When rivers are connected to their floodplains, channels are able to migrate naturally. During high flow events, water is distributed across floodplains, dissipating hydraulic energy and increasing the exchange of nutrients and organic material between aquatic and riparian ecosystems. Floodplains also provide an expanded area for deposition and storage of excess sediment, particularly fine sediment, from streams during overbank flow events. Additionally, the water storage and recharge function of floodplains ensures a source of cold water in summer months and warmer water during winter months. Water seeps into the groundwater table during floods, recharging wetlands, off-channel areas, and shallow aquifers. In turn, these areas release water to streams during the summer months. Without this recharge, flows are typically lower and water is warmer.

Functioning riparian and wetland systems are dynamic and more resilient to disturbances from natural and human-caused events than impaired systems. Functioning riparian areas and wetlands have lateral, longitudinal, and drainage network connections, connecting uplands to riparian areas, groundwater to surface water, and streams to floodplains. As defined in Potyondy and Geier (2011), riparian and wetland areas function properly when they: have adequate vegetation present to dissipate stream energy associated with high water flow, thereby reducing erosion and improving water quality; improve flood-water retention and ground-water recharge; provide shade to moderate stream temperatures; develop root masses that provide streambank stability; supply large woody debris to streams for pool development and sediment entrapment; sequester carbon; filter pollutants; and contribute to nutrient cycling.

Riparian and wetland vegetation is an indicator assessed in the Watershed Condition Framework analysis (U.S. Department of Agriculture 2011d). Based on the Nez Perce-Clearwater 2011 classification, 56 percent of the 220 subwatersheds classified were rated Functioning Properly for this attribute. Approximately 26 percent of subwatersheds were scored as Functioning at Risk and 18 percent of subwatersheds were rated as having Impaired Function. The functioning at risk and impaired subwatersheds have areas where water tables are disconnected from the adjacent riparian areas, primarily due to roads; alteration of near-surface hydrologic processes; and vegetation that reflects the loss of available soil water. See the Aquatic Ecosystems and Fisheries Affected Environment section and Aquatic, Wetland, Water, and Riparian Habitats in the Wildlife section for a more detailed discussion of riparian vegetation.

Disturbances are a natural part of the riparian environment and derive both from fluvial processes (for example, large floods and ice scour) and more general terrestrial ones (for example, wildfire, landslides, and wind storms) (Montgomery and Buffington 1997, Bendix and Hupp 2000). Factors that may have interrupted hydrologic function or contributed to a decrease in riparian and wetland conditions on the Nez Perce-Clearwater include concentrated livestock grazing, current and historic mining, historic timber harvest, road construction and road use, water diversions, removal of beavers, invasive plant species infestations, and disturbances associated with recreational use. These types of management activities have altered conditions by altering flow regimes, disrupting sediment and wood material transport downstream, altering channel morphology, and changing plant communities. A variety of timber harvest treatments have occurred in riparian areas in the past. Most of those harvested areas have revegetated as a result of planting or natural regeneration. Historically, it was acceptable for system roads, temporary roads, and skid trails to be constructed close to stream channels. Localized sedimentation and temperature increases are likely to have occurred. Natural recovery, active restoration, and limitations to the type of harvest and associated infrastructure allowed have mitigated or improved riparian conditions that were impacted by these past actions. See the Aquatic Ecosystems and Fisheries Affected Environment section for a more detailed discussion on riparian conditions due to roads, livestock grazing, fire, and historic dredge mining.

Natural disturbance in riparian areas, including wildfire, insects, disease, flooding, drought, and weather events such as windstorms, may temporarily degrade conditions but these disturbances are necessary for the regeneration of many native plant species. Aggressive fire suppression over the last 100 years has to some extent altered natural disturbance regimes within riparian systems, particularly in the more managed portions of the Nez Perce-Clearwater. With the addition of PACFISH and INFISH amendments to the existing forest plans in 1995, little to no vegetation management or prescribed fire have been implemented in riparian areas. Although current forest plan standards do not restrict vegetation management in riparian areas, the time and complexity to complete National Environmental Policy Act analysis and associated regulatory consultation for vegetation treatments or prescribed burning in riparian areas has generally limited those actions from being implemented. Forest succession in the absence of disturbance, particularly wildland fire, has resulted in encroachment of conifer species into some riparian areas and meadows. In these particular areas, conifer species have replaced much of the tall woody species, such as willows, cottonwood, and birch. Reintroduction of fire commensurate with natural fire regimes could reestablish tall hardwoods and shrubs as well as help to maintain a mosaic of vegetation species and composition. For example, beavers require deciduous trees or shrubs as a food source as a basic requirement. Their dam building activities can create diversity in stream channel morphology, store water for increased year-round flow, lower water temperatures, raise water tables, dissipate flood energy, and store carbon.

Increasingly, restoration practitioners are using beavers to accomplish stream, wetland, and floodplain restoration (Castro et al. 2018). Beaver populations have declined across much of the Nez Perce-

Clearwater, primarily due to heavy trapping in the 1800s. More recently, decline is due to a combination of factors including reductions in herbaceous and woody vegetation, direct removal of animals, trapping, livestock grazing impacts, roads located in riparian areas, and other human activities. Under the prolonged absence of fire, some riparian areas have converted more towards coniferous tree species and away from the aspen, cottonwood, poplar, and willow species preferred by beavers.

Roads have the potential to affect aquatic ecosystems through several direct and indirect pathways and to modify natural drainage patterns which often lead to accelerated erosion of road surfaces and associated cut and fill slopes. This can lead to increased sediment delivery to streams. Roads can affect stream channels directly if they are located on active floodplains or directly adjacent to stream channels acting as a chronic source of sediment and interrupting floodplain function. If the road impinges on the morphological characteristics of the stream, it can set forth a chain reaction of channel adjustments that can result in accelerated bed and bank erosion, which produces excessive sediment. Roads can also affect floodplains by disconnecting them from the river channel, potentially altering subsurface flows and groundwater contributions to the river. Roads in riparian areas result in a semi-permanent loss of riparian vegetation, which can influence the amount of solar radiation reaching a water body, increase water temperatures, and alter the amount of wood available for recruitment into the stream ecosystem.

Roads can result in changes in channel morphology, especially at road crossing locations. Poorly placed roads can encroach on stream channel and floodplain areas. Many older roads were constructed very close to stream channel areas, often in the floodplain. Often streams were straightened to accommodate road routing. Roads can permanently affect wetlands by interrupting natural flow paths and channelizing water flow through culverts.

System roads generally have notable impact to riparian and wetland conditions and floodplain function on the Nez Perce-Clearwater. Out of the 7,682 miles of Forest Service system roads, 1,600 miles of road or approximately 6,400 acres occur within riparian management zones. Approximately 686 miles of road or 2,700 acres are located within 100 feet of stream channels and wetlands, which equates to approximately 7 percent of the total road system. Some of these road miles are continuous along substantial lengths of a stream channel or are unconnected sections of road that interact with streams only at stream crossings.

Over 60 percent of the Nez Perce-Clearwater's land base is contained within designated wilderness or Idaho Roadless Areas. Approximately 70 percent of river miles in the plan area flow through these areas. It is assumed that natural processes drive riparian and wetland conditions and floodplain function in these areas and that conditions are within the natural range of variation.

Groundwater Dependent Ecosystems

Groundwater and surface water are interconnected and interdependent in almost all ecosystems. Ground water plays significant roles in sustaining the flow, chemistry, and temperature of streams, lakes, springs, and wetlands in many settings, while surface waters provide recharge to ground water in other settings. Groundwater-dependent ecosystems are communities of plants, animals, and other organisms that rely on access to or discharge of groundwater such as springs, fens, seeps, areas of shallow groundwater, cave and karst systems, hyporheic zones, and groundwater-fed lakes, streams, and wetlands. Owing to their unique water and chemical characteristics, groundwater dependent ecosystems often support rare and endemic species, as well as provide critical ecosystem services including water storage, supply and purification. Impacts to the quantity, timing and quality of groundwater discharge to these ecosystems have notable consequences to their persistence and viability.

Peatlands, including fens and fogs, are rare and important. Are uncommon habitats that provide habitat for unique plant and animal communities. These wetlands form where high water tables and permanent saturation slows rates of decomposition and where soils are formed from accumulating partially decayed organic matter. Peatlands generally occur as small, discreet landscape features. Locations and extent of peatlands, as with other groundwater dependent ecosystems, are not well documented. Known occurrences of peatlands exist in some research natural areas and special areas on the Nez Perce-Clearwater, such as the Sing Lee Wetland botanical special area and the wispin'iitpe botanical and historical special area, which includes Packer Meadows.

Groundwater dependent ecosystems contain ecological resources that potentially are highly susceptible to permanent or long-term environmental damage from contaminated or depleted ground water. Ground water extraction or interception by humans modifies the pre-existing hydrologic cycle. It can lower ground water levels and alter the timing, availability, and volume of ground water flow to dependent ecosystems. The largest threats to springs, seeps, and groundwater habitats are those that change water flow, temperature, or water quality. Particular threats to groundwater dependent ecosystems on the Nez Perce-Clearwater include roads that intercept and/or redirect ground water, contamination of water from chemicals and oils on road surfaces, diversion for public water supply, ground disturbance from livestock, diversion for livestock water developments, salting associated with livestock grazing, entrenchment of streams, and modification of forested vegetation that alters groundwater and surface flows or changes microclimates.

Benefits to People and Key Ecosystem Services

Healthy streams, lakes, and rivers benefit Americans in a myriad of ways, from clean drinking water to diverse recreational opportunities. One in five Americans rely on water that comes from National Forest System lands (U.S. Department of Agriculture 2017e). Water from National Forests is valued for many ecological, cultural, economic, and social purposes. Healthy, properly functioning watersheds provide ecosystem services and multiple uses that provide benefits to people either directly or indirectly and contribute to long-term social and economic sustainability.

Water is the basis for many of the recreational and amenity values people seek. Altered flows and reduced water quality could affect forest visitor use and long-term economic sustainability. Adequate flow and water quality are essential to maintaining key fish species and fisheries, which in turn, are sources of many economic, cultural, and spiritual values.

The Forests to Faucets 2.0 assessment identified Hydrologic Unit Code (HUC) 12 watersheds in the United States that are most important to surface drinking water sources (Mack et al. 2021). The assessment also identifies forested areas important to the protection of drinking water and areas where the quantity and quality of drinking water supplies might be threatened by climate change, development, insects and diseases, or wildland fire. Watersheds on the Nez Perce-Clearwater have a moderate importance for the delivery of surface drinking water supplies from waters originating on the Forests (Mack et al. 2021). The assessment also indicated that lands within the Nez Perce-Clearwater have minimal threats to surface water supply from land use changes and moderate to high threats to surface water supply from climate change, insects and disease, and wildfire.

Ecosystem services are broken out into four distinct categories: provisioning, supporting, regulating, and cultural. Provisioning services are products obtained from ecosystems, such as abundant clean water. Supporting services are equivalent to ecosystem functions, such as nutrient cycling. Regulating services are benefits obtained from the regulation of ecosystem processes, such as water filtration and storage; slope stabilization; flood and drought control; delivery of public water, including maintenance of consumptive and non-consumptive water rights; supply of drinking water; and support of municipal watersheds and source water protection areas. Cultural services are nonmaterial benefits obtained from ecosystems, such as adequate flows for sustainable recreation opportunities. For some American Indian tribes, water is considered a culturally significant food used for ceremonies and subsistence needs. These goods and services are essential to the social, environmental, and economic well-being of local communities. The wide array of critical ecosystem services provided by healthy watersheds is frequently undervalued when making land use decisions. Due to the complexity of natural systems and economic precedents, it is difficult to assign a dollar amount to a particular ecosystem service. An assessment completed locally by the Ecosystem Research Group (Ecosystem Research Group 2018) estimated that just the waters in the Clearwater River and tributaries upstream of Orofino yields an estimated value of $168 million per year. This is based on an average annual water flow of 6.4 million acre-feet of water per year for the Clearwater River measured at Orofino and a conservative value of $26.34 per acre-foot.

Water is a key ecosystem service that is provided by the Nez Perce-Clearwater. It is important in the broader landscape and outside the plan area and is likely to be influenced by the proposed Land Management Plan. Figure 34 shows the extent of contribution the water originating from the Nez Perce-Clearwater has on the larger Snake and Columbia River systems, which support many communities in Idaho, Washington, and Oregon (U.S. Department of Agriculture 2020b).

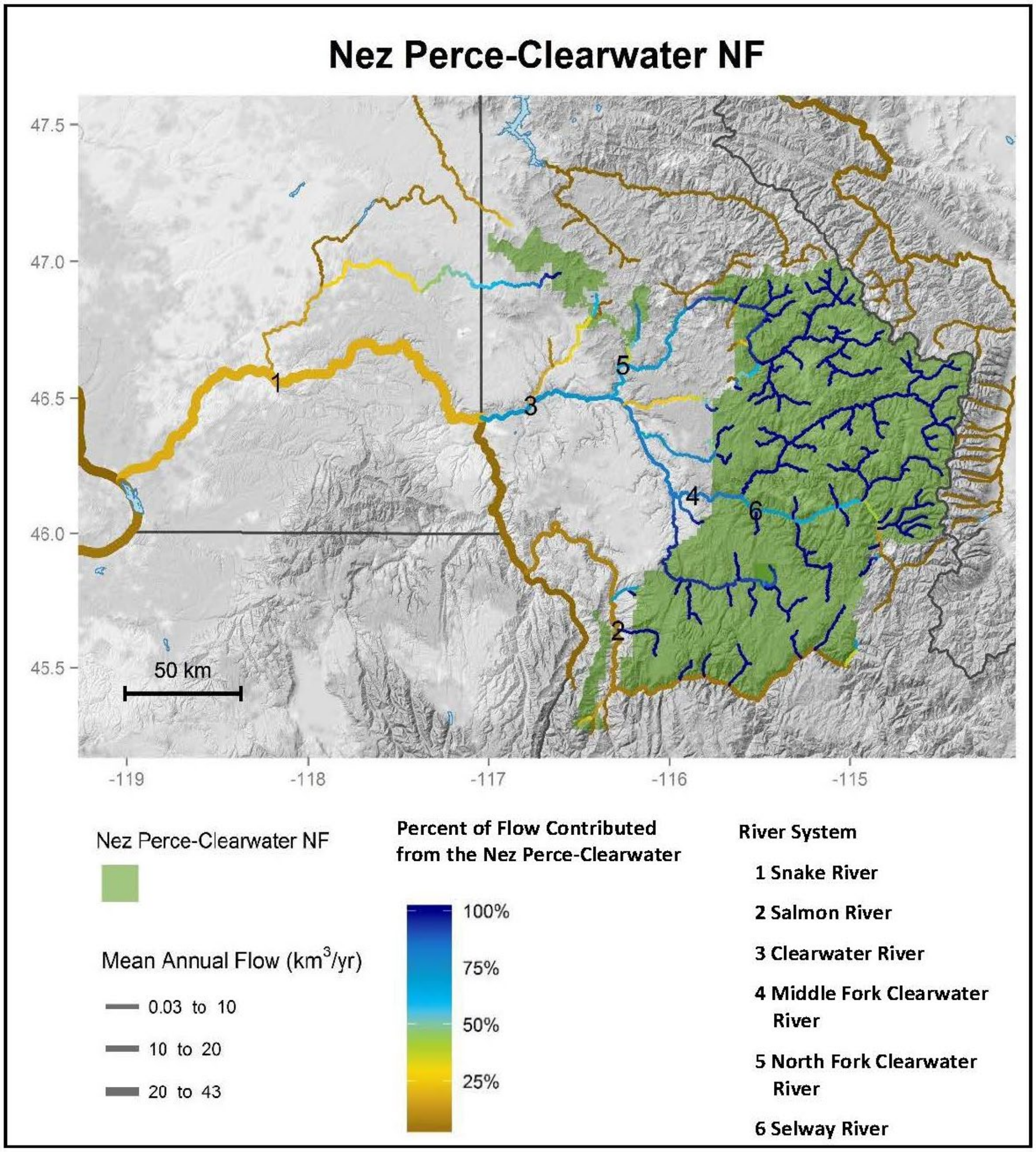


Figure 34. Flow contribution from the planning area to major rivers

Data Source: USDA Forest Service, Rocky Mountain Research Station, Estimating the Contribution of Forests to the Nation's Water Supply (U.S. Department of Agriculture 2020b); https://www.fs.fed.us/rm/value/research_cpl.html.

Water that originates on the Nez Perce-Clearwater provides many important benefits, including public drinking water, municipal water supplies, recreational opportunities, aesthetics, fishing opportunities, water for fish and wildlife, livestock watering, and irrigation. Although no large hydropower facilities exist on the Nez Perce-Clearwater, numerous facilities are located downstream on larger river systems. Additionally, water quality and supply are important for ecological sustainability, which contributes to the many benefits and ecosystem services that people derive from the Nez Perce-Clearwater. See Appendix K for additional information regarding public drinking water, municipal water supply watersheds, source water protection areas, groundwater supply, and water rights.

Groundwater is an important resource in Idaho, and it will likely become more important in the future as the State of Idaho's population and industries grow. Ground water is the source of drinking water for 95 percent of Idaho citizens (State of Idaho Department of Environmental Quality 2018). Idaho uses over 38,000 acre-feet of groundwater per day for domestic use, public water supplies, irrigation, livestock, and industry (Murray 2018). Water generated in the mountains of the Nez Perce-Clearwater is an important source of recharge for downstream aquifers and is an important ecosystem service to local communities. The Nez Perce-Clearwater contains all or portions of the following groundwater flow systems – Palouse River, Hangman Creek, Clearwater Uplands, Clearwater Plateau, Mill Creek, Little Slate Creek, Elk City, and Red River (Graham and Campbell 1981).

Pumping of groundwater can reduce river flows, reduce, or eliminate discharges to wetlands and springs, and influence the sustainability of drinking-water supplies. Due to relatively sparse populations and an extensive amount of wilderness and roadless areas, utilization of Nez Perce-Clearwater groundwater is generally limited. Consumptive groundwater use within the Nez Perce-Clearwater is restricted to special-use permits, Forest Service campgrounds or administrative sites with domestic wells, private in-holdings, and in-forest communities.

There are few natural sources of groundwater contamination. Most threats to groundwater quality are linked directly or indirectly to a variety of human activities. Any type of hazardous material that soaks into the ground has the potential to contaminate ground water resources. Contamination of soils and ground water can be difficult, time-consuming, and expensive to address so it is much easier and cost-effective to protect groundwater than it is to remediate after contamination has occurred. Groundwater can be contaminated by fuel spills from long haul truck accidents, saline runoff from roads and highways, herbicide application, and leaching and seepage from mine spoils and tailing impoundments. Over the past decade, there have been multiple long-haul truck accidents on U.S. Highway 12 along the Lochsa River that have drained thousands of gallons of fuel into the groundwater and river.

Municipal Watersheds

Direction for management of National Forest System watersheds that supply municipal water is provided in 36 CFR 251.9 and Forest Service Manual 2542. The Forest Service is directed to manage National Forest watersheds for multiple uses while recognizing domestic supply needs. Municipalities may apply to the Forest Service for municipal watershed agreements if they desire protective actions or restrictive measures to protect municipal water supplies not specified in the Land Management Plan. Formal written agreements to ensure protection of water supplies may be appropriate when multiple use management fails to meet the needs of a water user. Although there are currently no municipal watershed agreements established for watersheds on the Nez Perce-Clearwater, agreements could be developed in the future.

Forest Service Manual 2542.03 provides guidance to identify watersheds providing the principal source of community water during land management planning. The Nez Perce-Clearwater provides the principal source of community water for the communities of Elk River, Elk City, and Pierce. See Appendix K for additional information regarding municipal water supply.

Source Water Protection Areas

Source water protection areas protect public water systems from contamination in accordance with the 1996 amendments to the Safe Drinking Water Act. Public water systems are defined under the Safe Drinking Water Act as entities that provide "water for human consumption through pipes or other constructed conveyances to at least 15 service connections or serves an average of at least 25 people for at least 60 days a year."

Source water is untreated ground water (aquifers and springs) and surface water (rivers, streams, and lakes) used to supply drinking water for private and domestic wells and public water systems. Groundwater and surface water used for drinking water supplies are often vulnerable to contamination from land use practices and potential contaminant sources within the vicinity of drinking water wells and intakes.

The Nez Perce-Clearwater contains 80,000 acres of source water protection areas; 6,500 acres from groundwater and 73,500 from surface water. Source water protection areas occur within 57 Hydrologic Unit Code (HUC) 12 subwatersheds. See Appendix K for a delineation of source water protection areas by subwatershed.

The Idaho Department of Environmental Quality's Source Water Protection Program provides guidance and approval of source water protection areas within the State of Idaho. The State of Idaho has completed a source water assessment for each of the 41 public water systems derived from the Nez Perce-Clearwater. A source water assessment summarizes the likelihood of individual drinking water sources becoming contaminated and serves as a foundation for public water systems to prepare source water (drinking water) protection plans and implement protection measures.

Source water protection is a voluntary effort a community can implement to help prevent contamination of the source water that supplies its public water system. A Source Water Protection Plan is a written plan a community develops to document its source water protection activities and outlines the management tools the local community plans to use to protect drinking water sources. The following communities utilize water flowing from the Nez Perce-Clearwater and have formalized source water protection plans established with the Idaho Department of Environmental Quality: City of Elk River (Idaho Rural Water Association 2008), Elk City Water and Sewer Association (Idaho Department of Environmental Quality 2017), City of Kamiah (Hummer and City of Kamiah Planning Team 2017), City of Orofino (City of Orofino 2006), City of Lewiston (City of Lewiston and Asotin County Public Utility District 2010), City of Juliaetta (City of Juliaetta 2019), Riverside Independent Water District (Idaho Department of Environmental Quality 2013), City of Kooskia (City of Kooskia 2013), and City of Potlatch (Idaho Rural Water Association 2010).

There are 13 public water systems that have surface water intakes located on Nez Perce-Clearwater land or that have surface water source water protection areas that extend onto Nez Perce-Clearwater lands, as delineated in the source water assessments. These public water systems serve approximately 22,650 people. The communities of Elk River, Elk City, Kamiah, Orofino, Lewiston, Juliaetta, Pierce, and Riverside derive their domestic water supply directly from the surface water originating from within the Nez Perce-Clearwater. Approximately 73,490 acres of the Nez Perce-Clearwater are delineated as source water protection areas for surface water intakes. See Appendix K for more information regarding public water systems.

There are 28 public water systems withdrawing groundwater from wells and springs within Nez Perce-Clearwater land or have groundwater source water protection areas that extend onto Nez Perce-Clearwater lands as delineated in the source water assessments. These public water systems serve approximately 6,240 people. The communities of Grangeville, Kooskia, and Potlatch derive groundwater that drains from Nez Perce-Clearwater land. Approximately 6,440 acres of the Nez Perce-Clearwater are delineated as source water protection areas for groundwater intakes. See Appendix K for more information regarding public water systems.

Watershed Restoration

The aim of the Nez Perce-Clearwater watershed restoration program is to maintain and restore healthy watershed, riparian, wetland, and aquatic ecosystems within the context of broad ownership patterns and in collaboration with partners. Over the past 25 years, restoration work has been completed through partnerships with county, state, and federal agencies; private organizations; and youth education programs. The primary restoration partner on the Nez Perce-Clearwater is the Nez Perce Tribe, which has invested millions of dollars in project areas that cover the Lolo Creek watershed and most of the Middle Fork Clearwater, South Fork Clearwater, Lochsa, and Selway River subbasins.

The watershed restoration program is a multi-million-dollar program that supports approximately 30 permanent positions in county and state agencies, and the Nez Perce Tribe, and provides substantial work to several local contracting businesses. Restoration actions have primarily focused on road decommissioning and culvert upsizing on open roads to pass 100-year flows and allow for aquatic organism passage. Other watershed, riparian, wetland, and aquatic restoration projects have included rehabilitation of abandoned mines, soil decompaction, planting of native vegetation, stabilization of stream banks, fencing of riparian and wetland areas, removal of streamside mine tailings, improving stream habitat, meadow restoration, installing beaver dam analogs, in-stream large wood placement, re-meandering stream channels. These activities have resulted in decreased sediment delivery and improved riparian functions and stream processes.

Restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions. Restoration may not necessarily return an ecosystem to its former state, because contemporary constraints and conditions can cause it to develop along an altered trajectory (U.S. Department of Agriculture 2006, Clewell et al. 2005).

Restoration needs on the Nez Perce-Clearwater include, but are not limited to, the following:

- Treating vegetation strategically, managing natural wildfire, and utilizing prescribed fire are needed to alter the structure, pattern, and composition of upland and riparian vegetation to move towards desired conditions, restore fires role on the landscape, and increase resilience;
- Maintaining or improving riparian area conditions, stream habitat, and existing and predicted future stream thermal refugia;
- Decommissioning or relocating system roads on unstable slopes and/or stream adjacent; if not feasible focus on improving roads by hydrologically disconnecting and/or storm proofing;
- Removing or upgrading fish passage barriers that block or restrict access to historically occupied aquatic habitats or restrict connectivity between aquatic habitats;
- Storm proofing and hydrologically disconnecting system roads, including upsizing road stream crossings and road drainage features; Restoring or promoting a diversity of tree and plant species to increase stream shading, provide sources of woody debris, stabilize the soil, and restore fluvial processes;
- Removing, relocating, or mitigating dispersed sites in riparian areas that are causing resource impairment;
- Reconstructing or improving system roads, focusing on roads with chronic sediment delivery to streams or potential future road prism failures;

- Improving trail systems, focusing on trail segments with chronic sediment delivery to streams;
- Improving meadow conditions, including installation of beaver dam analogs, relocation of roads, increased drainage through roads, and reduced conifer encroachment;
- Restoring hydrologic connectivity of floodplains and meadows; and
- Reintroducing or supplementing beaver into suitable habitats within their former range.

Restoration actions that are intended to improve water quality can often result in short-term adverse effects to water quality, specifically if the implementing actions occur within or adjacent to a water body. Short-term adverse effects are anticipated and considered acceptable when activities provide long-term protection or improvement of water quality and riparian and wetland condition and function.

Environmental Consequences

This section describes the effects of forestwide management as outlined in the Land Management Plan on water resources. The Land Management Plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carry out any project or activity. Because the Land Management Plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications or longer-term environmental consequences of managing the Nez Perce-Clearwater under this programmatic framework.

The 2012 Planning Rule requires that National Forests provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.8). Sustainability is defined as the capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. Watersheds with functioning watershed condition and good water quality support ecological sustainability. Water resources that provide ecosystem services or benefits to people and surrounding communities support economic and social sustainability.

The Nation's forests and grasslands that provide clean and available water are a fundamental part of the American landscape and legacy that the Forest Service holds in trust for future and present generations. One of the 2022-2026 U.S. Department of Agriculture Strategic Plan objectives is to restore, protect, and conserve watersheds to ensure clean, abundant, and continuous provision of water resources (U.S. Department of Agriculture 2022a).

Effects Common to All Alternatives

The potential impacts from climate change to water resources would be the same for all alternatives. Regional climate change scenarios project a significant decline in snowpack in the coming decades, with more winter precipitation falling as rain (Halofsky, Peterson, et al. 2018a, b). This reduction in peak snow accumulation will have significant implications for regional hydrology, including more runoff in winter, earlier peak flows in spring, reduced storage capacity associated with snowpack, and declining summer flows (Clark and Harris 2011, Luce and Holden 2009, Luce et al. 2014, Luce et al. 2012, Luce 2018). The increased magnitude of peak streamflows have the potential to damage roads near perennial streams, ranging from minor erosion to extensive damage, thus affecting public safety, access for resource management, water quality, and aquatic habitat. Bridges, campgrounds, and national forest facilities near streams and floodplains will be especially vulnerable, potentially reducing access by the public (Halofsky, Peterson, et al. 2018a, b).

Increasing temperatures; changing precipitation patterns; and more frequent, intense, and unpredictable extreme weather conditions caused by climate change are exacerbating existing risks. In addition to affecting the amount of available water, climate change is also expected to reduce overall water quality, due to higher summer water temperatures and changes in the timing, intensity and duration of precipitation events. A possible increase in frequency and intensity of rainfall during fall and winter months could produce more overall pollution and sedimentation entering waterways, as well as an increased possibility of flooding in winter and early spring (Clark and Harris 2011). Decreased snowpack in combination with higher air temperature could increase stream temperatures (Halofsky, Peterson, et al. 2018a).Decreasing snowpack and declining summer flows will alter timing and availability of water supply, affecting agricultural, municipal, and public uses in and downstream from national forests. Declining summer water flows may result in some communities experiencing summer water shortages (Halofsky, Peterson, et al. 2018a, b). Water flows could affect water rights and beneficial uses. Most of the streams in the western subregion depend on snowmelt for runoff and snowpack changes strongly dictate streamflow responses (Halofsky, Peterson, et al. 2018a, b). Changes in the timing of streamflow related to changing snowmelt are already observed and will continue, reducing the supply of water for many competing demands and causing far-reaching ecological and socioeconomic consequences (Mote et al. 2014).

The 2012 Planning Rule requires a plan to include plan components to maintain or restore structure, function, composition, and connectivity of terrestrial and aquatic ecosystems and watersheds, taking into account stressors, such as climate change (36 CFR 219.8(a)). Although the No Action does not contain explicit information on climate change, the 1987 Forest Plans provide management direction that promotes healthy forest and watershed conditions. Under the Action Alternatives, the Land Management Plan includes many desired conditions that promote resilient physical and biological ecosystems. Resilient systems are better able to adapt to changing climates. Desired condition FW-DC-WTR-01 describes National Forest System lands that provide the distribution, diversity, and complexity of watershed and landscape-scale features, including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity. Primary adaptation strategies to address changing hydrology due to climate change in the Northern Rockies (Halofsky, Peterson, et al. 2018a, b) include restoring the function of watersheds, connecting floodplains, reducing drainage efficiency, maximizing valley storage, and reducing hazardous fuels. Adaptation tactics include adding wood to streams, restoring beaver populations, modifying livestock management, and reducing surface fuels and forest stand densities. Primary strategies for infrastructure include increasing the resilience of stream crossings, culverts, and bridges to higher peak flows and facilitating response to higher peakflows by reducing the road system and disconnecting roads from streams. Further discussion of climate change effects can be found within the Climate Change and Forest Carbon section. See also Appendix G for specific examples of potential climate adaptation strategies that were used in the development of forest plan components to help sustain the fundamental ecological functioning of water resources.

Effects of the No Action Alternative

Under the No Action Alternative, the 1987 Nez Perce National Forest Plan (U.S. Department of Agriculture 1987b) and 1987 Clearwater National Forest Plan (U.S. Department of Agriculture 1987a) would continue to provide direction for the combined Nez Perce-Clearwater unless modified by a forest plan amendment. Analysis of a no action alternative is a requirement of the National Environmental Policy Act.

The Nez Perce and Clearwater 1987 Forest Plans provide direction for the protection and management of water quality and quantity, watershed processes, and riparian and channel function. In 1995, the Chief of the Forest Service amended the Nez Perce National Forest Plan (Amendment 20) and Clearwater National Forest Plan (Amendment 10) to implement PACFISH for managing anadromous fish-producing watersheds on National Forest lands. The amendment to the Clearwater Forest Plan as included the addition of INFISH guidance. PACFISH and INFISH were designed to provide interim aquatic and riparian management guidance, halt further degradation, and begin recovery aquatic ecosystems. While these strategies were initially intended to be interim guidance, they have now been in place on the Nez Perce-Clearwater for over 25 years. They established and defined interim riparian habitat conservation areas, prescribed specific standards and guidelines that limited activities within the riparian habitat conservation areas, and established riparian management objectives. The 1995 forest plan amendments interim direction intended to remain in effect until forest plans are amended or revised. See the Aquatic Ecosystems and Fisheries section, particularly the Policy and Affected Environment pieces, for more information regarding PACFISH and INFISH amendments to the Nez Perce and Clearwater forest plans.

Both the Nez Perce and Clearwater forest plans, as amended by PACFISH and INFISH, include goals and standards for the protection of water quality, water quantity, and aquatic habitat during management activities and include directions to implement best management practices. Since the Nez Perce and Clearwater National Forests administratively combined in 2012, it has been difficult to provide consistent water management administration across the combined Nez Perce-Clearwater because the direction from the two forest plans differ. This inconsistency mainly impacts forest management planning and implementation.

Watershed Condition

Under the existing 1987 Forest Plans, both Forests have been actively pursuing restoration work to meet forest plan fish and water quality objectives. Restoration has resulted in decreased sediment delivery and improved riparian functions and stream processes. With the addition of PACFISH and INFISH direction, interim riparian habitat conservation areas were established and specific standards and guidelines that limited activities within the riparian habitat conservation areas were prescribed. Passive restoration in riparian habitat conservation areas since 1995 have also improved overall watershed condition. Both active and passive restoration would continue under the No Action Alternative as long as the Nez Perce-Clearwater continues to prioritize watershed restoration and emphasize partnership opportunities. The national Watershed Condition Framework program (U.S. Department of Agriculture 2011d) established in 2011 provides a method for classifying watershed condition and offers broad guidance to help national forests prioritize integrated, subwatershed scale restoration actions. This program would continue to be used under the No Action Alternative.

There would continue to be localized improvements to watershed, soil, riparian, and aquatic habitat conditions as projects are implemented but watershed-scale improvements may occur slowly given current and anticipated funding levels. Under the No Action Alternative, location of watershed restoration projects would more than likely, be prioritized and directed by more commodity-based resource projects, such as timber harvest and integrated vegetation restoration projects, which has been the case over the last decade.

Designated wilderness and Idaho Roadless Areas cover just over 50 percent of the Nez Perce-Clearwater and natural ecological processes and disturbances dominate. The Idaho Roadless Rule designated approximately 1,500,000 acres to be managed as roadless under specific themes. This reduced timber harvest and road construction potential relative to the 1987 estimated levels. Watersheds in these areas are in good condition and are functioning within the natural range of variation.

In the more managed portion of the Nez Perce-Clearwater, legacy effects from past livestock grazing; recreation; road and trail construction, maintenance, and use; timber harvest and associated activities; fire exclusion; mining; and other human-caused disturbances continue to affect watershed health. Generally, under the direction of the 1987 Nez Perce and the Clearwater Forest Land Management Plans, the intensity and risks associated with management actions and human-induced disturbances have been reduced when compared to conditions prior to the 1987 Plans, especially with the inclusion of the PACFISH and INFISH amendments. Watershed conditions would be maintained or continue to improve, as a reflection of the adherence to PACFISH and INFISH standards, use of best management practices, and implementation of watershed restoration activities.

Water Quality

Both the Nez Perce and Clearwater forest plans, as amended, also have standards that require management activities to meet or exceed State of Idaho water quality standards, protect beneficial uses, and provide for public water supply (Clearwater Goal 10a, Standard 8b and 8m, and Amendment 10, Standards 1 and 2; Nez Perce Goals 3 and 21, Standard 1, and Amendment 20, Standards 1 and 2).

Both plans established fishery and water quality objectives and include standards to meet those objectives (Clearwater Standards 8d and 8e; Nez Perce Standard 8). Watershed systems were assigned water quality objectives in Appendix K of the Clearwater National Forest Plan and prescription watersheds were assigned fish and water quality objectives in Appendix A of the Nez Perce Forest Plan. These objectives provide management direction in terms of the maximum estimated increase in sediment over baseline conditions that can be approached or equaled for a specific number of years per decade. Watersheds not meeting fish and water quality objectives in 1987 were identified and associated upward trend requirements were imposed, which allowed timber management to occur concurrent with watershed improvement efforts, as long as a positive, upward trend in habitat carrying capacity was indicated (Clearwater Standard 8h, Nez Perce Standard 8). The 1993 Stipulation for Dismissal for the Clearwater Forest Plan litigation (1993)mandates that any activity in a watershed not meeting water quality objectives outlined in Appendix K yield no net increase of sediment during the project. Appendix A of the Nez Perce Forest Plan also assigned entry frequency guidelines for each of the prescription watersheds, limiting the number of timber harvest projects allowed per decade. Appendix K of the Clearwater Forest Plan set an allowable number of years in 30 years that the sediment yield threshold could be exceeded.

The fishery and water quality objectives in the 1987 Forest Plans were tied to particular sediment delivery prediction models, utilizing information, formulas, and coefficients outlined in the R1/R4 Guide for Predicting Sediment Yields (Cline et al. 1981). The WATBAL model was used on the Clearwater National Forest and the NEZSED model was used on the Nez Perce National Forest. Both of the original model platforms the models were built on no longer exist. The NEZSED model now is used in an excel spreadsheet format. As R1/R4 Guide for Predicting Sediment Yields was published in 1981, some of the assumptions were based on forest practices related to harvest and road construction that occurred in the 1960s and 1970s. Since then, there have been advances in technology, PACFISH and INFISH amendments to the forest plans, development and implementation of best management practices, and updates to contract provisions.

More research and improvement in sediment modeling technology has occurred since the 1987 plans were developed (Hyde et al. 2006, Nelson et al. 2019, Black et al. 2012). Since the mid-2000s, the Nez Perce-Clearwater has also been utilizing the Water Erosion Prediction Project (WEPP) model and Geomorphic Road Analysis and Inventory Package (GRAIP) and GRAIP-Lite models developed by the U. S. Forest Service Rocky Mountain Research Station to aid in erosion and sediment delivery evaluations.

Implementation of best management practices would continue as directed in both forest plans (Clearwater Objective 9d, Standard 8c and 8k; Nez Perce Standard 1). Best management practices are outlined in the National Core Best Management Practices Technical Guide (U.S. Department of Agriculture 2012b), the Soil and Water Conservation Practices handbook (U.S. Department of Agriculture 1988b), Rules Pertaining to the Idaho Forest Practices Act (Idaho Department of Lands 2022b), Stream Channel Alteration Rules (Idaho Department of Environmental Quality 2005), and Dredge and Placer Mining Operations in Idaho (Idaho Department of Lands 1992).

Water Quantity

Both the Nez Perce and Clearwater forest plans include standards to maintain water quantity and provide guidance for proposed activities that have a potential to significantly alter water flow, quantity, timing, or flow duration (Clearwater Objective 9a, Standards 8a and 8l, Amendment 10, Goals 3 and 4; Nez Perce Goal 20, Objective 2, Standards 5, 6 and 7, and Amendment 20, Goals 3 and 4). The Nez Perce and Clearwater forest plans do not include guidance regarding climate change or offer adaptation strategies.

Both forest plans require a watershed cumulative effects feasibility analysis for projects involving significant vegetation removal prior to including the projects on the implementation schedules to ensure that the project, considered with other activities, will not increase water yields or sediment beyond acceptable limits. Both plans also require that the analysis identifies any opportunities for mitigating adverse effects on water-related beneficial uses, including capital investments for fish habitat or watershed improvement (Clearwater Standard 8g(4); Nez Perce Standard 4).

Riparian Areas, Wetlands, and Floodplain Function

Both the Nez Perce and Clearwater forest plans include management direction to maintain or restore riparian areas (Clearwater Standard 8a, Amendment 10, Goals 5 and 6; Nez Perce Goal 22; Amendment 20, Goals 5 and 6). Both forest plans, as amended by PACFISH and INFISH, delineated and established interim riparian habitat conservation areas widths and assigned standards and guidelines to particular management activities to limit impacts to riparian areas and better attain riparian management objectives. See the Aquatic Ecosystems and Fisheries section for more information regarding PACFISH and INFISH amendments to the Nez Perce and Clearwater forest plans.

Riparian habitat conservation areas are considered their own Management Area in both the Nez Perce and Clearwater Forest Plans. Forestwide goals and direction in the 1987 plans address water quality, stream channel integrity, diversity of plant communities, riparian-dependent wildlife, and other features associated with aquatic and riparian areas that provide protection for the riparian-associated resources and values. They include direction allowing no management in riparian areas that would cause detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect streams or fish.

Riparian habitat conservation areas (RHCA) are classified as not suitable for timber production. Timber harvest is allowable within riparian habitat conservation areas if conducted to achieve objectives for the stream and riparian habitat conservation areas. Prescribed fire is also prohibited in RHCAs unless designed to improve riparian condition. See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section for specific PACFISH standards under the No Action Alternative. In practice, timber harvest and prescribed burning activities within RHCA's have not been conducted, despite being permissible under PACFISH. The time and complexity to complete NEPA analysis and associated regulatory consultation for vegetation treatments or prescribed burning in riparian areas has generally limited those actions from being implemented. The No Action Alternative assumes that the majority of projects would continue to not propose treatments within RHCAs.

Municipal Water Supplies and Source Water Protection Areas

Management under both the Nez Perce and Clearwater forest plans require protections for municipal water supplies and source water protection areas (Clearwater Goal 1, Standards 8k and 8m; Nez Perce Goal 21, Management Area 22 and 23). The Nez Perce forest plan included designated management areas for Wall Creek Municipal Watershed and Elk Creek Municipal Watershed to ensure that the Idaho water quality standards for community public supply water uses are met and beneficial uses are protected. Management Area 22 consists of the Wall Creek Municipal Watershed which provided water for domestic use to the town of Clearwater, Idaho. The instream water reservoir and intake is no longer active and the city obtains its water from groundwater wells (Public Water System # ID2250011). The Wall Creek Municipal Watershed Management Plan, last updated in 1990, is no longer valid. Management Area 23 consists of the National Forest portion of the Elk Creek Municipal Watershed which provides water for domestic use to the town of Elk City, Idaho. There is no official Municipal Watershed Management Plan on record between Elk City and the Nez Perce National Forest.

Under the No Action Alternative, water from the Nez Perce-Clearwater would continue to provide ecosystem services to downstream communities.

Effects Common to Action Alternatives

The 2012 Planning Rule requires forest plans to include plan components that emphasize the maintenance or improvement of water quality (36 CFR 219.8(a)(2)(iii)) and promote the maintenance or restoration of water resources in the plan area, including lakes, streams, and wetlands; ground water; public water supplies; source water protection areas; and other sources of drinking water; including guidance to prevent or mitigate detrimental changes in water quantity, quality, and availability (36 CFR 219.8(a)(2)(iv)).

Desired conditions in the Land Management Plan provide a vision of the future landscape and serve to focus management attention by describing the specific desired ecological characteristics of the watersheds within the plan area towards which management of the land and resources would be directed. Standards and guidelines are constraint on projects, established to help achieve or maintain the desired conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. Because desired conditions, standards, and guidelines for water and aquatic resources do not vary between Action Alternatives, any differences in the indirect effects to water resources would be based on the variation of the aquatic ecosystems objectives and the projected amounts of objectives for other resources.

The effects analysis evaluates the relative ability of the Action Alternatives to affect watershed conditions; water quality; water quantity; and riparian areas, wetlands, and floodplain function. Many Forest Service management activities have the potential to adversely affect watershed and water resources to some degree, particularly those activities that disturb soil and ground cover in close proximity to water bodies. The goals, desired conditions, standards, and guidelines within the Aquatic Ecosystems section of the Land Management Plan are consistent across all Action Alternatives. Additionally, the Land Management Plan includes a monitoring plan that would track the effectiveness of implementing the Land Management Plan and a management approaches section that offers possible strategies the Nez Perce-Clearwater could undertake to maintain or make progress towards achieving the desired conditions described in the Land Management Plan.

The analysis primarily focuses on management activities that occur in the more managed portion of the Nez Perce-Clearwater, which is delineated as Management Area 3 and covers 1,240,340 acres under the Preferred Alternative; approximately 30 percent of the Nez Perce-Clearwater. Management Area 3 is described as the “front country” and broadly consists of the areas with roads, trails, developed recreation sites, and structures, as well as evidence of past and ongoing activities designed to actively manage the area. The rest of the Nez Perce-Clearwater is split into Management Areas 1 and 2 lands where more natural ecological and disturbance processes occur and where water resources are generally considered to be within the natural range of variation. Management Area 1, consisting of approximately 30 percent of Nez Perce-Clearwater acres for the Preferred Alternative, contains designated wilderness, designated wild and scenic rivers, and National Historic Landmark areas. Management Area 2 encompasses approximately 37 percent of Nez Perce-Clearwater acres for the Preferred Alternative, and includes lands within Idaho Roadless Areas, recommended wilderness areas, eligible and suitable wild and scenic rivers, geographic areas, special areas, and proposed and designated research natural areas.

Watershed Condition

The 2012 Planning Rule requires Land Management Plans to include plan components to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity (36 CFR 219.8(a)(1)).

The desired conditions for watersheds is that National Forest System lands provide the distribution, diversity, and complexity of watershed and landscape-scale features, including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity (FW-DC-WTR-01).

The watershed condition indicator addresses overall health and resiliency of subwatersheds (HUC12)as classified through the Watershed Condition Framework program. . Existing watershed conditions vary across the Nez Perce-Clearwater, ranging from those unaffected by direct human disturbance to those exhibiting various degrees of modification and impairment. In 2011, the Nez Perce-Clearwater completed the Watershed Condition Classification for 220 subwatersheds. In summary, 140 subwatersheds were rated as Functioning Properly, 73 were rated as Functioning at Risk, and 7 were rated as having Impaired Function. A watershed that is functioning properly is resilient and able to recover to the desired condition when altered by natural disturbances or land management activities (Yount and Niemi 1990).

To facilitate moving watershed condition towards the desired condition, objective FW-OBJ-WTR-01 aims to complete the actions identified in watershed restoration action plans for 10 to 20 priority watersheds, depending on alternative (Table 118), as identified under the Watershed Condition Framework process every 15 years. Objective FW-OBJ-WTR-05 aims to improve soil and watershed conditions on 2,500 to 5,300 acres, depending on alternative (Table 118), every 5 years, emphasizing actions in priority watersheds and Conservation Watershed Network watersheds. This includes non-system road decommissioning.

Overall, the Land Management Plan is intended to provide an integrated approach to promoting the restoration of natural landscapes and natural processes. Instead of focusing on local scale concerns, the focus would be to move the entire landscape toward a more natural functioning system within the natural range of variation. The plan components for most natural resource areas are intended to maintain or increase ecological integrity and resiliency.

Priority watersheds

The 2012 Planning Rule requires Land Management Plans to identify watershed(s) that are a priority for maintenance or restoration (36 CFR 219.7(f)(1)(i)). Identification of priority watersheds is done to focus effort on the integrated restoration of watershed conditions in these areas. The Forest Service National

Watershed Condition Framework must be used in all plan revisions for identifying priority watersheds. The plan should include plan components that address conditions in priority watersheds. The 2012 Planning Rule Directives require watersheds that are a priority for restoration and maintenance be identified in Land Management Plans. The Nez Perce-Clearwater Land Management Plan identifies Upper Elk Creek (Hydrologic Unit Code [HUC] 12 #170603080701), Upper Clear Creek (HUC12 #170603040102), Upper Little Slate Creek (HUC12 #170602090301), Musselshell Creek (HUC12 # 170603060202), and Lower Crooked River (HUC12 # 170603050302) as a priority for maintenance or restoration.

By design, Watershed Condition Framework priority watersheds are not intended to be permanent designations—when all needed work is completed, a new Watershed Condition Framework priority watershed is to be identified. Priority areas for potential restoration activities could change quickly in response to disturbance events, such as wildfire, landslides, severe flooding, or rapid expansion of invasive species. Therefore, the 2012 Planning Rule includes priority watersheds as other plan content so that an administrative change could be used to quickly respond to changes in priority.

Under all Action Alternatives, essential project implementation would continue in Upper Elk Creek, Upper Clear Creek, Upper Little Slate Creek, Musselshell Creek, and Lower Crooked River as outlined in the watershed restoration action plans. Future priority watersheds would be determined throughout the life of the Land Management Plan. Priority watersheds are selected by a Forest or area responsible official after analysis and evaluation using a multi-functional interdisciplinary approach. The participation of partners in the priority selection process is expected and highly encouraged. The 2012 Planning Rule and the planning directives require the responsible official to reach out to local, state, tribal, other federal agencies and interest groups when identifying priority watersheds (Forest Service Handbook 1909.12, section 22.31).

The use of the Watershed Condition Framework process and the rate of priority watersheds moved to an improved watershed condition class would increase under all Action Alternatives when compared to the No Action Alternative (Table 118). The Preferred Alternative proposes to complete the actions identified in watershed restoration action plans for 15 priority watersheds, as identified under the Watershed Condition Framework process every 15 years (FW-OBJ-WTR-01).

Water Quality

The 2012 Planning Rule requires Land Management Plans to include plan components, including standards or guidelines, to maintain or restore water quality (36 CFR 219.8(a)(2)(iii)) and include plan components ensure implementation of national best management practices for water quality (36 CFR 219.8(a)(4)).

The water quality indicator addresses the expressed alteration of physical, chemical, and biological components of water quality. It is measured qualitatively by evaluating potential changes in sediment delivery, stream water temperature, and contaminates; as well as potential changes to the amount of streams not meeting beneficial uses and/or amount of streams classified as water quality impaired.

The desired condition for waterbodies on the Nez Perce-Clearwater is that water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, and is of sufficient quality to support surrounding communities, municipal water supplies, and natural resources. The Forest has no documented lands or areas that are delivering water, sediment, nutrients, and/or chemical pollutants that would result in conditions that violate the State of Idaho's water quality standards (FW-DC-WTR-05). The Land Management Plan also contains desired conditions for maintaining or improving water quality associated with peatlands, including fens and bogs (FW-DC-TE-03); biophysical features, such as such as caves, karst, and rock cavities (FW-DC-CAVE-03); and hot springs (FW-DC-TT-04).

Standards and guidelines to help achieve or maintain the desired conditions for water quality, to avoid or mitigate undesirable effects, or to meet applicable legal requirements are included in the Land Management Plan. They would limit water contamination from fuel spills (FW-STD-WTR-03, FW-STD-RMZ-02); use of herbicides, pesticides, and other chemicals in riparian management zones (FW-STD-RMZ-03, FW-GDL-RMZ-08); aerial spray of chemical retardant, foam, or other fire chemicals (FW-GDL-RMZ-04); application of dust abatement chemicals (FW-STD-ARINF-02); mining activities (FW-STD-AREM-02, FW-GDL-AREM-03); solid and sanitary waste facilities (FW-GDL-ARREC-01); new facilities or infrastructure in floodplains (FW-GDL-ARREC-02); and groundwater use developments (FW-GDL-WTR-05).

Appendix 4 of the Land Management Plan offers a possible management approach for improving water quality, which includes building and maintaining partnerships to fund and implement projects that result in improved water quality (FW-GL-WTR-02).

Sediment was a primary cause for streams on the Nez Perce-Clearwater to not meet beneficial uses and be listed as impaired by the Idaho Department of Environmental Quality. The desired condition for sediment regimes on the Nez Perce-Clearwater is that sediment delivery to streams is of the types, quantities, and rates that support the natural instream sediment transport and storage rates and instream sediment substrate composition (FW-DC-WTR-06). To help watersheds trend toward desired conditions FW-DC-WTR-05 and FW-DC-WTR-06, standard FW-STD-WTR-06 requires management activities in watersheds with approved total maximum daily loads to be designed to comply with the total maximum daily load allocations following project implementation. Standard FW-STD-WTR-04 requires projects to restore or not retard attainment of desired condition if aquatic and riparian desired conditions are not being achieved.

Notable sources of sediment is road construction, reconstruction, maintenance, and use. More sediment is contributed to streams from roads and road construction than any other land management activity (Potyondy and Geier 2011). Desired conditions for roads are that the transportation system has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity of roads to streams, lower sediment delivery to streams, reduced road impact to floodplains, and improved aquatic organism passage, where transportation infrastructure affects these features (FW-DC-ARINF-01); that the transportation network is resilient to the effects of climate change, including the ability to accommodate increased runoff and peak flows that may exceed historic streamflow events (FW-DC-ARINF-02); and that roads in the Conservation Watershed Network present minimal risk to aquatic resources (FW-DC-CWN-03). Desired conditions for trails are that trails have minimal impacts on aquatic resources (FW-DC-ARREC-01).

To move towards these desired conditions, objective FW-OBJ-INF-01 aims to complete 600 miles of road work under the Preferred Alternative, such as reconstruction; re-routing; road improvements; decommissioning; or placing roads in intermittent stored service, every 5 years. Priorities shall include reducing effects on desired aquatic and riparian conditions from chronic sediment delivery or potential future road prism failures, including previously decommissioned roads where drainage features have failed. Objective FW-OBJ-INF-02 aims to annually maintain 1,400 miles of operational maintenance level two through five roads under the Preferred Alternative (Table 118). Objective FW-OBJ-CWN-02 proposes to stormproof 10 to 20 percent of roads in Conservation Watershed Network (CWN) watersheds every 5 years, depending on alternative Table 118. The Preferred Alternative aims to stormproof 15 percent every 5 years. There are approximately 3,900 miles of system road within CWNs. Stormproofing 15 percent of those roads would equate to treating approximately 585 miles of road every five years. Additionally, objectives for trail system management aim to annually maintain to standard a minimum of 30 percent of National Forest System trail miles (FW-OBJ-REC-01) and reduce deferred maintenance of trails by five percent, every five years (FW-OBJ-REC-02).

Numerous standards and guidelines are proposed to limit the amount of sediment delivery or alteration of hydrologic flow regime from roads and trails, including limits on sidecasting of road material or snow (FW-STD-ARINF-03, FW-GDL-ARINF-07); routing road drainage away from streams and unstable slopes (FW-GDL-ARINF-09, FW-GDL-ARINF-02); requiring upgrading or removal of stream crossings (FW-STD-ARINF-04, FW-GDL-ARINF-03, FW-GDL-ARINF-05, FW-GDL-ARINF-11, FW-GDL-ARREC-03); avoiding high mass wasting potential areas and wetland areas (FW-GDL-ARINF-04, FW-GDL-ARINF-08, FW-GDL-ARREC-04); and hardening of stream crossings (FW-GDL-ARINF-06, FW-GDL-ARREC-06).

The Land Management Plan also includes standards and guidelines to limit the amount of sediment delivery to streams from the management of other resource areas, including hydrologically disconnecting roads, skid trails, temporary roads, airstrips, and trails (FW-GDL-ARINF-01, FW-GDL-ARREC-05); hardening livestock trail stream crossings and approaches (FW-GDL-GR-02); avoiding construction of new road, temporary road, trail, and landings in riparian management zones (FW-GDL-RMZ-01); limiting ground disturbing activities in riparian management zones from harvest activities (FW-GDL-RMZ-02, FW-GDL-RMZ-03), fire suppression activities (FW-GDL-RMZ-05, FW-GDL-RMZ-06), and saleable sand and gravel extraction (FW-GDL-RMZ-09).

Restoration actions that are intended to improve water quality can result in short-term adverse effects to water quality, specifically if the implementing actions occur within a water body. Short-term adverse effects are anticipated and considered acceptable when activities provide long-term protection or improvement of water quality and riparian and wetland condition and function. These impacts can only be assessed at the site-specific level and would vary depending on type of restoration treatment, current condition of the resource, and characteristics of the area being restored. Changes in water quality may be allowed without an antidegradation review by the Idaho Department of Environmental Quality where determined necessary to secure long-term water quality improvement through restoration projects designed to trend toward natural characteristics and associated uses to a water body where those characteristics and uses have been lost or diminished. Restoration projects would be required to include best management practices during implementation (FW-STD-WTR-02).

Best Management Practices for Water Quality

Best management practices (BMPs) for water quality are methods, measures, or practices used to meet nonpoint source control needs as directed by the Clean Water Act. BMPs can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (36 CFR 219.19).

The National Best Management Practices Program is guided by the land management planning regulation 36 CFR 219.8 (a)(4), which requires the Chief of the Forest Service to establish requirements for National BMPs for water quality in the Forest Service Directive System. These requirements, and associated program direction, are outlined in Forest Service Handbook 2509.19, Chapter 10 National Core Best Management Practices and Forest Service Manual 2500, Chapter 30, Section 2532 Water Quality Management.

The National Core Best Management Practices Technical Guide (U.S. Department of Agriculture 2012b) provides a standard set of core BMPs and a consistent means to track and document the use and effectiveness of BMPs on National Forest System lands. Appendix K further describes federal and State of Idaho best management practices direction.

The Land Management Plan ensures implementation of national BMPs for water quality (36 CFR 219.8 (a)(4)) through standard FW-STD-WTR-02, which requires project-specific BMPs, including both federal and state BMPs, to be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet soil and watershed desired conditions, and to protect beneficial uses.

Water Quantity

The 2012 Planning Rule requires Land Management Plans to include plan components to maintain or restore water resources in the plan area, including lakes, streams, and wetlands; ground water; public water supplies; source water protection areas; and other sources of drinking water, including guidance to prevent or mitigate detrimental changes in water quantity, quality, and availability (36 CFR 219.8(a)(2)(iv)).

The water quantity indicator addresses changes to the natural flow regime with respect to the magnitude, duration, or timing of the natural streamflow hydrograph. It is measured qualitatively by potential changes in forested vegetation openings; hydrologic connectivity of roads to streams, and consumption of public water supply.

The desired conditions for maintaining or improving the hydrologic flow regime are:

- Spatial connectivity exists within or between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact habitat refugia. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-associated, and many upland species of plants and animals. (FW-DC-WTR-02)
- Instream flows are sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained. Stream flow regimes maintain riparian ecosystems and natural channel and floodplain dimensions. (FW-DC-WTR-07)
- Groundwater dependent ecosystems, including peatlands, bogs, fens, wetlands, seeps, springs, riparian areas, groundwater-fed streams and lakes, and groundwater aquifers, persist in size and seasonal and annual timing and exhibit water table elevations within the natural range of variability. Surface and groundwater flows provide late-season stream flows, cold water temperatures, and sustain the function of surface and subsurface aquatic ecosystems. (FW-DC-WTR-08)
- The transportation network is resilient to the effects of climate change, including the ability to accommodate increased runoff and peak flows that may exceed historic streamflow events. (FW-DC-ARINF-02)

To maintain quality and quantity of water flows to, within, or between groundwater dependent ecosystems guideline FW-GDL-WTR-05 requires that new or reconstructed groundwater use developments, such as recreation and administrative sites, drinking water wells, or wastewater facilities, should not be developed in riparian management zones (unless no alternatives exist); should not measurably lower river flows, lake levels, or flows to wetlands or springs; and should not discharge pollutants directly to surface water or groundwater unless covered by a National Pollutant Discharge Elimination System permit.

Roads, depending on density and location, can affect near-surface lateral flow pathways and watershed drainage density, which can alter timing and magnitude of streamflow (Wemple and Jones 2003). To help achieve or maintain the desired conditions for hydrologic flow regimes and to avoid or mitigate undesirable effects standard FW-STD-ARINF-07 requires that when constructing or reconstructing roads in the Conservation Watershed Network and Hydrologic Unit Code (HUC) 12 subwatersheds with Endangered Species Act critical habitat or listed aquatic species, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network unless no further decreases are needed to meet desired conditions for Water and Aquatic Resources or Conservation Watershed Network. Appendix 4 of the Land Management Plan offers a possible management approach that includes methods for decreasing the hydrologic connectivity of the road system. Standard FW-STD-ARINF-04 specifies that new, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other permanent stream crossings, accommodate at least the 100-year flow, including associated bedload and debris. Guideline FW-GDL-ARINF-10 requires transportation infrastructure to be designed to maintain natural hydrologic flow paths, including surface and subsurface flow, to the extent practical. For example, streams and seeps upslope from roads should have cross-drains or relief culverts with sufficient capacity to ensure water is not routed down ditches.

Altering the amount or distribution of vegetation can affect water quantity and ultimately alter stream channel conditions. In general, removal of the forest canopy increases streamflow for the first few years, but the magnitude, timing, and duration of the response varies considerably among ecosystems. The Forestlands desired conditions emphasize landscape and within-patch patterns that reflect historic fire regimes, which would include increasing amounts and size of early seral openings.

Standard FW-STD-TBR-06 limits the maximum opening size created by clearcutting, seed tree cutting, shelterwood seed cutting, or other cuts designed to regenerate an even-aged stand of timber in a single harvest operation to 40 acres. To trend towards the Forestlands desired conditions an exception to the 40-acre maximum opening size standard could occur when determined necessary to help achieve desired ecological conditions for the plan areas. The desired conditions include providing for forest patterns, patch sizes and forest resilience both in the short- and long-term. The maximum opening size exception for the Nez Perce-Clearwater is 207 acres.

This is an increase in the maximum opening size compared to the No Action Alternative that limits the maximum opening size to 40 acres. Although this does not mean that all proposed regeneration harvest units would reach 207 acres in size, there is a higher potential to affect water quantity when openings are larger. The maximum opening size represents the average patch size under natural range of variation conditions. See Appendix B for more information on maximum opening size. Desired conditions for early successional forest patches, or “openings”

With the proposed increase in maximum opening size for regeneration and other even-aged harvest and the proposed increase in timber harvest under all action alternatives, there is an elevated likelihood of increased cleared forest vegetation area persisting on the landscape at any given time in a given HUC12 or smaller catchment. By extension, there is also an elevated potential for observed changes in average annual water yield and peak flows. These openings, depending on the distribution and size of openings and the level of tree retention, could be within the natural range of variation. The effects of vegetative manipulation on water yield are complex, highly variable, and depend on many independent factors, such as elevation, climate, aspect, and especially precipitation. Appendix 4 of the Land Management Plan offers a possible management approach that could be used to assess changes to hydrologic flow regimes and help determine potential effects to water yield and peak flows associated with proposed project activities.

Consumptive surface water and groundwater uses would continue under all the action alternatives in alignment with existing water rights and regulatory authorities. Municipal Supply Watersheds and Source Water Protection Areas would continue to provide source water for their constituent communities (FW-DC-MWTR-01, FW-STD-MWTR-01).

Riparian Areas, Wetlands, and Floodplains

The 2012 Planning Rule requires Land Management Plans to include plan components to maintain or restore the ecological integrity of riparian areas in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity (36 CFR 219.8(a)(3)(i)). The 2012 Planning Rule also requires the establishment of widths for riparian management zones around all lakes, perennial and intermittent streams, and open water wetlands, giving special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams and lakes (36 CFR 219.8(a)(3)(ii)).

The Riparian areas, wetlands, and floodplain function indicator addresses the potential for alteration of these geomorphic features and sensitive ecosystems. It is measured qualitatively by potential changes in riparian and wetland conditions and floodplain function.

System roads have the most notable impact to riparian and wetland conditions and floodplain function on the Nez Perce-Clearwater. There are approximately 1,600 miles of Forest Service system roads located within riparian management zones. More importantly, there are approximately 686 miles of Forest Service system roads located within 100 feet of stream channels, which equates to approximately seven percent of the total road system. Table 117 displays road miles and road surface material for open and closed system roads within 100 feet of stream channels. Some of these road miles are continuous along substantial lengths of a stream channel or are unconnected sections of road that interact with streams only at stream crossings. There are approximately 4,200 stream crossings associated with these roads. Risk of sediment delivery to streams is generally highest with native surface roads in close proximity to the stream channel and lowest with asphalt. Closed system roads, if stable, hydrologically disconnected, and revegetating, contributes less chronic sediment delivery than open roads.

Table 117. Road miles by surface material for open and closed system roads within 100 feet of stream channels

Road surface material	Miles of roads open to motorized traffic	Miles of roads closed to motorized traffic
Asphalt	51	0
Crushed aggregate or gravel	238	37
Bituminous surface treatment	1	0
Native material	196	163

Data Source: Nez Perce-Clearwater Geographic Information System.

In some areas, roads have interrupted the hydrologic connectivity of headwater streams to lower reaches, disrupting sediment and wood material transport downstream. Stream adjacent roads can also interrupt the connectivity of streams to floodplains and alter channel morphology. The effects increase with increases in the hydrologic connection of roads to the stream channel network (Jones and Grant 1996, Wemple et al. 1996). Roads that are closer to stream channels have a greater potential for sediment delivery to streams (Wemple et al. 1996). Sediment delivery to streams occurs primarily at road-stream crossings and secondarily by road-induced gullies (MacDonald and Coe 2008, Croke et al. 2005). Roads that bisect meadows and other wetland areas intercept and concentrate water through culverts, lowering the water table. As long as the road prism persists on the landscape, there is little to no chance for recovery of floodplain function or condition. Routine maintenance, hydrologically disconnecting roads, stormproofing roads, and site-specific improvements, however, can be made to mitigate impacts.

Numerous plan components are proposed to limit new impacts and reduce existing impacts from roads to riparian areas, wetlands, and floodplains by reducing hydrologic connectivity and sediment delivery (FW-DC-CWN-03, FW-STD-ARINF-07, FW-DC-ARINF-01, FW-GDL-ARINF-01, FW-GDL-ARINF-02, FW-GDL-ARINF-10); limiting road construction in riparian management zones (FW-GDL-RMZ-02), limiting sidecasting during road construction or reconstruction and maintenance (FW-STD-ARINF-03, FW-GDL-ARINF-07); and increasing the size of new, replacement, and reconstructed stream crossings to accommodate at least the 100-year flow (FW-STD-ARINF-04).

In areas with stream-adjacent roads there is higher hydrologic connectivity and sediment delivery to streams may not be able to be fully mitigated. Hydrologic connectivity cannot reach zero, as there will always be some remaining road segment that cannot be fully disconnected at stream crossings. However, implementation of best management practices can be employed to reduce the fraction of road surface erosion being delivered to streams at these locations (Sugden 2018).Stream crossing and road drainage failures on National Forest System lands initiated by intense precipitation or rain-on-snow events have caused extensive resource damage. Modification of stream crossings and control of road drainage, whether generated on the road surface or intercepted by the road cut and ditch, are the most important issues for preventing storm damage. Addressing streamside road locations, slope stability issues, and adequate vegetation erosion control are also important to reduce the risk of storm damage (Keller and Ketcheson 2015). Objective FW-OBJ-CWN-02 proposes stormproofing 10 to 20 percent of roads in Conservation Watershed Network areas prioritized for restoration every 5 years, as funding allows, to benefit threatened and endangered aquatic species. Stormproofing refers to nonrecurring treatments on existing roads that reduce the potential for resource impacts and damage or failure of a road feature or road system, typically resulting from storm events. These treatments relate to open and stored roads and include timely road maintenance; utilizing many key road drainage measures; reducing culvert diversion potential; pulling back marginal fill slopes; using biotechnical and vegetative slope stabilization and erosion control, gully prevention, bridge maintenance; and many other measures.

Public and general administrative road use is expected to remain consistent across the No Action Alternative and Action Alternatives. Due to proposed increases in the amount of vegetation management proposed for the Action Alternatives, road use related to timber harvest and associated log haul is expected to increase. For Alternative Z, log-haul traffic would be similar to the existing levels found under the No Action Alternative. Alternatives W, X, and Y and the Preferred Alternative have a higher risk of impact due to the amount of log truck traffic associated with proposed timber harvest.

As discussed in the Infrastructure section of the Final Environmental Impact Statement, increased log truck traffic can increase the amount of road sediment available for delivery to streams. There is a direct correlation between the volume of commercial timber sale traffic generated from Forest Service management activities and the volume of timber sold. Logging trucks hold roughly 5,000 board feet per truck, for a total weight of 80,000 pounds. The number of logging trucks and other commercial traffic on the roadways would be proportionate to increases or descreases of timber volume sold. For example, for the Preferred Alternative, timber outputs would be about 190 to 210 million board feet annually, which corresponds to roughly 38,000 to 42,000 commercial vehicles traveling Nez Perce-Clearwater roads annually. Increased log-haul multiplies the amount of aggregate breakdown. When this occurs near streams, the potential for sediment delivery is higher. The wear rate calculated in 2018 was estimated to be one inch per ten million board feet, varying by geologic parent material of the gravel, with basaltic and limestone gravels being more resilient than granitic gravels.

Because of the increase in log-haul traffic proposed in the Action Alternatives, there is a higher potential risk of sediment delivery to streams, especially from roads that are hydrologically connected or adjacent to streams. The associated road maintenance and road reconstruction can also be a source of sediment; pulses of road sediment created by road grading can elevate sediment delivery in the short-term, although improving stream sedimentation in the long run. On the other hand, higher timber volumes can also result in in a higher rate of positive road modifications, such as installing road drainage features at regular intervals, adding gravel surfacing on highly erodible soils, and replacement of failing or undersized culverts. Under timber stewardship sales, watershed improvements can be accomplished, including installation of aquatic organism passage culverts; bridge improvements; additional gravel surfacing; and replacement of additional drainage structures with upsized culverts, retaining walls, landslide repairs, and forestwide road maintenance, such as road blading.

Roads are considered necessary for social and economic sustainability. Not only are roads needed for managing the Nez Perce-Clearwater they also provide recreational opportunities and access important to local communities. To trend towards achievement of desired condition FW-DC-ES-01, ecosystem services guideline FW-GDL-ES-01 specifies that to provide for social and economic sustainability of rural communities, access to activities such as recreation, hunting, fishing, gathering, egress and wildfire management should continue to be provided for on routes or in areas designated as open to motorized use in the summer and winter. If a route is identified as substantially impairing aquatic ecological values, rerouting and route improvement should be considered prior to closure, to preserve motorized access opportunities. If a route or area needs to be closed, alternate motorized access to maintain social and economic sustainability of rural communities should be provided.

Although road decommissioning and storage could still occur if roads were causing natural resource impacts, the primary road treatment focus would be minimizing the impacts of roads to water and aquatic resources by hydrologically disconnecting roads from streams (FW-GDL-ARINF-01, FW-STD-ARINF-07), storm proofing roads (FW-OBJ-CWN-02), improving road conditions (FW-OBJ-INF-01, FW-OBJ-INF-02), and relocating roads out of riparian areas, wetlands, and floodplains (FW-WTR-OBJ-02, FW-WTR-OBJ-04, FW-OBJ-RMZ-01). Additionally, standard FW-STD-WTR-02 requires project-specific best management practices (BMPs), including both federal and state BMPs, to be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet water quality desired conditions, and to protect beneficial uses. The following are examples of potential road related best management approaches that could be incorporated into project implementation.

- Installing road drainage features at regular intervals to reduce erosion and divert overland flow from roads onto undisturbed hillslopes to promote water infiltration.
- Ensuring road runoff is disconnected from streams toward filtration areas.
- Revegetating and establishing ground cover on disturbed areas near streams (cutslopes, fillslopes, and road ditches).
- Adding gravel surfacing on highly erodible soils or when wet weather use is required.
- install supplemental filtration for suspended sediments where needed to prevent direct sediment delivery to streams, such as slash windrows, silt fences, straw bales, etc.
- Installing appropriately sized stream crossing structures that allow passage of flood flows, sediment, wood, and minimize disruptions to aquatic species movement.

- Managing or restricting seasonal road access to vehicles as needed to prevent rutting, and perform any necessary maintenance; such as road grading, culvert cleaning, or ditch cleaning; through time.

Riparian and wetland conditions and floodplain functions are expected to improve as the Nez Perce-Clearwater trends towards the Aquatic Ecosystems desired conditions and limits the amount of hydrologic connectivity, sediment delivery, and alteration of riparian areas that occur from roads. Relocation of streamside roads or roads in meadows could further improve riparian, wetland, and floodplain functions. Best management practices would be implemented with all management activities having the potential to affect water quality. Riparian Management Zones are not suitable for timber production as it would not be compatible with the achievement of desired conditions and objectives established by the plan for those lands (36 CFR 219.10 (a)(iii)). Timber harvest for purposes other than timber production could occur in riparian management zones. Timber harvest could be used as a tool to assist in achieving or maintaining one or more applicable desired conditions or objectives. Examples of using timber harvest to protect other multiple use values may include improving wildlife or fish habitat, thinning to reduce fire risk, or restoring meadow or savanna ecosystems where trees have invaded. Additionally, the use of prescribed fire, particularly under burning, may be desirable in riparian management zones to restore natural ecosystem function, reduce forest density or fuel loadings.

Riparian management zones are not intended as exclusion areas or reserves. Instead, management activities designed to benefit aquatic and riparian-dependent resources and move the landscape towards desired conditions are allowed and encouraged within them. Plan component FW-STD-RMZ-07 establishes default riparian management zone widths that can contain both upland and riparian vegetation. Although the default riparian management areas widths are uniform, the management of them is not intended to be.

Vegetation management in riparian management zones would be guided by the desired conditions for riparian and wetland vegetation (FW-DC-TE-05 FW-DC-GS-04) and riparian management zones (FW-DC-RMZ-01, FW-DC-RMZ-02). Proposed standards and guidelines were developed to reduce the risk of potential effects to riparian conditions, including the requirement of specific conditions before vegetation management and prescribed fire could occur within riparian management zones (FW-STD-RMZ-01, FW-STD-RMZ-06) and direction to avoid riparian management zones when constructing new permanent roads, temporary roads, landings, skidding trails, staging or decking areas, and machine burn piles (FW-GDL-RMZ-01, FW-GDL-RMZ-02). Vegetation management or prescribed fire could be used to achieve restoration of hardwoods (FW-OBJ-TE-01) and reduce conifer encroachment in meadows (FW-OBJ-GS-01).

The following standards have specific requirements for vegetation treatments in riparian management zones to help achieve or maintain the desired conditions or to avoid or mitigate undesirable effects, including harvest and fuels treatments in riparian management zones (FW-STD-RMZ-01), hazard tree management in riparian management zones (FW-STD-RMZ-05), and prescribed fire management in riparian management zones (FW-STD-RMZ-06). Site specific, interdisciplinary analysis at multiple scales would occur before actions proceed within riparian management zones. Restoration of riparian areas may be accomplished through passive management or may require active management, particularly in areas where natural disturbances, such as fire or flooding, have been prevented from occurring or if past projects and activities have altered riparian functions, such as where roads are located within riparian areas. Floodplain restoration can focus on enlarging the functional floodplain, reconnecting the channel and floodplain, restoring natural regimes of water, sediment, and/or large wood, or enhancing the spatial heterogeneity of the channel and floodplain. Each of these forms of floodplain restoration can increase floodplain storage and resiliency to natural and human-caused disturbances. The establishment of riparian management zones does not prohibit projects that may have short-term adverse effects to water conditions and fish habitat, if the actions maintain or restore structure, function, composition, and connectivity of riparian areas over the long term.

Restoration is emphasized in the Land Management Plan through objectives. Objectives related to improvement of riparian areas focus on improving riparian habitat, floodplain function, and hydrologic connectivity. Objectives specific to riparian areas include improving 300 to 700 acres of riparian habitat every 5 years (FW-OBJ-RMZ-01); restoring hardwood species or allowing disturbance processes, such as fire or other disturbance, on 3,000 to 4,200 acres of riparian areas every 5 years (FW-OBJ-TE-01); maintaining existing meadows and grasslands by reducing conifer encroachment into meadows and grasslands on 2500 acres every 5 years (FW-OBJ-GS-01); and increasing camas production on 50 acres of camas habitat every 5 years, primarily through wildland fire (FW-OBJ-TT-02).

The largest threats to springs, seeps, and groundwater dependent ecosystems are those that change water flow, temperature, or water quality of springs. Plan components that directly address springs include FW-DC-WTR-08, FW-GDL-WTR-05, FW-DC-TT-04 and FW-GDL-ARGRZ-03. These plan components provide guidance to maintain quality and quantity of water flows, and persist in size and seasonal and annual timing, exhibit water table elevations within the natural range of variability and sustain the function of surface and subsurface aquatic ecosystems. Diversions for livestock water developments and livestock use of springs can impact springs, seeps, and other groundwater dependent ecosystems. Add plan component for water developments. See Livestock grazing management section below under Effects to water resources from management of other resources.

For further information on riparian areas, see sections Forestlands, At-Risk Plant Species, Aquatic Ecosystems and Fisheries, and Abundance and Diversity of Wildlife in the Final Environmental Impact Statement.

Municipal Water Supplies and Source Water Protection Areas

The 2012 Planning Rule (36 CFR 219.8(a)(2)(iv)) requires that a plan include plan components to maintain or restore water resources in the plan area, including ground water; public water supplies; source water protection areas; and other sources of drinking water, including guidance to prevent or mitigate detrimental changes in water quantity, quality, and availability. It also requires that a plan include plan components for integrated resource management to provide for ecosystem services and multiple use [including watershed] (36 CFR 219.10(a)), considering riparian areas and surface and subsurface water quality (§219.10(a)(1)) and public water supplies and associated water quality (§219.10(a)(9)).

Water draining off the Nez Perce-Clearwater is often used for drinking water supplies. Municipal watersheds and source water protection areas are two separate constructs for drinking water protection that are applicable to National Forest System land management.

Municipalities may apply to the Forest Service for municipal watershed agreements if they desire protective actions or restrictive measures not specified in the Land Management Plan. Formal written agreements to ensure protection of water supplies may be appropriate when multiple use management fails to meet the needs of a water user. Although there are currently no municipal watershed agreements established for watersheds on the Nez Perce-Clearwater, agreements could be developed in the future.

Source water protection areas, as delineated by the Idaho Department of Environmental Quality, protect public water systems from contamination in accordance with the 1996 amendments to the Safe Drinking Water Act. Approximately 73,490 acres of the Nez Perce-Clearwater are delineated as source water protection areas for surface water intakes and 6,440 acres are delineated as source water protection areas for groundwater intakes.

The desire condition for municipal water supplies and source water protection areas is that lands that contribute to municipal watersheds and source water protection areas are in a condition that contributes to consistent delivery of clean water and meets or exceeds State of Idaho water quality standards (FW-DC-MWTR-01). To help trend towards this desired condition, standard FW-STD-MWTR-01. Requires management activities conducted in source water protection areas to be consistent with source water protections and goals. Short-term effects from activities in source water protection areas may be acceptable when those activities support long-term benefits to water quality. Best management practices would be implemented with all management activities having the potential to affect water quality (FW-STD-WTR-02).

A dilemma when managing municipal water supplies and source water protection areas is whether the watersheds should be placed under active or passive management regimes to sustain supplies of high-quality water over the long run. Some people think that water supplies can be best protected by actively managing these watersheds to maintain forest vegetation at a condition with low fire risk. Conversely, others believe that, in the interest of water quality, people should not alter watersheds in any way, other than to divert the water (Sedell et al. 2000).

Municipal watersheds are not considered suitable for timber production, although timber harvest is suitable to meet other resource desired conditions. Under the Action Alternatives the treatment of forested vegetation in watersheds containing municipal water supplies and source water protection areas would trend towards the Forestlands desired conditions.

Consumptive surface water and groundwater uses would continue under all the Action Alternatives in alignment with existing water rights and regulatory authorities.

Effects that Vary by Action Alternative

Although desired conditions, standards, and guidelines are the same for Action Alternatives, land allocation and suitability, including recommended wilderness and recreation opportunity spectrum do differ between Action Alternatives. Although actions likely to be taken and activities likely to occur under these alternatives may differ, the effects of are not expected to be different to watersheds and water resources due to the universal application of aquatic ecosystem plan components under all Action Alternatives.

The primary difference between Action Alternatives is the pace and scale at which the treatment of forest vegetation trends toward Forestlands and Fire Management desired conditions. The amount of proposed vegetation treatment varies by Action Alternative and directly correlates to the rate of achieving vegetation desired conditions, as described in the Forestlands section. Proposed vegetation treatments range from 3,700 to 14,000 acres per year for the Action Alternatives, compared to 4,300 annual acres in the No Action Alternative. The Preferred Alternative proposes 8,825 to 10,000 acres per year. As discussed in the riparian, wetland, and floodplain function under the effects common to all alternatives. The amount of log haul associated with timber harvest has the potential to affect water resources. Due to the programmatic nature of the draft EIS, it is difficult to determine the effects of alternatives with respect to the use of roads during timber harvest. The effect of log haul traffic on aquatic resources is dependent upon a number of variables, such as, but not limited to: road surface, miles to access harvest units, number of stream crossings, proximity of a road to a stream, and amount of timber removed. These types of impacts are evaluated on a project-specific basis.

The numerous standards and guidelines that are proposed to limit the amount of sediment delivery or alteration of hydrologic flow regime from roads would help to mitigate undesirable effects. They include limits on sidecasting of road material or snow (FW-STD-ARINF-03, FW-GDL-ARINF-07); routing road drainage away from streams and unstable slopes (FW-GDL-ARINF-09, FW-GDL-ARINF-02); requiring upgrading or removal of stream crossings (FW-STD-ARINF-04, FW-GDL-ARINF-03, FW-GDL-ARINF-05, FW-GDL-ARINF-11); avoiding high mass wasting potential areas and wetland areas (FW-GDL-ARINF-04, FW-GDL-ARINF-08); and requirement of incorporating best management practices into project planning (FW-STD-WTR-02). Standard FW-STD-ARINF-07 requires that when constructing or reconstructing roads in the Conservation Watershed Network and HUC12 subwatersheds with Endangered Species Act critical habitat or listed aquatic species, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network.

Table 118 displays the water and aquatic resources restoration objectives that vary by alternative. Alternatives W and X would result in the highest volume of timber production and, therefore, would have the potential to generate increased revenue from timber receipts that could be available for watershed and aquatic restoration projects. Proposed miles or acres are proportional to the level of proposed timber harvest for each alternative. For example, road reconstruction and road improvement would primarily be accomplished during implementation of integrated projects that include timber harvest. Watershed restoration projects are intended to occur as integrated treatments strategically located and implemented at the watershed scale, primarily in priority and conservation watershed network watersheds.

Table 118. Water and aquatic resources restoration objectives by alternative

Restoration action	No Action (2013 to 2022)	Alt W	Alt X	Alt Y	Alt Z	Preferred
FW-OBJ-WTR-01. Number of priority watersheds where actions identified in watershed restoration action plans are completed every 15 years.	3	18	20	15	10	15
FW-OBJ-WTR-05. Acres of improved soil and watershed conditions every 5 years with emphasis on priority and conservation watershed network watersheds. This includes non-system road decommissioning.	1,520	5,000	5,300	4,000	2,500	3,000-4,000
FW-OBJ-CWN-02. Percent of roads in Conservation Watershed Network watersheds storm proofed every 5 years. There are approximately 3,900 miles of road within CWNs. Under the preferred alternative 15% every 5 years would equate to approximately treating 585 miles every five years.	NA	20	20	15	10	15

Restoration action	No Action (2013 to 2022)	Alt W	Alt X	Alt Y	Alt Z	Preferred
FW-OBJ-INF-01. Miles of road reconstructed or roads improved every 5 years with focus on roads with chronic sediment delivery to streams or potential future road prism failures.	500	1,000	1,100	600	300	600
FW-OBJ-INF-02. Miles of operational Maintenance Level 2 through 5 roads maintained annually.	1,100	1,900	2,000	1,400	1,000	1,400

Cumulative Effects

Stream systems on the Nez Perce-Clearwater originate in high elevation headwater drainages and flow downstream through the Nez Perce-Clearwater onto lands owned or administered by entities other than the Forest Service. The streams ultimately flow into the Clearwater, Salmon, Snake, and Spokane rivers. Water is an ecosystem service provided by the Nez Perce-Clearwater that is important in the broader landscape outside the plan area and is likely to be influenced by the Land Management Plan. Water that originates on the Nez Perce-Clearwater provides many important benefits, including public drinking water, recreational opportunities, aesthetics, fishing opportunities, water for fish and wildlife, livestock watering, and irrigation. Additionally, water quality and supply are important for ecological sustainability, which contributes to the many benefits and ecosystem services that people derive from the Nez Perce-Clearwater.

Portions of the Nez Perce-Clearwater adjoin five other national forests, each having its own Land Management Plan. The Nez Perce-Clearwater is also intermixed with lands of other ownerships, including other federal, state, and private lands. Some of these entities develop and implement their own resource management plans. Management plans from other federal and state agencies and the Nez Perce Tribe are summarized in Table 119. Actions, strategies, and prioritization of activities under these management plans, in conjunction with the Nez Perce-Clearwater Land Management Plan, cumulatively affect water resources at the landscape scale.

Table 119. Summary of cumulative effects to water resources from other resource management plans

Resource Plan	Description and Summary of Effects
Adjacent National Forest Land Management Plans (U.S. Department of Agriculture 2010d, 2018h, 1987d, 1986a, 2015c)	Land management plans for National Forest System lands adjacent to the Nez Perce-Clearwater include the Payette, Wallowa-Whitman, Bitterroot, Lolo, and Idaho Panhandle National Forests. All plans address water resources management and watershed management would be complementary. Water resources management is fairly consistent across all national forests due to law, regulation, and policy, and plan components are relatively consistent and compatible with overall direction.
Bureau of Land Management Cottonwood Resource Management Plan (U.S. Department of the Interior 2009)	Bureau of Land Management lands near the Nez Perce-Clearwater are managed by the Cottonwood field office. The Cottonwood Resource Management Plan contains components similar to the Pacific Anadromous Fish Strategy and would be complementary to the plan components proposed in the revised Land Management Plan.

Resource Plan	Description and Summary of Effects
Nez Perce Tribe Integrated Resource Management Plan (Tribe 2023)	The protection and enhancement of water quality and restoration of degraded hydrologic systems are high priorities. This Plan includes desired conditions for water resources that would be complementary to the plan components proposed in the revised Land Management Plan.
The Idaho Forest Action Plan Resource Assessment and Resource Strategy (Idaho Department of Lands 2020)	Identified water quality and quantity as benefits, which depend on maintaining ecological integrity and sustainable use of forests. This plan is complementary to the revised Land Management Plan related to the protection and management of water resources. The Idaho Shared Stewardship Initiative will focus on treating prioritized landscapes by promoting cross-boundary work on state, private, tribal, and Federal lands to protect communities from wildfire, improve forest and watershed health, and sustain jobs and local economies in Idaho.
State of Idaho, Source Water Protect Plans (see Appendix K)	The communities of Kamiah, Orofino, Lewiston, Juliaetta, Pierce, and Riverside derive their domestic water supply directly from the surface water originating from within the Nez Perce-Clearwater. The communities of Grangeville, Kooskia, and Potlatch derive groundwater that drains from Nez Perce-Clearwater lands. The proposed Land Management Plan would be consistent with community specific source water protection plans.
Idaho Ground Water Quality Plan (Ground Water Quality Council 1996)	This Plan protects ground water quality for public use and provides guidance to state agencies, local governments, and citizens to prevent ground water contamination. The Plan establishes the basis for protecting ground water now and for future generations and preventing contamination whenever possible. The plan also helps agencies develop management programs and regulations and implement ground water quality protection strategies. It is intended to work in conjunction with the Idaho State Water Plan. The proposed Land Management Plan would be consistent with the Idaho Ground Water Quality Plan.
Idaho State Water Quality Management Plan (https://www.deq.idaho.gov/water-quality/planning-and-administration/)	The Plan is not a single plan or document but rather a compilation of the guidance and programs Idaho Department of Environmental Quality uses to implement Clean Water Act requirements. It describes how the state's water resources are managed and describes how Idaho manages water quality. The Plan follows a continuing planning process and outlines laws, rules, and guidance; water quality programs; monitoring and assessment; implementation; planning; and public involvement. The proposed Land Management Plan would be consistent with the Idaho State Water Quality Management Plan.
Idaho Comprehensive State Water Plan (Idaho Department of Water Resources 2012)	The plan includes the statewide water policy plan and associated component basin and water body plans, which cover specific geographic areas of the state. The Plan guides the development, management, and use of the state's water and related resources. The proposed Land Management Plan would be consistent with the Idaho Comprehensive State Water Plan.

Landscape or watershed scale restoration requires an interdisciplinary effort and necessitates close coordination between multiple resource programs, watershed councils, adjacent landowners, stakeholders, partners, and interested parties. Cooperation can result in large benefits and returns on investments because mutual priorities and opportunities are identified and resources can be pooled to accomplish conservation and restoration actions. The Land Management Plan stresses the importance of coordination by including goal FW-GL-WTR-02, which emphasizes that the Nez Perce-Clearwater builds and maintains partnerships to fund and implement projects that result in improved water quality and watershed and stream conditions.

Effects to Water Resources from Other Resources

Effects listed in this section are shared across all action alternatives, unless otherwise noted. Management from the following resources or designations do not affect water resources or the ability to manage water resources: carbon storage and climate change, wildlife, air quality, scenery, Idaho roadless areas, research natural areas, geographic areas, and special areas.

Terrestrial Ecosystems Across the Landscape

Plan components in the Terrestrial Ecosystems Across the Landscape section of the Land Management Plan provide management direction that supports the maintenance or improvement of watersheds, riparian areas and wetlands and is the same for all Action Alternatives. There is a desired condition for peatlands, including fens and bogs, to have the necessary soil, hydrologic, water chemistry, and vegetative conditions to provide for continued development and resilience to changes in climate and other stressors (FW-DC-TE-02) Additional desired conditions promote vegetation that reflects natural disturbance regimes (FW-DC-TE-04 and riparian vegetation includes native assemblages of hardwood trees, deciduous shrubs, conifers, and, where appropriate, unique coastal disjunct species (FW-DC-TE-05). To trend towards these desired conditions the Land Management Plan includes an objective to restore hardwood overstory and understory species or allow disturbance processes, such as fire or other disturbance, on 3,000 to 4,200 acres of riparian areas every 5 years (FW-OBJ-TE-01).

The beneficial effects to water resources from terrestrial ecosystems management would be the same under all Action Alternatives.

Cave and Karst Features

Caves include any naturally occurring void, cavity, recess, or system of interconnected passages beneath the surface of the Earth or within a cliff or ledge. Karst features are geological landforms that predominantly result from the shaping process controlled by soluble bedrock. Karst features create unique microhabitats and are important areas for rapid subsurface drainage and aquifer recharge. The desired conditions for cave and karst features for all the Action Alternatives are that hydrological resources are protected and maintained (FW-DC-CAVE-01) and that water flowing into, from, or within caves is not altered or diverted in its flow; contains normally fluctuating background levels of sediment, organic matter, and dissolved minerals; and is not polluted (FW-DC-CAVE-03). The beneficial effects from cave and karst management would be the same under all Action Alternatives.

Forestlands Management and Timber Harvest

The plan components in the Forestlands section were developed to increase forest resilience and to maintain or restore the composition, structure, function, and connectivity of terrestrial ecosystems, considering multiple spatial and temporal scales. The exact location of future timber harvest would depend largely on factors of road access and site-specific forest conditions relative to the desired conditions as outlined in the Land Management Plan. However, uncertain disturbance events would also influence location and extent of harvest.

Watershed conditions and water resources could potentially be impacted by the Forestland desired conditions and objectives and the timber objectives under all Action Alternatives. Although, the proposed amount of vegetation management varies by Action Alternative, there is little differentiation of impacts to water resources between the alternatives when viewed at the Forest scale.

Broadly, the desired conditions for terrestrial vegetation on the Nez Perce-Clearwater are characterized by improvements in species composition, desirable densities, and general forest health and condition; vigorous non-forested plant communities; and maintaining native biodiversity on the landscape. The desired conditions are consistent with the Forest Service's understanding of the natural range of variation and are most likely to be resilient in the future given expected drivers, such as climate change, drought, vegetation succession, wildfire, insects and disease, and the demands of people. Overall, the restoration of forested ecosystems and trend towards reestablishing historical fire regimes would benefit watersheds and water resources in the long-term by restoring ecological integrity and resiliency of forested ecosystems.

The amount of proposed vegetation restoration varies by alternative and directly correlates to the rate of achieving vegetation desired conditions, as described in the Forestlands section. Proposed vegetation restoration ranges from 3,700 to 14,000 acres per year for the Action Alternatives, compared to 4,300 annual acres in the No Action Alternative. The Preferred Alternative proposes 8,825 to 10,000 acres per year. Although, the proposed amount varies by Action Alternative, there is little differentiation between the alternatives when viewed in the larger context. The proposed acres equate to 0.3 to 1.1 percent of Management Area 3 and 0.1 to 0.3 percent of the Nez Perce-Clearwater per year. The potential risk to water resources from vegetation restoration is not so much the amount of area harvested but how those acres are concentrated or distributed across the landscape and if units are located in or near areas with high resource concerns. The exact locations of timber harvest openings and how they are arranged across a watershed cannot be determined during programmatic analysis.

With the proposed increase in timber harvest under all action alternatives, there is an elevated likelihood of increased cleared forest vegetation area occurring on the landscape at any given time in a specified Hydrologic Unit Code (HUC) 12 or smaller catchment. By extension, there is also elevated potential for observed changes in average annual water yield and peak flows. These openings could be within the natural range of variation depending on distribution and size of openings and the level of tree retention.

Changes in the amount or distribution of vegetation can affect water quantity and ultimately alter stream channel conditions. The Forestlands desired conditions emphasize landscape and within-patch patterns that reflect historic fire regimes, which would include increasing amounts and size of early seral openings. The desired condition (FW-DC-WTR-07) for hydrologic flow regimes is that instream flows are sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained. Stream flow regimes maintain riparian ecosystems and natural channel and floodplain dimensions. Stream channels transport sediment and woody material over time while maintaining reference dimensions (for example, bankfull width, depth, entrenchment ratio, slope, and sinuosity).

The effects of vegetative manipulation on water yield are complex, highly variable, and depend on many independent factors such as elevation, climate, aspect, and especially precipitation. The management approach for plan component FW-DC-WTR-07 in Appendix 4 provides methodologies to assess the potential effects on water yield and peak flows associated with proposed project activities.

Timber harvest and associated temporary roads, skid trails, landings, and site preparation can create ground disturbance, which can result in erosion and sediment delivery to streams. Soil compaction can also alter infiltration rates, potentially to increasing overland and channelized flow. The desired condition for sediment regimes is that sediment delivery to streams is of the types, quantities, and rates that support the natural instream sediment transport and storage rates and instream sediment substrate composition. The sediment regime in water bodies is not chronically affected by management activities to the extent that the availability of functioning spawning areas and interstitial spaces are reduced (FW-DC-WTR-06).

Sediment was a primary cause for streams on the Nez Perce-Clearwater to not meet beneficial uses and be listed as impaired by the Idaho Department of Environmental Quality. It is desired that water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, and is of sufficient quality to support surrounding communities, municipal water supplies, and natural resources (FW-DC-WTR-05). To help trend towards that desired condition, Standard FW-STD-WTR-06 requires management activities in watersheds with approved total maximum daily loads to be designed to comply with the total maximum daily load allocations following project implementation. Additionally, best management practices, including both federal and state, shall be incorporated in land use and project plans as a principal mechanism for controlling non-point pollution sources to meet soil and watershed desired conditions and to protect beneficial uses (FW-STD-WTR-02).

The Nez Perce-Clearwater also proposes to limit the amount of sediment delivery to streams by hydrologically disconnecting roads, skid trails, temporary roads (FW-GDL-ARINF-01); avoiding construction of new road, temporary road, trail, and landings in riparian management zones (FW-GDL-RMZ-01); and limiting ground disturbing activities in riparian management zones from harvest activities (FW-GDL-RMZ-02, FW-GDL-RMZ-03). In addition, FW-STD-TBR-02 would provide further protections by requiring timber to not be harvested on lands where soil, slope, or other watershed conditions would be irreversibly damaged, as identified in project-specific findings.

Vegetation management can also benefit watershed condition. Vegetation departure, fire regime, and forest health are included in the watershed condition classification process as indicators that represent the underlying ecological functions and processes that affect soil and hydrologic function. Vegetation management, including wildland fire, can help achieve desired condition FW-DC-WTR-01. The desired condition is that National Forest System lands provide the distribution, diversity, and complexity of watershed and landscape-scale features, including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.

Riparian management zones are not exclusion zones but areas where vegetation management is allowed to occur when guided by the desired conditions for aquatic resources associated with riparian areas and wetlands (FW-DC-TE-05, FW-DC-GS-04) and riparian management zones (FW-DC-RMZ-01, FW-DC-RMZ-02). Proposed standards and guidelines were developed to reduce the risk of potential effects to water quality, including the requirement of specific conditions before vegetation management could occur within riparian management zones (FW-STD-RMZ-01) and direction to avoid riparian management zones when constructing new permanent roads, temporary roads, landings, skidding trails, staging or decking areas, and machine burn piles (FW-GDL-RMZ-01, FW-GDL-RMZ-02). Vegetation management could be used to achieve restoration of hardwoods (FW-OBJ-TE-01) and reduce conifer encroachment in meadows (FW-OBJ-GS-01).

See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section related to timber harvest and vegetation management for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives.

Fire Management

As described in the Forestlands and Fire Management sections of the Final Environmental Impact Statement, vegetation conditions are departed from the natural range of variation. The primary causing factor is fire exclusion due to active fire suppression over the last 100 years. The historic pattern of disturbance has also been altered, particularly in short fire return interval areas. Fuel accumulations, coupled with warmer, drier weather in the past decade, have resulted in the current trend of larger and higher intensity fires. This is a departure from the historic pattern where a variety of fire intensities occurred on the landscape.

Fire is a natural disturbance process that has historically influenced watershed conditions, including riparian and wetland areas. Fire is encouraged to function as a natural process across the Nez Perce-Clearwater, especially within designated wilderness and Idaho roadless areas. The aim of desired condition FW-DC-FIRE-01 is for landscapes across the Nez Perce-Clearwater to be resilient to fire-related disturbances in accordance with management objectives. Natural fuel conditions emulate the structure, species mix, spatial pattern, extent, and resiliency of the historic fire regime of the area. Wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner and meet desired conditions for other resources.

Wildfire removes hillslope vegetation, which can decrease soil water storage and increase surface runoff and erosion. Wildfires can also affect water chemistry, water quantity, and stream channel structure through changes in transpiration, infiltration, ground water recharge, mass wasting, riparian shading, and the recruitment and delivery of coarse debris (Moody and Martin 2001a, Benda and Dunne 1997, Gresswell 1999, Moody and Martin 2001b, Wondzell 2001). However, these impacts are within the natural range of variation. Wildland fire provides more beneficial effects to watershed conditions than negative effects by promoting natural ecological processes.

Wildfire exclusion has allowed fuel loads to accumulate above natural levels in some areas of the Nez Perce-Clearwater. In these areas, when wildfire does occur, the intensity and severity may be higher than would occur under natural conditions. This process can change infiltration characteristics of soil and change hydrologic flow attributes. Severe fires may also remove virtually all vegetation and ground cover and result in soil erosion and sedimentation to nearby water bodies. Long-term fire exclusion allows forest successional processes to continue, which can increase evapotranspiration and interception, potentially resulting in less available water. In some areas, lack of fire can lead to the encroachment of woody species and trees into meadow habitats, which could lead to competitive exclusion of herbaceous species.

Prescribed Fire

The Nez Perce-Clearwater is characterized as fire-adapted or fire-dependent and requires periodic fire to maintain a healthy, resilient condition. Within these ecosystems, prescribed fire can help restore and sustain long-term environmental health. A prescribed fire is a planned fire intentionally ignited by fire specialists to meet management objectives. Prescribed fires are analyzed differently than the fire associated with site preparation after timber harvest and are used to reintroduce fire disturbance on the landscape and to meet a variety of vegetation, wildlife, and watershed desired conditions. Prescribed fires allow for a better controlled scenario when compared to a wildfire occurring under extreme climate conditions.

Effects to water resources would vary depending on the management objective. Underburning in drier potential vegetation types results in low and moderate burn severity that retains much of the soil groundcover and forest floor. A mixed burn severity prescription in more moist potential vegetation types could lead to the loss of ground cover in areas of moderate to high burn severity and potentially increase soil erosion, although recovery generally occurs in one to three years, depending on the amount and spatial distribution of remaining ground cover. Across blackened areas, the net effect of the burn residue and surface sealing of soil pores can exacerbate erosion potential by slowing infiltration (Larsen et al. 2009, Wondzell and King 2003). This post-burn condition is highly variable spatially and decreases over time (Doerr et al. 2006).

Prescribed fire would promote the re-establishment of fire-adapted ecological processes and help create desired forest compositions and structures. Use of fire as a tool within riparian management zones would likely occur to a similar extent under all action alternatives because of the potential ecological benefits and ability to help maintain or achieve desired vegetation conditions within riparian management zones. Proposed standard FW-STD-RMZ-06 specifies the requirements of prescribed fire used in riparian management zones. Prescribed fire could be used to achieve restoration of hardwoods (FW-OBJ-TE-01) and reduce conifer encroachment in meadows (FW-OBJ-GS-01).

Although there is a potential for temporary loss of ground cover and soil erosion, the effects are within the natural range of variation. The reintroduction of fire provides more beneficial effects to watershed processes and water resources than negative effects and promotes overall watershed resiliency. Although the proposed amount of prescribed fire varies by Action Alternative, there is little differentiation of impacts to water resources between the alternatives when viewed at the Forest scale.

Mechanical Fuels Treatments

Fuel characteristics strongly influence fire behavior and the resulting fire effects on ecosystems. Exclusion of fire causes fuel loads to accumulate above natural levels in some forest types. When wildfire occurs in these areas, the intensity and severity are often higher than they would be with more natural levels of fuel. Reducing hazardous fuels though mechanical treatments can reduce fire hazards, especially in wildland urban interface areas. The Nez Perce-Clearwater would continue to treat fuels using a combination of mechanical thinning or masticating; machine piling and burning; hand thinning, piling, and burning; hand thinning and chipping; and underburning.

Acknowledging that fuel treatments often require the use of ground-based mechanical equipment that have the potential to impact water resources, effects would be similar to those discussed in the vegetation and timber management section above and the same plan components would apply.

Fire Suppression Operations

Wildfire management consists of actions that are applied to wildfires based on a variety of factors, such as safety, economics, social considerations, and anticipated environmental effects. When a wildfire occurs, the first priority is the protection of human life and the safety of the public and firefighters. All alternatives would have similar direction for fire suppression operations, so the effects are common to all alternatives. Management strategies and methods vary depending on which management area a wildfire occurs. Wildfires occurring in Management Area 1 and Management Area 2 locations may be managed as resource benefit fires and little active suppression actions occur. In Management Area 3 locations, more active fire suppression methods are used.

As it is nearly impossible to predict the extent and location of future wildfires, quantifying the effects to water resources is difficult. Effects for suppression of wildfires occurring in Management Area 1 and Management Area 2 locations would be similar as described in the prescribed fire section above due to less occurrence of active fire suppression tactics. This would vary depending on fire severity. Fire suppression of wildfires occurring on Management Area 3 lands and wildland urban interface areas would likely have greater impacts as more ground disturbing methods are used. Fire suppression operations, such as construction of machine fire lines and establishment of large fuel breaks, can cause loss of ground cover, soil compaction, and rutting, all of which can affect water infiltration and increase overland or channelized flow. Depending on the extent of ground disturbance, soil erosion and subsequent sediment delivery to streams could occur. Fire suppression activities also have the potential to affect channel stability when water is drafted from streams to fill water storage tanks. Water is often ponded at a culvert inlet to deepen the “pool” so that water can be pumped out of the stream. Depending on how long the ponding occurs, it can alter channel structure long-term. To protect channel conditions, the following guideline is proposed – water drafting sites should be located and managed to minimize adverse effects on stream channel stability, sedimentation, and instream flows needed to maintain riparian resources, channel conditions, and fish habitat (FW-GDL-WTR-04).

In some instances, the creation of fuel breaks can cause equal or greater impact to water resources than timber harvest activities. In an effort to address public safety concerns in emergency situations, strict controls on acceptable activities, such as those implemented through timber harvest contracts or developed through rigorous project planning, may not be feasible, desired, or embraced by fire managers. Impacts resulting from past fire suppression activities have sometimes been observed to be long-lasting and extensive in scope.

The Action Alternatives would minimize these effects by limiting fire suppression activities away from riparian management zones (FW-GDL-WTR-07, FW-GDL-RMZ-06) and locating incident bases, camps, helibases, helispots, staging areas, and other centers for incident activities away from riparian areas where risk of sedimentation and risk of degradation to water quality are highest (FW-GDL-RMZ-05). Aerial application of chemical retardant, foam, or other fire chemicals and petroleum would be avoided in mapped aerial retardant avoidance areas to minimize impacts to the riparian management zones and aquatic resources (FW-GDL-RMZ-04). Additionally, guideline FW-GDL-INV-02 specifies that equipment, including pumps used to draft water from water bodies, water tenders, and helicopter buckets, should be inspected and cleaned for aquatic invasive species prior to use in a water body or when moving between subbasins (HUC08).

Additionally, all suppression activities would follow protocols outlined in the Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations (National Wildfire Coordinating Group 2017a), the Northern Rockies Coordinating Group Supplemental (Northern Rockies Coordination Group 2018b), and the Northern Rockies Coordinating Group Directive on Aquatic Invasive Species Protocols (Northern Rockies Coordination Group 2018b). Fire operations would follow industry standards for invasive species decontamination, such as vehicle washing. Rehabilitation efforts after fire suppression operations would help to mitigate many of impacts to water resources. Standard FW-STD-SOIL-02 requires impaired soil function created through management activities, including fire suppression, shall be rehabilitated to reestablish soil function to the appropriate site potential. In addition, guideline FW-GDL-RMZ-07 requires restoration of fire suppression activities in riparian management zones and guideline FW-GDL-INV-03 specifies that measures should be used to address invasive weed management when rehabilitating areas burned by wildfire and affected by wildfire suppression.

See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section regarding fire management for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives. The effects to water resources from wildfire suppression would be the same for all Action Alternatives.

Meadows, Grasslands, and Shrublands Management

Under the Action Alternatives, the Land Management Plan includes six desired conditions that promote meadows, grasslands, and shrublands resilience and support native plant communities (FW-DC-GS-01 to 06). Desired condition FW-DC-GS-04 specifically encourages wetland graminoid and riparian shrub habitat type groups that are comprised of a mosaic of communities dominated by native species which tolerate and are adapted to periodic flooding and an associated seasonally high-water table. These communities may be dominated by native graminoids, such as water sedge *(Carex aquatilis)* and tufted hairgrass *(Deschampsia cespitosa)*, and a variety of native forbs. Native shrubs include willow *(Salix spp.),* dogwood *(Cornus spp)*, and alder *(Alnus spp.). Native hardwood trees such as aspen (Populus tremuloides),* birch (*Betula occidentalis*), and cottonwood (*Populus spp.*) occur with other native mesic species in both riparian and upland communities. Invasive plant species either are not present or occur with low cover.

The Land Management Plan also includes an objective to maintain existing meadows and grasslands by reducing conifer encroachment into meadows and grasslands on a minimum of 500 acres every 5 years (FW-OBJ-GS-01). The beneficial effects from meadows, grasslands, and shrublands management would be the same under all Action Alternatives. Meadows are included as riparian management zones under the Action Alternatives and riparian habitat conservation areas under the No Action alternative and would be managed similarly.

Invasive Species and Invasive Species Management

Invasive species occur in most subwatersheds across the Forest. Invasive plants can compete and displace desirable native vegetation, alter effective ground cover, and disrupt natural ecological processes. Aquatic invasive species are non-native plants, animals, and microorganisms living in aquatic habitats that have the potential to impair aquatic ecosystem conditions. The Land Management Plan includes plan components to limit the extent of invasive plant species (FW-DC-INV-01) and aquatic invasive species (FW-DC-INV-02). Land Management Plan objective FW-OBJ-INV-01 proposes to treat 6,000 acres annually to contain or reduce non-native invasive plant density, infestation area, or occurrence.

Invasive plants are often treated using an integrated approach, with a combination of control types that include prevention, early detection, manual, biological, cultural, and chemical methods. Prevention may be constraints to activities, such as equipment decontamination and exclusion from infested areas. Manual treatments, essentially hand pulling, can result in localized soil disturbance as plants are removed. It is very labor intensive and costly; thus, only a small amount of acres per year could be treated using this technique. There are no effects to the soil resource from biological control methods, as there is no disturbance of ground cover or soil. Cultural methods generally involve enhancing the desirable vegetation to minimize invasive plant invasion. Planting or seeding desirable species to shade or out-compete invasive plants are common cultural treatments.

Effects from herbicide application depend on the type, extent, and amount of herbicide that is used, the proximity to a stream or wetland, the ratio of surface area to volume of a stream, and whether transport from the site is runoff or infiltration controlled. Chemical persistence in the soil profile depends on the soil texture, infiltration rate, chemical half-life, local climate, and the size of the treatment area. Effects of herbicide treatment to groundwater and surface water would be localized. Applications would occur at the appropriate time of year, considering targeted species and environmental factors. Adverse impacts to water resources are controlled through limits on herbicide type and application rates outlined in various NEPA documents. Where discharges of biological and chemical herbicides would leave residues in waters of the United States, a National Pollutant Discharge Elimination System permit would need to be obtained for those activities to comply with Section 301(a) of the Clean Water Act. Although most of the risk to water quality from chemical application may be reduced by applying best management practices, they cannot be eliminated. The proposed Land Management Plan includes specific directions for invasive weed treatment in and around riparian management zones to protect water quality (FW-STD-RMZ-03).

Soils Resource Management

All activities associated with management of the soils resource would benefit water resources. Soil impairment, such as loss of ground cover, soil compaction, and rutting, can affect water infiltration and increase overland or channelized flow. Depending on the extent of ground disturbance, soil erosion and subsequent sediment delivery to streams could occur. The proposed desired conditions, standards, and guidelines for the Soils Resources provide for protection of soils, limit soil impacts, and/or require soil rehabilitation. The beneficial effects from soils resource management would be the same under all Action Alternatives.

Aquatic Ecosystems Management

The beneficial effects from aquatic ecosystems management to watersheds and water resources would be the same under all Action Alternatives. Restoration actions associated with aquatic ecosystem objectives have to potential to create short-term impacts, but would provide for long-term benefit. The desired condition is that watershed restoration projects promote the long-term ecological integrity of aquatic ecosystems and conserve the genetic integrity of native species (FW-DC-WTR-12). Restoration projects would include best management practices during implementation.

Tribal Trust Responsibilities

The Tribal Trust Responsibilities section of the Land Management Plan provides management direction that either does not impact water resources or supports the maintenance or improvement of water resources and is the same for all Action Alternatives. Desired condition FW-DC-TT-04 promotes hot springs that are natural and free flowing in function and appearance. The hydrological, biological, and aesthetic resources in and around them are preserved, and are accessible for traditional cultural uses. Water quality meets state water quality standards for beneficial uses. Human use impacts are minor and consistent with traditional cultural uses of the site. The beneficial effects to water resources from managing tribal trust responsibilities would be the same under all Action Alternatives.

Cultural Resource Management

Historic properties are protected from project activities through the commonplace adherence to existing federal laws. Existing federal laws include the Antiquities Act of 1906 (16 U.S.C. 431), Historic Sites Act of 1935 (16 U.S.C. 461), National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470), Archeological and Historic Preservation Act of 1974 (AHPA) (16 U.S.C. 469), Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. 47Oaa et seq.), and Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. 3001), and executive orders 11593, 13007, 13175, 13287 and 13327.

Activities, such as road decommissioning, road reconstruction, culvert replacement, meadow restoration, mine tailing removal, and riparian habitat restoration, can disturb or remove historic or prehistoric sites and have the potential to adversely affect non-renewable heritage resources. Managing for the protection of cultural resources has the potential to hinder implementation of watershed restoration activities. This constraint originates from federal law. There are no Land Management Plan components that restrict restoration activities. The effect to water resources from cultural resource management would be the same for all alternatives.

Sustainable Recreation Management

This section addresses non-motorized trails; motorized and non-motorized winter recreation; administrative sites; developed recreation sites, such as campgrounds; and dispersed sites.

Development sites and campground facilities in riparian areas can result in surface disturbance, leading to sediment increases to nearby streams; loss of stream bank vegetation; altered stream bank stability; and reduced water infiltration.

Associated human activities, such as off-highway vehicle use on trails and stream bank trampling, can also decrease ground cover and increase erosion. Recreational activities can cause soil compaction and loss of vegetation in wetlands and/or directly adjacent to them. This can also reduce subsurface water flow and increase surface runoff. Increases in surface runoff may contribute sediment to streams and associated aquatic habitats, depending on the proximity or connectivity to the hydrologic network.

Facilities can act similarly to roads in terms of potential effects by interrupting natural flow paths and rerouting of water. Additionally, administrative sites and developed recreation sites can impact water quality through spills of fuel, oil, cleaning materials, or human waste associated with equipment and the pumping of toilets.

Facilities, administration sites, and developed campgrounds provide public water supplies and restrooms. It is desired that recreation facilities and their use, including trails and dispersed sites, have minimal impacts on aquatic resources, including threatened and endangered species, designated critical habitat, and aquatic species of conservation concern (FW-DC-ARREC-01).

To protect water resources the Land Management Plan includes guidance in all action alternatives that directs new and reconstructed solid and sanitary waste facilities not be located within 100 feet of water, unless no other alternative exists (FW-GDL-ARREC-01) and that new developed recreation facilities avoid being placed in riparian management zones (FW-GDL-ARREC-02). The Land Management Plan also includes an objective to relocate or mitigate dispersed camp sites that are currently located within riparian management zones that have documented degradation of aquatic or riparian resources (FW-OBJ-ARREC-01).

Non-motorized trails typically have very little impact on water resources. Sediment from trails generally gets routed onto the forest floor with no impact to water quality. However, there are locations where sediment is routed to streams at crossings. These are temporary, localized impacts, which would not result in watershed scale impacts. The Land Management Plan includes plan components to reduce sediment delivery from trails (FW-GDL-ARREC-03, FW-GDL-ARREC-04, FW-GDL-ARREC-05, FW-GDL-ARREC-06) and objectives to maintain trails (FW-OBJ-REC-01, FW-OBJ-REC-02).

Contamination by petroleum products, such as motor oil and gasoline, may degrade water quality in waters adjacent to areas of concentrated use, such as developed recreation sites, parking lots, and snowmobile staging areas. These impacts are generally low as sites are relatively small in area and widely dispersed. Best management practices are used by the Nez Perce-Clearwater to ensure risk to soil and water resources is minimized.

See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section related to recreation management for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives.

System Roads and Motorized Trails Management

Roads and motorized trails is an indicator assessed in the watershed condition classification process (U.S. Department of Agriculture 2011d). This indicator addresses changes to the hydrologic and sediment regimes due to the density, location, distribution, and maintenance of the road and trail network. Attributes of this indicator include open road density, road and trail maintenance, proximity to water, and mass wasting. Based on the Nez Perce-Clearwater 2011 classification, 63 percent of the subwatersheds were rated as ‘Functioning at Risk’ (Class 2) or ‘Impaired’ (Class 3) for this indicator. For these subwatersheds, the density and distribution of roads and linear features indicates that there is a higher probability that the hydrologic and sediment regimes are considerably altered. See Appendix K for more information on watershed condition class related to roads and trails.

As stated in the watershed condition classification technical guide (Potyondy and Geier 2011):

Roads affect watershed condition because more sediment is contributed to streams from roads and road construction than any other land management activity. Roads directly alter natural sediment and *hydrologic regimes by changing streamflow patterns and amounts, sediment loading, transport, deposition, channel morphology and stability, and water quality and riparian conditions within a watershed (Copstead 1997, Dunne and Leopold 1978, Gibbons and Salo 1973). Road maintenance can also increase sediment routing to streams by creating areas prone to surface runoff, altering slope stability in cut-and-fill areas, removing vegetation, and altering drainage patterns (Burroughs and King 1989, Luce and Black 2001, Megahan 1978, Reid and Dunne 1984). Road density is known to play a dominant role in human-induced augmentation of sediment supply by erosion and mass wasting in upland forested landscapes in the Pacific Northwest (Cederholm et al. 1980, Furniss et al. 1991), and it is reasonable to assume that similar relationships exist elsewhere. Road-related mass soil movements can continue for decades after roads have been constructed, and long-term slope failures frequently occur after road construction and timber harvest (Megahan and Bohn 1989).*

The Impacts from motorized trails are similar as those from roads. The most notable impact is trail erosion and rutting, which can concentrate water flow and lead to sediment delivery to streams.

Effects in Common Across Action Alternatives

Desired conditions for roads are that the transportation system has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity of roads to streams, lower sediment delivery to streams, reduced road impact to floodplains, and improved aquatic organism passage, where transportation infrastructure affects these features (FW-DC-ARINF-01); that the transportation network is resilient to the effects of climate change, including the ability to accommodate increased runoff and peak flows that may exceed historic streamflow events (FW-DC-ARINF-02); and that roads in the Conservation Watershed Network present minimal risk to aquatic resources (FW-DC-CWN-03). Desired conditions for trails are that trails have minimal impacts on aquatic resources (FW-DC-ARREC-01).

To move towards these desired conditions, objective FW-OBJ-INF-01 aims to **c**omplete 600 miles of road work under the Preferred Alternative Table 118, such as reconstruction, re-routing, road improvements, decommissioning, or placing roads in intermittent stored service, every 5 years. Priorities shall include reducing effects on desired aquatic and riparian conditions from chronic sediment delivery or potential future road prism failures, including previously decommissioned roads where drainage features have failed. From 2013 to 2022, the Nez Perce-Clearwater reconstructed and decommissioned an average 95 miles of system road annually. Over the 5-year period from 2018 to 2022, approximately 500 miles of system road was reconstructed and 13 miles of system road was decommissioned. Objective FW-OBJ-INF-02 aims to annually maintain 1,400 miles of operational maintenance level two through five roads under the Preferred Alternative (Table 118). From 2013 to 2022, the Nez Perce-Clearwater maintained an average annual 1,100 miles of operational maintenance level two through five roads.

Additionally, objectives for trail system management aim to annually maintain to standard a minimum of 30 percent of National Forest System trail miles (FW-OBJ-REC-01) and reduce deferred maintenance of trails by five percent, every five years (FW-OBJ-REC-02). From 2013 to 2022, the Nez Perce-Clearwater annually maintained to standard an average 34 percent of National Forest System trail miles and annually improved an average 44 miles of National Forest System trail miles.

Numerous standards and guidelines are proposed to limit the amount of sediment delivery or alteration of hydrologic flow regime from roads and trails, including limits on sidecasting of road material or snow (FW-STD-ARINF-03, FW-GDL-ARINF-07); routing road drainage away from streams and unstable slopes (FW-GDL-ARINF-09, FW-GDL-ARINF-02); requiring upgrading or removal of stream crossings (FW-STD-ARINF-04, FW-GDL-ARINF-03, FW-GDL-ARINF-05, FW-GDL-ARINF-11, FW-GDL-ARREC-03); avoiding high mass wasting potential areas and wetland areas (FW-GDL-ARINF-04, FW-GDL-ARINF-08, FW-GDL-ARREC-04); and hardening of stream crossings (FW-GDL-ARINF-06, FW-

GDL-ARREC-06). Standard FW-STD-ARINF-07 requires that when constructing or reconstructing roads in the Conservation Watershed Network and HUC12 subwatersheds with Endangered Species Act critical habitat or listed aquatic species, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network.

Effects That Vary by Alternatives

Under the No Action Alternative, road maintenance would be expected to continue at similar levels or slightly decreased levels due to declining budgets. Portions of the road network would be treated to repair and improve drainage structures, improve the running surface of the road, and to clear vegetation along roadsides. Short-term increases of sediment delivery to streams and waterbodies would be expected as a result of road surface grading, and culvert and ditch cleaning near waterbodies. Portions of the road system that are in particularly poor condition or are currently closed and in long-term storage would be reconstructed periodically, particularly in connection with land management activities, such as timber harvest projects. Best management practices would be employed to minimize erosion and sediment transport to waterbodies.

The Land Management Plan includes objectives to maintain, improve, stormproof, or reconstruct system roads. As discussed in the Infrastructure section of this Final Environmental Impact Statement, increased log-haul multiplies the amount of aggregate breakdown. When this occurs near streams, the potential for sediment delivery is higher. Proposed road reconstruction and improvements (FW-OBJ-INF-01) are proportional to the rate of increase in proposed timber harvest. Road reconstruction includes application of surface rock, replacing damaged or poorly functioning culverts, adding stream-crossing or ditch relief culverts where necessary, road template widening as needed, and removing roadside vegetation that is encroaching on the road surface. Miles of road maintenance (FW-OBJ-INF-02) and storm proofing of roads (FW-OBJ-CWN-02) also increase by alternative, proportional to the level of proposed timber harvest. Log-haul traffic under Alternative Z would be similar to the existing levels found under the No Action Alternative. Alternatives W, X, and Y and the Preferred Alternative have a higher risk of impact due to the amount of log-haul associated with the proposed timber harvest.

Although the Action Alternatives have the potential to increase sediment delivery to stream courses as a result of increased truck traffic associated timber harvest, this concern could be avoided or mitigated through development and implementation of project design features, timber sale contract provisions, and best management practices during project planning and implementation. Future road building would likely be confined to realignment or relocation, although new roads could be constructed to reach currently inaccessible areas. The road system, including miles, management level, and location is the same for all alternatives; however, road use would vary by alternative

See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section related to infrastructure for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives.

Land Ownership and Land Uses

The forest issues a variety of permits for projects under the lands and special uses programs. Forest Service permits can lead to interrelated and interdependent effects on private lands that are enabled by issuing a road use permit or right-of-way grant. It is assumed that temporary and short-term impacts could occur where special uses are allowed or mandated. Management activities that result in ground disturbance near streams and other bodies of water have the potential to affect water quality. These potential increases are based on site-specific factors such as slope, soil types, proximity to waterbodies, residual ground cover, and revegetation. Additionally, soil erosion, sediment delivery, and turbidity can increase due to heightened road activity from issuance of road use permits or granting rights-of-way. Road-related effects are discussed in the road and motorized trail section below.

Proposed standard FW-STD-ARLND-01 requires when authorizing new lands special uses, or reauthorizing existing uses, include conditions to avoid adverse effects to fish, water, and riparian resources. If adverse effects are unavoidable to Endangered Species Act listed fish, species of conservation concern, impaired water bodies, or stream habitat conditions, authorizations shall require actions that result in the re-establishment, restoration, mitigation, or improvement of conditions and ecological processes to ensure that projects that degrade conditions also include measures to improve conditions to the extent practicable. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat.

New hydropower support facilities would be located outside of riparian management zones to reduce effects to fish, water, and riparian resources (FW-STD-ARLND-02). If existing hydropower support facilities are located within riparian management zones at the time of permit reissuance guideline FW-GDL-ARLND-01 impacts to be reduced on aquatic and riparian resources, such as moving support facilities outside of riparian management zones or further from water bodies where feasible.

Permitted power and telephone line construction and maintenance would continue under all alternatives. Clearing brush and trees in riparian areas may increase solar radiation to streams and the forest floor, increasing water temperature. Limbing, topping, or removal of hazard trees near utility lines can also reduce in-channel wood. Power and telephone line corridor maintenance could result in loss of riparian vegetation where they cross or are adjacent to the stream network. The permitting process for new authorizations would look at options to minimize this effect.

Effects would be the same under all alternatives because the plan components under the Action Alternatives are generally the same as PACFISH and INFISH standards and guidelines under the No Action Alternative, with the exception of reauthorizations. See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section related to lands and special uses for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives.

Ecosystem Services Management

Ecosystem services are the benefits the National Forests provide to area residents, visitors, and the American public. Ensuring ecosystem services are provided is critical to providing for ecologic, social, and economic sustainability. The Land Management Plan includes desired condition FW-DC-ES-01 that promotes the Nez Perce-Clearwater's ability to provide ecosystem services to area residents and visitors. Key benefits the Nez Perce-Clearwater provides include clean water; clean air; wood products, including timber and firewood; forage; hunting, trapping and fishing; fish; cultural values, including heritage values, subsistence food gathering, and spiritual and inspirational values; scenery; recreation; and flood control and soil stabilization.

Guideline FW-GDL-ES-01 specifies that to provide for social and economic sustainability of rural communities, access to activities such as recreation, hunting, fishing, gathering, egress, and wildfire management should continue to be provided for on routes or in areas designated as open to motorized use in the summer and winter. If a route is identified as adversely affecting aquatic ecological values, rerouting and route improvement should be considered prior to closure, to preserve motorized access opportunities. If a route or area needs to be closed, alternate motorized access to maintain social and economic sustainability of rural communities should be provided.

This guideline could increase potential effects to water resources by limiting the ability to close or decommission system roads, as the focus of the plan component is to preserve motorized access opportunities. The amount and location of roads and trails were the major cause for subwatersheds to be classified as functioning at risk or having impaired function when rated using the watershed condition classification process. System roads generally have notable impact to riparian and wetland conditions and floodplain function on the Nez Perce-Clearwater. Out of the 7,682 miles of Forest Service system roads, 1,600 miles of road or approximately 6,400 acres occur within riparian management zones. Approximately 686 miles of road or 2,700 acres are located within 100 feet of stream channels and wetlands. Some of these road miles are continuous along substantial lengths of a stream channel or are unconnected sections of road that interact with streams only at stream crossings.

Under this guideline, if roads are decommissioned for adversely affecting aquatic ecological values, alternative access should be provided. This is not necessarily replacement mile for mile. Water resource conditions could still trend towards desired conditions if roads located within riparian management zones or mass movement areas are relocated or decommissioned and alternative routes are located on more stable areas, away from riparian areas. Hydrologically disconnecting roads (FW-STD-ARINF-07), storm proofing roads (FW-OBJ-CWN-02), annually maintaining 1,400 miles of operational maintenance level two through five roads (FW-OBJ-INF-02), and completing 600 miles of road work, such as reconstruction; re-routing; road improvements; decommissioning; or placing roads in intermittent stored service, every 5 years (FW-OBJ-INF-01) would also reduce impacts to water resources. Any new road construction to provide alternate motorized access would have to adhere to Aquatics and Riparian Infrastructure plan components and follow best management practices (FW-STD-WTR-02). The effects from ecosystem services management would be the same under all Action Alternatives.

Minerals Management

Historically, there have been hundreds of locatable mineral mining operations across the Nez Perce-Clearwater on both patented and unpatented mining claims. Impacts from historic mining are still evident across the Nez Perce-Clearwater. Placer and, to a lesser extent, lode mining have physically altered stream morphologies in much of the Palouse, Clearwater, Upper and Lower North Fork Clearwater, and South Fork River subbasins. Effects from historic mining was one of the leading causes for impairment to streams when the Nez Perce-Clearwater evaluated watershed conditions in 2011 using the watershed condition classification process. All seven of the subwatersheds identified as having impaired function included channel alteration and reduced water quality due to historic mining.

Recreational mining activities, such as panning, metal detecting, hand-sample collection, and the use of small-scale sluice systems, occur across the Nez Perce-Clearwater, particularly in areas of historic lode or placer mining activities. Unless an authorized officer determines that an activity is or will cause a significant disturbance to surface resources, a Plan of Operations is not likely to be required. The 1872 mining law allows for the development of locatable minerals, including gold and other minerals in streams. All locatable mineral activities are required to meet applicable environmental protection measures as required by both Federal and State laws, regulations, and policies. Proposed locatable mineral activities are subject to review and approval, as well as environmental analysis and reclamation and monitoring requirements. Mining activities are restricted in many rivers within the Nez Perce-Clearwater by the Idaho Comprehensive State Water Plan (Idaho Department of Water Resources 2012). Mining that occurs within or adjacent to riparian areas and wetlands can reduce water availability and flow and increase sedimentation and/or other pollution. Dredge mining in streams can cause redistribution of fine sediment. As equipment dredges the stream bed, water flow immediately transports material downstream. Placer mining operations create disturbed areas large enough to gather streambed material, sort it, and deposit it. Loss of riparian vegetation through mining activities can increase sediment delivery and alter stream temperatures.

To protect water quality, riparian areas, and stream channels, the Land Management Plan proposes standards and guidelines that include the following: requirement of a reclamation plan and bond for mining activities in riparian management zones (FW-STD-AREM-01); limiting mine waste in riparian management zones (FW-STD-AREM-02); limiting mineral operations in riparian management zones unless strict adherence to guidance is followed (FW-GDL-AREM-01, FW-GDL-AREM-02); controlling water flow paths to maintain water quality and to prevent biological, chemical, or industrial pollutants from being delivered to water bodies (FW-GDL-AREM-03); and requiring the use of best management practices (FW-GDL-AREM-04). Standard FW-STD-EM-01 directs that new mineral and energy management activities shall only be authorized when the associated reclamation plan includes provisions to return disturbed areas to a state of site condition comparable to pre-mineral activity. Additionally, to minimize ground disturbance and sediment inputs, and avoid adverse effects to riparian vegetation and water temperature New saleable sand and gravel mining and extraction should not occur within riparian management zones (FW-GDL-RMZ-09).

The No Action Alternative also includes direction for minerals management. The Nez Perce and Clearwater forest plans, as amended by PACFISH, include standards and guidelines that are equivalent to the revised Land Management Plan, although they do not require a reclamation plan and bond for mining activities in riparian management zones. See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section related to minerals management for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives.

Livestock Grazing Management

The Nez Perce-Clearwater has 36 active range allotments occurring on 612,766 acres or approximately 15 percent of the Nez Perce-Clearwater. Some of the allotments are forested and considered transitory range. The Land Management Plan alternatives do not propose changes to allotment boundaries or level of use. Objective FW-OBJ-GRZ-01 is the same for all action alternative, projecting approximately 29,800 to 34,400 animal unit months per year. This is the same level of livestock grazing as the No Action Alternative.

Impacts to the water resource from livestock grazing are localized but tend to be highest near riparian and wetland areas. Impacts are often greater in riparian and meadow areas because they are preferred by livestock due to the availability of shade, water, and more palatable forage. The most notable impacts are reduced riparian and meadow vegetation and stream bank alteration at livestock trail crossings and watering sites, although the extent, severity, and locations are highly variable from year to year. Livestock grazing near streams can result in changes in channel morphology (Belsky et al. 1999). Livestock trailing, chiseling, and general soil displacement along stream bank areas can result in collapse of undercut bank areas and an overall increase in bank angle, loss of bank cover, and stream widening along the entire stream reach. Over long time periods, loss of riparian habitats may occur due to stream channel widening or degradation, and lowering of water tables through channel incision. In a few allotments, fences have been installed to exclude cattle from grazing and trampling banks within riparian zones or to protect sensitive areas, such as meadows.

The effects of historic livestock grazing are still evident, affecting riparian vegetation composition and stream channel form and function. Many of the allotments have seen improvements through best management practices, updated allotment management plans, and specific guidance in annual operating instructions. However, impacts to riparian and wetland area conditions within grazing allotments persist.

Annual indicators that can be used to monitor livestock grazing include within season or end of season stubble height, streambank alteration, woody species utilization, and extent of bare ground. When designed with and supported by best available science, annual indicators can provide a reasonable assurance that if they are consistently met, long-term desired condition attainment would be expected within reasonable timeframes. As such, they provide a short-term means of using adaptive management on an annual basis to meet or move toward the long-term desired conditions.

Under the Action Alternatives, existing grazing permits would continue to be administered under current allotment management plans; however, they would be required to meet or be moving towards desired conditions for riparian and meadow areas (FW-DC-GS-04, FW-DC-RMZ-01, FW-DC-RMZ-02) as outlined in the Land Management Plan. To address livestock grazing impacts and reduce the effects of grazing on water resources, the Land Management Plan includes standard FW-STD-ARGRZ-01, which requires monitoring and adjustment of grazing practices as necessary to promote desired conditions for riparian and meadow areas. Standard FW-STD-ARGRZ-02 specifies that where livestock trailing, bedding, watering, salting, loading, off road vehicle use for managing or gathering livestock, and other related activities in riparian management zones are adversely affecting aquatic resources, annual operating instructions shall include measures to mitigate or relocate to other areas or times. Guideline FW-GLD-ARGRZ-03 requires the protection of seeps and springs from livestock trampling at spring developments. Additionally, standard FW-STD-WTR-04 specifies that where aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions; where aquatic and riparian desired conditions are not yet achieved, and to the degree that project activities would contribute to those conditions, projects shall restore or not retard attainment of desired conditions.

Streams with lower gradients are the most sensitive to livestock grazing impacts (Rosgen 1996). To maintain or improve riparian and aquatic conditions and achieve riparian desired conditions, proposed guideline FW-GDL-ARGRZ-01 establishes minimum end of season stubble heights of 10 to 15 centimeters (4 to 6 inches) along the greenline for low gradient streams.

Stubble height is a meaningful and relatively easily determined metric related to riparian vegetation and has been found to correlate with instream habitat quality (Roper 2020), and has been widely used as an end-of-season monitoring indicator (U.S. Department of Agriculture 2022e). End of season stubble height along the greenline has been shown to be a good indicator of two primary factors: 1) the effect of grazing on the physiological health of herbaceous, hydrophytic plants, and 2) the ability of the vegetation to provide streambank protection and bank building function.

Clary and Webster(1990) recommended that in the Intermountain West, a minimum stubble height of approximately 10 to 15 centimeters should remain at the end of the grazing season to maintain plant vigor and provide for bank protection and for sediments to be deposited. However, 19-20 centimeters stubble height was the optimal length to retain sediment deposits (Abt et al. 1994, Thornton et al. 1997). Similarly, Clary and Leininger (2000) indicated that 15-20 centimeters stubble height would be necessary to protect willow and vulnerable streambanks. Clary (1999) found that 10 centimeters protected most of the stream attributes while 14.1 cm was needed to protect all stream attributes. Higher average stubble height at the end of season is more likely to provide plants with enough growth during the season to retain vigor in the following season (Clary 1995, Boyd and Svejcar 2012).The proposed standards and guidelines in the Land Management Plan are designed to protect upland and riparian resources and provide overall guidance for managing livestock grazing within allotments. In addition, specific allotment management plans and/or annual operating plans provide instructions to grazing permittees designed to ensure adequate riparian and upland resource protection while providing for the sustainability of forage. These plans and the direction they contain are site specific for each allotment and are not part of this analysis.

The No Action Alternative would continue management of the grazing program under direction in the 1987 Forest Plans, as amended by PACFISH and INFISH. The direction requires modification of grazing practices that retard or prevent attainment of riparian management objectives or are likely to adversely affect listed anadromous fish. They also require that new livestock handling facilities be located outside of riparian habitat conservation areas and that livestock trailing, bedding, watering, salting, loading, and other handling efforts be limited to areas and times where they will not retard or prevent attainment of riparian management objectives. See Aquatic Ecosystems and Fisheries Effects of No Action Alternative vs Action Alternatives section related to livestock grazing for a direct comparison between PACFISH standards under the No Action Alternative and plan components from the Land Management Plan under the Action Alternatives.

Special Forest and Botanical Products

Firewood cutting in riparian areas has the potential to impact riparian function through reductions in thermal cover, large wood recruitment to streams, and ground disturbance. To limit the potential for impacts to riparian areas, standard FW-STD-RMZ-04 dictates that no fuelwood cutting within 150 feet of the stream edge would be authorized. This direction is also included in national firewood permits.

Designated Wilderness Management

Watershed conditions in designated wilderness areas were found to be functioning properly when watershed conditions were assessed in 2011. Ecological processes are within historical ranges and the resiliency of watersheds to recover from disturbances is high. The primary drivers of change in wilderness areas are wildfires, landslides, and insect and disease infestations. Changing climate may contributed to, and possibly exacerbate, the magnitude and extent of effects from these drivers. The management of designated wilderness benefits water resources under all alternatives. Natural processes would continue to drive watershed and water resource functions and conditions.

Designated Wild and Scenic Rivers Management

Three wild and scenic rivers have been designated on the Nez Perce-Clearwater – the Middle Fork Clearwater, which includes the Lochsa River and Selway River; the Main Salmon River; and Rapid River. Regulation ensures that water quality is maintained and, where possible, enhanced, and minimum flows are reserved to maintain a river's social and ecological values. Water rights are regulated in wild and scenic river drainages. All surface water rights, and ground water rights diverted from sources hydraulically connected to the wild and scenic river reaches upstream from the ending points are recorded, tracked, and administered as anticipated under the provisions of the Wild and Scenic Agreement. The area hydraulically connected to the wild and scenic river reaches covers 2,112,767 acres, or 52 percent of Nez Perce-Clearwater lands.

Designated wild and scenic rivers would receive the same or better level of protections under the Action Alternatives as compared to the No Action Alternative. For the Action Alternatives, standard MA1-STD-DWSR-02 requires management activities in designated wild and scenic river corridors to protect and enhance their free-flowing character, water quality and outstandingly remarkable values for which the river was designated.

Recommended Wilderness

Management direction for recommended wilderness would be beneficial to water resources under all the Action Alternatives because of the limitation of land management activities that most often directly impact water resources. The amount of recommended wilderness varies by alternative. Alternative X proposes no recommended wilderness. The Preferred Alternative identifies three recommended wilderness areas totaling 258,210 acres–Mallard Larkins, Hoodoo, and East Meadow Creek. Alternative W proposes the most wilderness areas, identifying ten areas, totaling 856,932 acres, followed by Alternative Z with 569,755 acres, and Alternative Y with 309,332 acres. Under the No Action Alternative, 197,695 acres have been managed as recommended wilderness since the 1987 plans were developed. Recommending these areas as wilderness would ensure that wilderness characteristics would be maintained. Under the Action Alternatives, management actions are already limited because they are all included in Idaho Roadless Rule areas. Therefore, the magnitude of the positive effects to water resources from the Action Alternatives relative to the No Action alternative are anticipated to be small. Natural processes would continue to drive watershed and water resource functions and conditions.

Eligible and Suitable Wild and Scenic Rivers

For all alternatives, identifying segments of rivers and streams that are eligible or suitable for wild and scenic river designation provide beneficial effects to water resources. Rivers found to be eligible or suitable for wild and scenic river inclusion would be managed to protect the river-related outstandingly remarkable values identified for the river and protect the free-flowing nature and quality of the water. These protection measures would be maintained until a decision is made on the future use of the river and adjacent lands through an Act of Congress or a determination that the river is not suitable for inclusion. Wild and scenic rivers are bounded by a corridor that extends one-quarter mile on each side of the river segment, measured from the high-water mark.

Under the Action Alternatives, to protect river values, standard MA2-STD-E&SWSR-01 limits the construction of roads, trails, facilities, or airstrips within the eligible or suitable river segment that would alter the classification of the river. Any new road, trail, and airfield construction would be designed to maintain the outstandingly remarkable values, classification, free-flowing character, and water quality of the river. Additionally, hydroelectric power facilities are not suitable in eligible or suitable wild and scenic rivers (MA2-SUIT-E&SWR-10). Within the riparian management zone directly adjacent to the eligible or suitable wild and scenic river, Aquatic Ecosystems plan components in the Land Management Plan, under all Action Alternatives, provide management direction that is more rigorous for water resources than direction in the Wild and Scenic Rivers Act. Wild and scenic river designation in the future could offer additional water resource benefits, such as the establishment of non-consumptive minimum stream flow water rights.

Summary of Environmental Consequences

A summary of the environmental consequences to water resource by alternative is presented in Table 120. Because desired conditions, standards, and guidelines for water and aquatic resources do not vary between Action Alternatives, any differences in the effects to water resources would be based on the potential positive movement towards desired conditions through implementation of aquatic ecosystem objectives compared to the potential increased risk to water resources from the movement towards desired conditions for other resources. Overall, the desired conditions for the terrestrial and aquatic ecosystem resource areas are integrated and encourage maintaining or improving ecosystem resilience and ecological integrity.

The 2012 Planning Rule requires that National Forests provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.8). The 2012 Planning Rule also requires that a plan include plan components including standards or guidelines, for integrated resource management to provide for ecosystem services and multiple use (36 CFR 219.10(a)). To achieve that balance, there could be a potential continued or increased risk to water resources. These potential risks to water resources would primarily occur in Management Marea 3. Standards and guidelines for management actions that could affect water resources are included in the Land Management Plan to help achieve or maintain aquatic ecosystem desired conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements. The potential benefit from increased restoration and potential risk from management resources varies by Action Alternative and are all greater than what would occur under the No Action Alternative.

Table 120. Summary of consequences to water resources by alternative (Alt)

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Watershed Condition Rate of improvement in Hydrologic Unit Code (HUC) 12 subwatersheds using the watershed condition framework	Low	Highest	Highest	High	Moderate	High
Water Quality Potential risk to water quality Potential benefit from restoration	Moderate	High	Highest	High	Moderate	High
Water Quantity Potential risk to water quantity Potential benefit from restoration	Moderate	High	Highest	High	Moderate	High
Riparian areas, wetlands, and floodplain function Potential risk Potential benefit from restoration	Moderate	High	Highest	High	Moderate	High

Conclusion

The Land Management Plan must include plan components to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity (36 CFR 219.8(a)(1)).

The Land Management Plan identifies five "in progress" priority watersheds that are a priority for maintenance or restoration (36 CFR 219.7(f)(1)(i)) and provides guidance for the establishment of additional priority watersheds through the life of the plan.

The Land Management Plan includes plan components that emphasize the maintenance or improvement of water quality (36 CFR 219.8(a)(2)(iii)) and includes a plan component to ensure implementation of national best management practices for water quality (36 CFR 219.8(a)(4)).

The Land Management Plan includes plan components that promote the maintenance or restoration of water resources in the plan area, including lakes, streams, and wetlands; ground water; public water supplies; source water protection areas; and other sources of drinking water, including guidance to prevent or mitigate detrimental changes in water quantity, quality, and availability (36 CFR 219.8(a)(2)(iv)).

The Land Management Plan includes plan components to maintain or restore the ecological integrity of riparian areas in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity (36 CFR 219.8(a)(3)(i)). The Plan also establishes riparian management zone widths around all lakes, perennial and intermittent streams, and open water wetlands, giving special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams and lakes (36 CFR 219.8(a)(3)(ii)).

The Land Management Plan provides a broad spectrum of standards and guidelines designed to protect soil, water, riparian, and aquatic resources. The goals and intent of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) would be met through compliance with the Land Management Plan direction.

The Land Management Plan contains plan components for integrated resource management to provide for ecosystem services and multiple use [including watershed] (36 CFR 219.10(a)), including plan components to maintain or restore riparian areas and surface and subsurface water quality (§219.10(a)(1)) and public water supplies and associated water quality (§219.10(a)(9)).

3.2.8 Aquatic Ecosystems and Fisheries

Chapter 3 presents the existing environment of the areas used for analysis and the potential consequences to that environment that may be caused by implementing the alternatives described in Chapter 2. The following discussion of resources and potential effects draws on existing information included in the Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a), other planning documents, resource reports and related information, and other sources, as indicated. In addition, in 2018, an interagency and partner working group (Aquatic and Riparian Conservation Strategy) was convened that brought significant amounts of information from partners and other reg agencies. The planning record contains additional references not listed in the reference sections of the Final Environmental Impact Statement and appendices. This section considers numerous physical and biological resources associated with riparian and aquatic habitats, including aquatic species.

Changes between draft and final

Comments received since the proposed action and Draft Environmental Impact Statement were published have been used, where appropriate, to improve the Land Management Plan and have helped inform this Final Environmental Impact Statement. Multiple changes were made for the Final Environmental Impact Statement; all changes are within the scope of the Draft Environmental Impact Statement analysis and address issues that the public had an opportunity to comment on. With respect to aquatic ecosystems and fisheries, there were changes to Affected Environment section to update status descriptions using new or more accurate data and information. In addition, changes were made to the draft Species of Conservation Concern list (with the Forest Service recommendation omitting Clearwater spring and summer Chinook, editing rationale for other species) because a review of the list and the criteria for that list found that changes were warranted. In addition, more analysis was added for plan direction that differs by alternatives. In addition, there were changes to the Aquatic Ecosystems plan components and Wildlife plan components that were driven from commenters and internal Forest Service suggestions. Also, as a result of public input, an additional alternative was developed, called the Preferred Alternative. Analysis of the Preferred Alternative for aquatic ecosystems and fisheries is similar to all action alternatives.

Relevant Laws, Regulations, and Policy

Federal Laws

National Environmental Policy Act of 1969

The National Environmental Policy Act of 1969 requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. Specifically, all federal agencies are to prepare detailed statements assessing the environmental impact of and alternatives to major federal actions significantly affecting the environment (1969).

Endangered Species Act of 1973, as amended

Endangered Species Act (ESA) of 1973, as amended: Section 7(a)(1) supports biotic sustainability by requiring that "all federal agencies shall . . . utilize their authorities in furtherance of the purposes of the ESA, and cooperate with state and local agencies to resolve water resource issues in concert with conserving endangered species.

Section 7(a)(2) includes direction that federal agencies, in consultation with the U.S. Fish and Wildlife Service, will not authorize, fund, or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat. This is accomplished by formal consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service in cases where ESA listed species or critical habitat are present and may be affected by federal agencies' actions. This pertains to project level activities, as well as forestwide activities like plan revision, or forest or region wide programmatic consultations. In the case of the revised forest plan, consultation is underway, and the ensuing Biological Opinion will supersede any previous Biological Opinions pertaining to forest plans.

Multiple Use Sustained Yield Act of 1960

Multiple-Use Sustained-Yield Act of 1960: Congress has affirmed the application of sustainability to the broad range of resources over which the Forest Service has responsibility. The Multiple-Use Sustained-Yield Act confirms the Forest Service's authority to manage the national forests and grasslands "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes" (16 U.S.C. § 528) and does so without limiting the Forest Service's broad discretion in determining the appropriate resource emphasis or levels of use of the lands of each national forest and grassland.

Magnuson-Stevens Act of 1976, as amended

The Magnuson-Stevens Act of 1976 (16 U.S.C. 1801 et seq.) (MSA) is the primary law that governs marine fisheries management in United States federal waters. It is intended to foster the long term biological and economic sustainability of marine fisheries. It is primarily concerned with regulating commercial fisheries and preventing overfishing. It established federal waters as spanning 200 miles offshore of the United States and established regional fishery management councils. One important provision of the Act is an objective to "protect habitat that fish need to spawn, breed, and grow to maturity." The Act was reauthorized in 1996 with the Sustainable Fisheries Act of 1996 (63 FR 24212), which added a requirement for fishery management councils to identify and describe "Essential Fish Habitat" (EFH). The provision for EFH was revised in 2002 (67 CFR 2343) allowing fishery management councils to designate Habitat Areas of Particular Concern and established a federal consultation process for agencies working in EFH areas. The Act was reauthorized with the MSA Reauthorization Act of 2006, and again amended with the Modernizing Recreational Fisheries Management Act of 2018.

National Forest Management Act of 1976

National Forest Management Act of 1976: This act directs the Forest Service to manage for a diversity of habitats to support viable populations (36 CFR § 219.19). Regulations further state that the effects on these species and the reasons for their choice as management indicator species need to be documented (36 CFR § 219.19(a)(1)).

Idaho Roadless Rule

The Idaho Roadless Rule (36 CFR § 294.29, as amended) established roadless areas and established five management classifications that provided management direction and constraints across a continuum (these classifications are often referred to as themes), including Wildland Recreation; Special Areas of Historic or Tribal Significance; Primitive; Backcountry/Restoration; and General Forest, Rangeland, and Grassland.

Agency Regulations

The Nez Perce-Clearwater supports five fish species currently listed as threatened or endangered under the Endangered Species Act (ESA) and contains designated critical habitat for these species. The last two decades history of listings related to the ESA is complicated. In Idaho, in the 1990s, sockeye salmon (*onchorynchus nerka*), steelhead (*onchorynchus mykiss*), and two stocks of Chinook (*onchorynchus tsawytscha*) salmon were listed under the ESA, in addition to bull trout (*salvelinus confluentus*). Snake River spring and summer Chinook salmon were listed threatened in the Salmon River subbasin on April 22, 1992 (57 FR 14653), and critical habitat was designated on October 25, 1999 (64 FR 57399). Snake River fall Chinook salmon were listed threatened on April 22, 1992 (57 FR 14653), and critical habitat was designated December 28,1993 (58 FR 68543). Snake River sockeye salmon were listed endangered on November 20, 1991 (56 FR 58619), and critical habitat was designated on December 28, 1993 (58 FR 68543). Snake River steelhead were listed threatened on August 18, 1997 (62 FR 43937), with critical habitat designated September 2, 2005 (70 FR 52629). These species are present on the Nez Perce-Clearwater, although in the case of sockeye salmon no spawning or rearing occurs on the Nez Perce-Clearwater. Bull trout were listed threatened throughout the United States on November 1, 1999 (64 FR 58910), and critical habitat was designated on October 6, 2004 (69 FR 59995). The U.S. Fish and Wildlife Service (USFWS) released a bull trout recovery plan (U.S. Department of the Interior 2015c) and Recovery Unit Implementation Plans for the Mid-Columbia and Upper Snake Recovery Areas (U.S. Department of the Interior 2015a, d), which include portions of the Nez Perce-Clearwater. In addition, range-wide consultation on bull trout critical habitat with the USFWS occurred in 2018 (U.S. Department of the Interior 2018a) that included the streams on the Nez Perce-Clearwater National Forest.

National Oceanic and Atmospheric Administration Fisheries Recovery Plans

Snake River Spring/Summer Chinook and Steelhead Recovery Plan

Snake River Recovery Plan (Snake River Basin Steelhead and Snake River Spring/Summer Chinook Salmon): The National Marine Fisheries Service has released final recovery plans for Snake River spring and summer Chinook salmon and steelhead in 2017 (National Oceanographic and Atmospheric Agency 2017). Prior to recovery planning, the National Oceanic and Atmospheric Administration Fisheries, also known as the National Marine Fisheries Service (NMFS), conducted broad-scale consultations on Land Management Plans, as amended by PACFISH. As part of programmatic consultations with the Forest Service and Bureau of Land Management, the NMFS issued two Biological Opinions – one in 1995 for Snake River salmon and another in 1998 for Snake River salmon and steelhead. Consultations with the NMFS resulted in direction above and beyond that which is contained in PACFISH, including but not limited to the addition of two sediment Riparian Management Objectives, adoption of nine conservation measures for listed steelhead, enhanced direction for watershed analysis, and expansion of the “key” watershed concept to all Interior Columbia River Basin watersheds within the range of listed steelhead. This direction was intended to apply until forest plans were revised.

The 2017 Snake River Recovery Plan is comprised of nine chapters and includes an implementation framework. Appendix C: Idaho Management Unit Plan is specific to Idaho spring and summer Chinook salmon and steelhead populations (National Oceanographic and Atmospheric Agency 2017). The recovery plan identifies populations and geographic locations within each major population group of listed steelhead and spring and summer Chinook salmon, along with a summary of threats and limiting factors. Portions of these geographic areas, including large percentages for the Clearwater steelhead major population group and smaller percentages of the Salmon River major population group, are on the Nez Perce-Clearwater. The Clearwater steelhead major population group includes Lolo Creek, the Lower Mainstem Clearwater River, the Lochsa River, the Selway River, and the South Fork Clearwater River. The Salmon River major population group includes the Little Salmon River and Chamberlain Creek. For each of these populations, habitat limiting factors and improving actions are identified. Areas where focused habitat restoration is a priority are identified for each population. The draft recovery plan also identified major and minor spawning areas within each population area.

The plan includes a framework for achieving implementation of the plan that builds on and enhances partnerships.

Snake River Fall Chinook Recovery Plan

National Oceanic and Atmospheric Administration Fisheries released a final recovery plan for Snake River Fall Chinook Salmon in 2017 (National Oceanic and Atmospheric Administration 2017) It identifies one major population group (MPG) consisting of the extant Lower Snake River population and the extirpated Middle Snake population. The recovery plan identifies geographic locations within the existing major population group, along with a summary of threats and limiting factors, and identifies five major spawning areas (MaSA) to include Upper Hells Canyon, Lower Hells Canyon, Clearwater River, Grande Ronde River, and Tucannon River. Most of these geographic areas are outside the boundaries of the Nez Perce-Clearwater National Forest. The Clearwater MaSA includes the Clearwater River up to its confluence with Lolo Creek, and the Upper Hells Canyon MaSA includes the lower mainstem Salmon River as a dependent tributary. For this population, habitat limiting factors and improving actions are identified. Areas where focused habitat restoration is a priority are identified for each population.

Snake River Sockeye Recovery Plan

National Oceanic and Atmospheric Administration Fisheries released a final recovery plan for Snake River Sockeye Salmon in 2015 (National Oceanic and Atmospheric Administration 2015). It identifies one MPG, the Sawtooth Valley Lakes group. Within this MPG are one extant population and four extirpated populations. The recovery plan identifies geographic locations within the existing major population group, along with a summary of threats and limiting factors, and identifies one extant MaSA to include Redfish Lake, and from two to four extirpated historical populations, all of which occur on an adjacent national forest. The mainstem Salmon River, which forms the southernmost boundary of the Nez Perce-Clearwater National Forest, was identified as a migrations corridor for sockeye.

United States Fish and Wildlife Service

Columbia River Bull Trout Recovery Plan

Columbia River Bull Trout Recovery Plan and Recovery Unit Implementation Plans: The Columbia River bull trout recovery plan was completed in 2015. Recovery actions were developed in cooperation with federal, state, tribal, local, and other partners and generally fall into four categories:

1. Protect, restore, and maintain suitable habitat conditions for bull trout.
2. Minimize demographic threats to bull trout by restoring connectivity or populations, where appropriate, to promote diverse life history strategies and conserve genetic diversity.
3. Prevent and reduce negative effects of non-native fishes and other non-native taxa on bull trout.
4. Work with partners to conduct research and monitoring to implement and evaluate bull trout recovery activities consistent with an adaptive management approach using feedback from implemented, site-specific recovery tasks and considering the effects of climate change.

Streams and lakes on the Nez Perce-Clearwater are included in two Recovery Unit Implementation Plans – the Mid-Columbia and Upper Snake (U.S. Department of the Interior 2015a, d).

Recovery and conservation actions for the Clearwater basin, which is part of the Mid-Columbia Recovery Unit Implementation Plan, include changes to upland and riparian land management practices, including reduction of fine sediment production and stabilization of roads, road stream crossings, landslides, and other known sources of sediment delivery. There are specific objectives and priorities identified for many subwatersheds on the Nez Perce-Clearwater. Recovery and conservation actions for the Salmon basin, which is part of the Upper Snake Recovery Unit Implementation Plan, are similar.

Policy

FSM 2670: As an implementing rule of the 1976 National Forest Management Act, FSM 2670 requires federal land managers to maintain viable populations of all native and desirable non-native species, with special care taken to assure that federally listed species are allowed to recover. Actions that may cause a species to become listed as threatened or endangered are to be avoided.

PACFISH or INFISH Amendments: In the early 1990s, concerns about stream habitat degradation in the western United States, as well as the potential loss of salmon, trout, and char populations, increased (Nehlsen et al. 1991, Rieman and McIntyre 1993). In response, the Forest Service and Bureau of Land Management completed three broad reaching documents that amended forest plans across the west to improve their conservation function. PACFISH and INFISH were designed to maintain options for anadromous and inland native fish by reducing negative impacts to aquatic habitat. Riparian management objectives, standards, guidelines, and monitoring requirements were implemented beginning in 1995 to avoid causing further damage and begin recovery of aquatic habitats. All forest plans in the Forest Service Northern Region were amended by either PACFISH or INFISH in 1995, and this strategy is still in effect on all National Forests that have yet to update their plans. The Clearwater Forest Plan was amended by both PACFISH and INFISH.

PACFISH and INFISH were originally expected to last 18 months to three years. An effort similar to the Northwest Forest Plan, the Interior Columbia Basin Ecosystem Management Project (U.S. Department of Agriculture and U.S. Department of the Interior 2014a), was completed for the Interior Columbia River Basin. That effort acts in the form of guidance for plan revisions occurring in areas covered by PACFISH and INFISH. Interior Columbia Basin Ecosystem Management Project science and guidance has been used to guide this plan. In addition, this plan also follows direction in the 2012 Planning Rule. Specifically, greater emphasis is placed on meeting improved and more refined desired conditions. "Standards and guidelines" that were not differentiated in PACFISH and INFISH are separated into standards or guidelines in this plan. Objectives as occurring in PACFISH or INFISH have been replaced by Desired Conditions and some indicators that had objectives are not monitored for improvement.

Record of Decision for Amendments to Forest Service and Bureau of Land Management Land Planning Documents Within the Range of the Northern Spotted Owl, often referred to as the Northwest Forest Plan Record of Decision (U.S. Department of Agriculture 1994). Both the Northwest Forest Plan and PACFISH greatly improved protection for migratory salmon and steelhead.

Decision Notice and Decision Record for Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon, Washington, Idaho, and Portions of California (U.S. Department of Agriculture and U.S. Department of the Interior 1995a); referred to as PACFISH

Inland Native Fish Strategy-Interim Strategies for Managing Fish-Producing Watersheds in Eastern Oregon, Washington, Idaho, Western Montana, and Portions of Nevada (U.S. Department of Agriculture 1995d); referred to as INFISH

Memorandum on Restoring Healthy and Abundant Salmon, Steelhead, and Other Native Fish Populations in the Columbia River Basin (Sep 7, 2023): This memorandum sets forth the following language as the policy:

Section1. Policy. It is a priority of my Administration to honor Federal trust and treaty responsibilities to Tribal Nations — including to those Tribal Nations harmed by the construction and operation of Federal dams that are part of the Columbia River System (CRS) — and to carry out the requirement of the Pacific Northwest Electric Power Planning and Conservation Act (Public Law 96-501) to operate, manage, and regulate the CRS to adequately protect, mitigate, and enhance fish and wildlife affected by the Federal dams in the Basin in a manner that provides equitable treatment for fish and wildlife with the other purposes for which the Federal dams are managed and operated.

In recognition of these priorities, it is the policy of my Administration to work with the Congress and with Tribal Nations, States, local governments, and stakeholders to pursue effective, creative, and durable solutions, informed by Indigenous Knowledge, to restore healthy and abundant salmon, steelhead, and other native fish populations in the Basin; to secure a clean and resilient energy future for the region; to support local agriculture and its role in food security domestically and globally; and to invest in the communities that depend on the services provided by the Basin's Federal dams to enhance resilience to changes to the operation of the CRS, including those necessary to address changing hydrological conditions due to climate change.

It also includes instructions to federal agencies regarding implementation, and directs federal agencies to use their authorities and available resources to further the policy found in Section 1.

State and Local Plans

State of Idaho

Idaho Department of Fish and Game

Idaho Department of Fish and Game 5 Year Fisheries Management Plan

Idaho Department of Fish and Game (IDFG) Five-year Fisheries Management Plan (Idaho Department of Fish and Game 2019b) (2019–2024): This management plan includes statewide principles related to management of fisheries and habitat; public involvement; rules such as fishing regulations; access; importation and introductions; cooperation with other agencies, Indian Tribes, outfitters, and guides; habitat restoration and protection; and mitigation. The IDFG has completed a specific management plan to conserve westslope cutthroat trout (*Onchorynchus clarki lewisii*) (2013b) and includes a goal of completing one for interior redband trout. In 2016, the Interior Redband Conservation Team (IRCT), comprised of multiple states, tribes, federal agencies, and Trout Unlimited, completed a document entitled "Conservation Strategy for Interior Redband (*Oncorhynchus mykiss* subsp.) in the States of California, Idaho, Montana, Nevada, Oregon, and Washington" (Interior Redband Conservation Team 2016) addressing redband throughout their range.

Specific to bull trout, the IDFG 5-year management plan states that the IDFG will continue to work closely with the U.S. Fish and Wildlife Service and other stakeholders on bull trout conservation and recovery planning and will advocate for de-listing those portions of the range where bull trout populations are secure and no longer in need of Endangered Species Act (ESA) protection. Additionally, they note that ongoing coordination with federal land management agencies, such as the Forest Service, is critical due to their large span of control over much of the bull trout habitat in Idaho.

The IDFG management plan also includes specific management principles to guide high mountain lakes, fish stocking within those lakes, and management of native amphibians.

For anadromous fish in Idaho, the IDFG management plan has outlined escapement goals at Lower Granite Dam for salmon and steelhead that exceed minimum abundance thresholds established in recovery plans for salmon and steelhead stocks listed under the ESA. Escapement goals identified by the management plan identify the number of adult salmon and steelhead needed to seed spawning habitat, provide directed harvest opportunity, and accommodate conservation and supplementation hatchery programs where currently implemented. Referred to as "healthy and harvestable," these escapement goals extend beyond the minimum abundance thresholds adopted in the ESA recovery plans to consider fish for delisting (National Oceanic and Atmospheric Administration 2016). The minimum abundance thresholds targets are minimum targets related to long-term extinction risk and do not provide sufficient escapement for full habitat seeding, nor do they reflect reasonable harvest opportunity.

Spring and summer Chinook salmon in the Clearwater basin are not listed under the ESA and escapement goals for them are not included in Snake River recovery plans. They are included in the IDFG escapement goals.

In addition, the IDFG management plan identifies geographic locations for emphasis of wild-origin summer steelhead and spring and summer Chinook salmon, which includes the Lochsa, Selway, and Potlatch rivers in the Clearwater Basin, Rapid River in the Lower Little Salmon subbasin, and tributaries to the Salmon River from the mouth upstream to the Middle Fork Salmon River excluding the Little Salmon and South Fork Salmon Rivers. Wild salmon and steelhead management areas were established intentionally to provide areas where wild fish would have priority management status and where there would be no direct hatchery intervention. The wild- and natural-origin fish management areas are intended to be maintained over the life of the 2019–2024 Management Plan. Many management areas overlap regions classified as wilderness or Wild and Scenic Rivers.

The Idaho Department of Fish and Game (IDFG) management plan also addresses specific river basins or portions of those basins. Relevant to the Nez Perce-Clearwater are the Palouse, Clearwater, Salmon (mouth upriver to Horse Creek), and the Little Salmon rivers. For the Palouse, the primary objective is to increase fishing opportunity. For the Clearwater, Salmon, and Little Salmon rivers, objectives include increasing fishing opportunity but are much more complex due to the presence of high-value resident fisheries and anadromous fish. Objectives include maintaining and improving fish habitat, maintaining a diversity of fishing opportunity, improving and increasing fishing access, maintaining and improving existing populations of natural and wild populations of salmon and steelhead, managing fisheries in mountain lakes to provide a diversity of fishing opportunities for anglers, maintaining long-term persistence of amphibians, and providing fishing opportunities for hatchery salmon and steelhead that satisfy different angler types.

Idaho State Wildlife Action Plan

In addition to those plans mentioned above, Idaho's State Wildlife Action Plan is a statewide plan for conserving and managing Idaho's diverse fish and wildlife and the habitats they depend on (Idaho Department of Fish and Game 2017b). It was originally written in 2005, revised in 2015, and the latest revision is from 2017. The Plan provides a checklist of wildlife species in the state; provides criteria for identifying species of greatest conservation need; and provides an assessment of each species of greatest conservation need, including their extirpation risk in Idaho. The document identifies associated conservation targets, such as habitat and species assemblage, and a narrative description for each conservation target, its viability, and prioritized threats and strategies. The plan has an emphasis on preventing additional Endangered Species Act (ESA)species listings in Idaho. There is nothing in this plan that is inconsistent with the revised forest plan.

Idaho Governor's Office of Species Conservation

The Idaho Governor's Office of Species Conservation was created in 2000 with the addition of Idaho Code 67-818 and is charged with planning, coordinating, and implementing the state's actions to preserve, protect, and restore species listed as candidate, threatened, or endangered under the ESA. It also helps to develop integrated state policies toward ESA listed species, reviews scientific information, negotiates and implements conservation plans and agreements, and recommends management plans for recently delisted species. It works in coordination with the state's natural resource agencies, while taking into consideration the economic vitality of the state. In addition, it provides constituent services for state, federal, and private stakeholders seeking assistance with ESA issues (https//species.idaho.gov). It has published a Strategic Plan that covers FY 2023-2026 that establishes a mission statement, a vision statement, and sets goals and objectives (Idaho Governor's Office of Species Conservation 2023). There is nothing in this plan that is inconsistent with the revised forest plan.

Idaho Department of Lands

Idaho Forest Practices Act

The Idaho Forest Practices Act (IFPA) was passed by the state in 1974, to assure the continuous growing and harvesting of forest tree species and to protect and maintain the forest soil, air, water resources, wildlife, and aquatic habitat. It requires that Best Management Practices (BMPs) be followed for reforestation, protection of water and soil resources, protection of wildlife habitat, proper road construction and maintenance, and protection of air quality. The Idaho Department of Lands enforces the law and monitors forest activities for compliance with state adopted BMPs. Every four years the state undertakes an audit and receives recommendations for improved standards. The U.S. Forest Service has an agreement to follow the IFPA. There is nothing in this plan that is inconsistent with the revised forest plan.

The Idaho Department of Lands Strategic Plan

The Idaho Department of Lands publishes a strategic plan at regular intervals. The latest version of the plan covers FY2023-FY2026. Its mission is to: Professionally and prudently manage Idaho's endowment assets to maximize long-term financial returns to the public schools and other trust beneficiaries and to provide professional assistance to the citizens of Idaho to use, protect, and sustain their natural resources. It includes a timber program that manages over 1 million acres, a fire program that provides cooperative fire suppression on over 6 million acres, a real estate and endowment leasing program that cover 1.4 million acres, a minerals, navigable waterways, and oil and gas program that provide statewide regulatory oversight of active and legacy extraction operations, and a program that provides forestry assistance, shared stewardship, and good neighbor authority assistance to federal, state, county, and private partners to protect and manage land throughout the state (Idaho Department of Lands 2022a). There is nothing in this plan that is inconsistent with the revised forest plan.

Idaho Forest Action Plan

The Idaho Forest Action Plan was created in 2010 and revised in 2020 and is a long-term coordinated strategy for reducing threats to Idaho's forests while increasing the social, economic, and environmental benefits they provide. The purpose is to help provide focus to landowners, agencies, collaborative groups, and partnership efforts in identifying projects and activities to reduce threats to, and increase the benefits of, Idaho's forestlands (Idaho Department of Lands 2020). It includes six goals, five of which focus on desired conditions of Idaho forests, and one is focused on a framework for implementation. These goals include: "(1) Idaho's Forests are diverse and resilient to climate changes and other natural and unique stresses, (2) The ecosystem benefits that Idaho forests provide are identified, maintained, and enhanced, (3) Forestlands with the highest benefits are identified, protected, and enhanced, (4) Forest ecosystems are resilient to human activities (development, recreation, forest practices, noxious weeds, etc., (5) Forest-based wood products are economically vibrant and sustainable, (6) Idaho has an integrated framework for implementing the Idaho Forest Action Plan, which guides project development and legislative/policy actions. This framework will promote cohesive management of Idaho's urban and rural forests." The Forest Action Plan identifies seven critical issues in Idaho, and 13 Priority Landscape Areas (PLA), and then identifies strategies, based on the goals, which address high priority issues within each PLA (Idaho Department of Lands 2015). There is nothing in this plan that is inconsistent with the revised forest plan.

Nez Perce Tribe

Nez Perce Tribe Integrated Resource Management Plan

The Nez Perce Tribe is currently in the process of developing an integrated resource management plan. This plan seeks to "establish programmatic resource management direction and balance the Tribe's economic development and resource stewardship goals within the boundaries of the Nez Perce Reservation" (Tribe 2023). The plan is in draft form at present, and the tribe is soliciting comments and holding public meetings. However, it is expected that a final version will be produced that articulates the Tribe's values and objectives with regard to natural resources on their lands. Because this plan is an ongoing planning effort subject to future revision, the following is quoted from the current version of the plan:

"This Integrated Resource Management Plan describes the Nez Perce Tribe's vision and strategy for the management of our natural and cultural resources. It has been developed to express the cultural values of the Nimiipuu; sustain and promote the welfare and opportunities of current and future generations; protect, perpetuate, and enhance the ecological diversity and long-term sustainability of our homeland;

and enhance our sovereignty. It specifically describes our overall natural and cultural resource management vision, our desired future condition of our Reservation and its resources, and our strategy to make that vision a reality for our descendants. It is the first such plan developed by and for the Nimiipuu" (Tribe 2023).

The Nez Perce Tribe Integrated Resource Management Plan is similar to the revised forest plan in that it identifies long term desired conditions; however, its scope is broader in that it describes desired conditions for not only environmental resources, but also social and cultural conditions as well. There is nothing in this plan that is inconsistent with the revised forest plan.

Nez Perce Tribe Fisheries Management Plan

Nez Perce Tribe Department of Fisheries Resource Management Plan (2013–2028): The Nez Perce Tribe's Fisheries Resource Management Plan includes a set of management goals and management objectives to achieve those goals. Management objectives include those related to achievement of escapement goals for anadromous fish, including habitat management of key populations within the Nez Perce-Clearwater such as Lolo Creek, the Potlatch River, the Upper South Fork Clearwater River, the Lochsa River, Meadow Creek, Moose Creek, and the Upper Selway River. Habitat management objectives include emphasis on watershed restoration within a "ridge-to-ridge" management philosophy where stream habitat is degraded. Fish management goals are consistent with those described in the Idaho Department of Fish and Game 5-year management plan and within the Snake River recovery and implementation plans (National Oceanic and Atmospheric Administration 2016), as the Nez Perce Tribe has worked closely with these agencies. However, the Nez Perce Tribe has set "healthy and harvestable" goals for abundance for all species of fish, and in the case of listed species, these goals far exceed federal recovery goals. The government-to-government relationship with the Forest Service, including the Nez Perce-Clearwater National Forest, is described. Co-stewardship of federal lands and cooperation on an extensive body of work occurs on the 11 National Forests with which the Nez Perce Tribe shares a working relationship. This extensive body of work includes restoration projects, fish and habitat monitoring, operation of acclimation sites, facility use, harvest access, and effects of forest management actions. There is nothing in this plan that is inconsistent with the revised forest plan.

Tribal Pacific Lamprey Restoration Plan for the Columbia River Basin

The Nez Perce Tribe is party to the Columbia River Intertribal Fish Commission's (CRITFIC) Tribal Pacific Lamprey Restoration Plan for the Columbia River Basin. The Nez Perce Tribe, along with the Confederated Tribes and Bands of the Yakama Nation (YN), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), developed this plan with the goal of

"Immediately halting Pacific lamprey decline and ultimately restoring lamprey throughout their historic range to levels that support their unique cultural and ecological values. The Plan objectives provide an explicit and timely path to address critical uncertainties, threats and limiting factors while implementing specific restoration actions" (CRITFIC 2010).

Master Plan: Pacific Lamprey Artificial Propagation, Translocation, Restoration, and Research

The Nez Perce Tribe is party to the Columbia River Intertribal Fish Commission's Lamprey Master Plan (CRITFIC 2018). This plan includes the Confederated Tribes and Bands of the Yakama Nation (YN), the Confederated Tribes of the Umatilla Indian Reservation (CTUIR), and the Nez Perce Tribe (NPT). The plan provides a comprehensive description of lamprey propagation and translocation activities in the Columbia River basin. There is nothing in this plan that is inconsistent with the revised forest plan.

NPPC

The Northwest Power and Conservation Council (NPCC) was established in 1980 by the states of Idaho, Montana, Oregon, and Washington in accordance with the passage of the Northwest Electric Power and

Planning Act by the U.S. Congress (Northwest Power Act, [Northwest Power Act, §2 (1-6), 94 Stat. 2698.] (94 Stat. 2698, 16 USC §839). The Act authorized the Council to serve as a comprehensive planning agency for energy policy and fish and wildlife policy in the Columbia River Basin and to inform the public about energy and fish and wildlife issues and involve the public in decision-making (Northwest Power and Conservation Council 2022). This is accomplished by implementation of the Columbia River Basin Fish and Wildlife Program, which currently directs approximately 250 million dollars annually of Unite States Department of Energy-Bonneville Power Administration revenues to projects designed to protect and enhance fish and wildlife that have been affected by hydropower dams in the Columbia Basin (Northwest Power and Conservation Council 2022). Current priorities identified by the program include climate change impacts, mitigation for losses of anadromous fish, studying ocean environments, operation of Libby and Hungry Horse dams in Montana to benefit resident and anadromous fish, and studying impacts to the Columbia River Estuary (NPCC 2021). NPCC's Fish and Wildlife Program provides most of the funding for fisheries and wildlife and aquatic and terrestrial habitat work in the Pacific Northwest, including aquatic restoration work that is done on the Nez Perce-Clearwater. The NPCC Fish and Wildlife Program and the revised forest plan are complementary in the focus on restoring habitat for Endangered Species Act listed fishes. In addition, NPCC's current (2014 with 2020 amendments) fish and wildlife plan recommends "protected areas" wherein the Federal Energy Regulatory Commission (FERC) not license any new hydropower facilities in areas where hydroelectric development would have unacceptable risks of loss to fish and wildlife species of concern, their productive capacity, or their habitat. NPCC's list of protected areas covers the entire forest and most of the Pacific Northwest. There is nothing in this plan that is inconsistent with the revised forest plan.

Methodology

This analysis programmatically addresses outcomes that might result from implementing the proposed management direction in each alternative over the life of the Land Management Plan. The three watershed scales most relevant to the implementation of the Plan are sub-basin (8-digit hydrologic unit), watershed (10-digit hydrologic unit), and sub-watershed (12-digit hydrologic unit). A sub-watershed may range from 10,000 to 40,000 acres in size. For estimating the effects at the programmatic forest plan level, the assumption has been made that the types of resource management activities allowed under the alternatives are reasonably foreseeable future actions to achieve the goals and objectives. However, the specific location, design, and extent of such activities are generally not known because these activities are made at the project level based on a site-specific analysis. Therefore, discussions within this document refer to the potential for the effects to occur and are in many cases only estimates. The effects analyses are useful when comparing and evaluating alternatives but are not intended to be applied directly to specific locations on the Nez Perce-Clearwater.

Since the site specificity of future activities is not known at the programmatic forest plan level, the potential spatial and temporal effects to water quality cannot be attributed to any specific watershed, nor can quantitative estimates of potential effects to aquatic resources, such as changes in water quantity, be determined. Broad scale estimated effects and trends related to hydrologic function and watershed processes for National Forest System lands within the project area have been qualitatively estimated. Cumulative effects to water quality are described in terms of their potential to generally affect trends on the subwatershed to sub-basin scale. The temporal scale for this analysis is limited to the life of this plan, generally 15 to 20 years.

Salmon, steelhead, and bull trout stocks have been listed under the Endangered Species Act in most drainages within the interior Columbia and Snake River basins, including streams and rivers within the Nez Perce-Clearwater. While many anthropogenic and environmental factors led to the listing of these populations, habitat degradation throughout their freshwater range documented in the 1990s was a limitation to recovery efforts, (Williams et al. 1999), primarily as a result of aggressive land management activities that did not utilize Best Management Practices. Improving stream habitat and the protection of processes that maintain these habitats increases the likelihood of successful adult spawning and juvenile rearing for these listed species. Since the initiation of the PACFISH and INFISH Biological Opinion (PIBO), over 30 publications have refined understanding of what is needed to arrest stream habitat degradation and facilitate habitat improvement on federal lands. This body of literature also documents what is required by National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and Environmental Protection Agency (EPA). The PIBO included stringent monitoring requirements to determine if current land management practices were meeting PACFISH and INFISH riparian management objectives. The PIBO Effectiveness Monitoring Program compares groups of managed river reaches to groups of reference reaches at different scales to evaluate the status of stream habitat within portions of the interior Columbia River and Missouri River basins and to also document changes in habitat conditions, such as trends, since PIBO sampling began in 1999. The USFWS Range-wide Biological Opinion for Bull Trout documented improving conditions in managed watersheds in the USFWS recovery unit encompassing the Nez Perce-Clearwater National Forest (U.S. Department of the Interior 2018a). PIBO sampling (or an equivalent) will continue to occur on the Nez Perce-Clearwater.

Methods and Assumptions

(Archer and Ojala 2016) provided a detailed discussion of how the PIBO monitoring data is used to assess stream habitat conditions and trends. They discuss the challenges associated with stream assessment and the rationale behind the methods used:

"Determining the condition or status of an individual, or group of stream reaches is a difficult task because of the natural inherent variability in stream conditions due to geoclimatic and disturbance regimes (Ebersole et al. 1997). PIBO's approach is to compare the status of stream habitat conditions at sites in 'managed' watersheds (watersheds exposed to disturbance from various management actions) to habitat conditions at sites within 'reference', or relatively pristine, watersheds, which are used as a benchmark of expected condition. Because all streams are affected by natural disturbance, in assessing status we are most interested in how the range of stream habitat conditions expressed at managed sites compares to what would be expected if the stream had experienced only natural disturbance. To ascertain the status of a given site we created an index of habitat condition which accounts for some natural variability among sites and combines several stream habitat attributes (Al-Chokhachy 2010). While an index is good for determining status, it may be less sensitive when detecting trends in habitat condition over time because it averages conditions of several attributes that may be more individually responsive. Therefore, trends were estimated by measuring changes in individual stream habitat metrics, such as bank stability or large wood frequency, at a site over the duration of PIBO sampling (2001–2015)."

To evaluate the status of stream habitat conditions at a given site, PIBO develops an index score for each physical habitat attribute and constructs the index by using multiple linear regression to explain inherent differences among sites. To account for local differences in stream type and geographic location this analysis included landscape "predictor" variables, such as average precipitation, percent forested, and slope of the valley, as well as some measures of stream power (reach gradient and catchment area) as covariates in the regression models. The best multiple regression model was selected to fit each attribute using data only from the reference sub-watersheds (sample size = 217 watersheds; 10% of reference were set aside to verify model performance) to provide expected stream habitat conditions in the absence of land management activities(Al-Chokhachy 2010).

To create an overall index of physical habitat condition for a site, individual attribute scores included in the index were summed and then rescaled from 0 to 100. For complete details and a better understanding, see Al-Chokhachy et al. (2010).

To estimate trends in stream habitat condition, actual measured values (and not index scores) were used for eight stream habitat attributes. Data collected at the first sampling visit were compared with data from the last visit using the Wilcoxon rank sum test, a non-parametric statistical test that evaluates repeated measurements at the same site to determine if there has been a change in the metric value. A p-value of less than 0.10 indicates that the change is significant. Desirable changes could be either in a positive or negative direction, as, for example, increased bank stability or fewer fine sediments. The desired direction of change (positive or negative) for each habitat attribute is shown in the summary tables. The general direction of change was indicated across reference sites sampled by PACFISH and INFISH Biological Opinion (PIBO). Summary tables also show the mean value for each attribute for the first and last sampling events.

To evaluate substrate trends with data other than PIBO, substrate data collected since the Nez Perce-Clearwater's last planning period was used. Cobble embeddedness data, percent surface fines derived from Wolman pebble count data, and percent fines by depth using a McNeil core sampler were used to describe the existing condition. All of these types of data have been collected on both national forests, but the Nez Perce National Forest emphasized cobble embeddedness as a key metric, while the Clearwater National Forest emphasized percent surface fines and fines by depth. Research conducted in the mid-1980s and development of the FISHSED model (Stowell et al. 1983) in the Red River, which is in the South Fork Clearwater subbasin, informed the use of cobble embeddedness as a preferred indicator on the Nez Perce National Forest. Both concluded that as interstitial spaces are reduced by fine sediment the capacity of the stream to support juvenile anadromous salmonids is reduced (Hillman et al. 1987, Stowell et al. 1983). In other words, reduced interstitial spaces in cobble bottom streams limits the amount of habitat available for juvenile fish, particularly in the winter. Thus, winter rearing space reduced by deposited fine sediment became widely regarded as a primary factor limiting early rearing of anadromous fish.

Further, the 1995 Land Resource Management Plan Biological Opinion (National Marine Fisheries Service 1995) added two sediment Riparian Management Objectives – percent surface fines in spawning habitat and percent cobble embeddedness in rearing habitat.

Assessment of trends in percent surface fines and cobble embeddedness data, in conjunction with PIBO data, were used to assess and make conclusions about fine sediment deposited on the stream bottom to determine whether it has changed in the last planning period and whether it affected the capacity of streams supporting spawning and early rearing by juvenile salmonids.

In addition, state, tribal, and federal data, and best available scientific literature was used to provide context for fish life history and how it relates to forest management.

Measurement Indicators

PACFISH and INFISH Biological Opinion (PIBO) monitoring data: PIBO data is used in the following analysis to describe both the existing condition of stream habitat and assess the effects of the alternatives to these conditions and their trends. Metrics used to assess existing conditions include:

- Percent surface fines at pool tailouts
- Median grain size of the substrate (D50)
- Percent pools
- Residual pool depth
- Streambank angle

- Percent undercut banks
- Large wood in the stream channel
- Streambank stability
- Aquatic macroinvertebrate diversity

The protocol for collection for collection and analyses of this data is fully described in Archer et al. (2012), Kershner (2004) and Kershner(2004), and Archer and Ojala (2016).

For the most recent report, the analysis of stream habitat data included comparisons of data from referenced and managed sites using a habitat index approach to determine if differences were statistically significant according to methods described in Al-Chokhachy et al. (2010). A predictive relationship was developed between landscape and environmental characteristics and habitat conditions at reference sites to minimize sources of variation. This statistical approach controls for inherent differences in climate and landscape characteristics among sites (Meredith et al. 2012, Archer and Ojala 2016). For analysis of macroinvertebrate data, distribution of observed versus expected macroinvertebrate scores in reference and managed sites was analyzed according to methods described in Hawkins (Hawkins 2006).

Reference conditions from PIBO sites across the Interior Columbia River Basin provide a representation of the natural range of variability in aquatic ecosystems in the Interior Columbia River (Kershner, Archer, et al. 2004), including the Nez Perce-Clearwater. Given the wide range of values seen in data from reference sites and inherent natural disturbance regimes that shape stream habitats, a range of indexed reference conditions is more useful than comparisons of single values that represent only one end of the distribution of values seen in reference reaches (Kershner and Roper 2010, Al-Chokhachy et al. 2010). The range of conditions exhibited in PIBO data collected from reference sites can be interpreted as the range of natural variability for streams; if the range of conditions from managed sites is different than the range for reference sites, management actions may have had an effect (Archer and Ojala 2016).

PIBO data summaries are included for each subbasin with enough sites to conduct a statistical analysis.

The Land Management Plan would maintain the use of PACFISH and INFISH Biological Opinion (PIBO) monitoring data or a future equivalent collected at a subset of sites on the national forest at regular intervals to evaluate trends towards desired conditions. While the Land Management Plan does not contain numerical riparian management objectives like PACFISH/INFISH did, descriptive desired conditions contained in the Land Management Plan would be used to guide project location, development, and actions. Because of the lag time between projects and effects, as well as the tremendous variability that can result from localized weather events, PIBO data analyzed at the Nez Perce-Clearwater scale is actually a more rigorous method to ascertain whether or not plan components designed to protect and restore the aquatic environment are effective. All this information would enable the national forest to adapt its management strategies and adjust project decisions in the future, if needed, based upon what has been learned.

One potential management approach to show achievement of desired conditions of the Land Management Plan would be a multiscale analysis, as described in Appendix 4. Multiscale analysis, a refinement of watershed analysis, has been a widely applied methodology that was first required for use by the Forest Service in the Northwest Region (Henjum et al. 1994). It was also described and recommended for use in the Interior Columbia Basin key and priority watersheds by PACFISH and INFISH strategies (U.S. Department of Agriculture 1995c) and is recommended for inclusion in plan revisions by the Interior Columbia Basin Ecosystem Management Project (2014a) strategy. The multiscale analysis strategy described in Appendix 4 has been clarified to aid with integration and implementation.

Substrate Data Other Than PIBO: Because of the predominance of the highly erosive Idaho Batholith geology on both the Nez Perce and Clearwater National Forests, deposited sediment in streams was recognized as a key limiting factor for anadromous salmonids during the previous forest planning efforts. Direction in both previous plans related to aquatic resources was based on contemporary research at the time identifying deposited sediment as a primary limiting factor for salmonids spawning and rearing in streams on the Nez Perce-Clearwater and a primary risk to beneficial uses as defined under the Clean Water Act. Deposited sediment in north central Idaho streams within the Idaho Batholith geologic type was a primary focus in both forest plans. Literature supporting this conclusion included Bjornn (1971), Bjornn et al. (1977), and Stowell et al. (1983), among others. In the years following PACFISH and INFISH implementation, as well as the implementation of the Northwest Forest Plan (U.S. Department of Agriculture 1994), many of the activities that were causing problems at the time of these publications were stopped, effectively arresting a great deal of the degradation occurring from streamside road building and harvest. In addition, the Roadless Rule and the Idaho Roadless Rule also limit construction of new roads.

The primary effects to aquatic ecosystems to be analyzed would result from the implementation of the Land Management Plan action and preferred alternatives, as compared to the No Action Alternative. Comparison is made between alternatives based on their relative ability to move the resources toward desired conditions.

Summary of Effects to Aquatic Threatened or Endangered Species, Species of Conservation Concern, and Species of Public Interest: The existing condition and indirect, and cumulative effects of the alternatives for the following aquatic species are summarized using the PIBO metrics described, as well as other sources of effects:

- Snake River spring and summer Chinook salmon (Oncorhynchus tshawytscha) – threatened, Salmon River Basin
- Snake River fall Chinook salmon (Oncorhynchus tshawytscha) – threatened, Clearwater and Salmon River Basins
- Snake River sockeye salmon (Oncorhynchus nerka) – endangered, Salmon Basin
- Snake River steelhead (Oncorhynchus mykiss) – threatened, Clearwater and Salmon Basins
- Columbia River bull trout (Salvelinus confluentus) – threatened, Clearwater and Salmon Basins
- Pacific lamprey (Entosphenus tridentatus) – Species of Conservation Concern, Salmon and Clearwater Basins
- Spring and summer Chinook salmon (Oncorhynchus tshawytscha) – Species of Public Interest, Clearwater Basin-
- Coho Salmon (Oncorhynchus kisutch) – Species of Public Interest, Clearwater River Basin

Affected Environment

Introduction

The current condition of riparian and stream habitats varies widely across the planning area, ranging from largely unaffected by human disturbances in designated wilderness areas to highly disturbed with varying degrees of impaired function.

The Nez Perce-Clearwater includes portions of 11 subbasins (HUC8), including Palouse, Lower North Fork Clearwater, Upper North Fork Clearwater, Clearwater, Middle Fork Clearwater, South Fork Clearwater, Lochsa, Upper Selway, Lower Selway, Lower Salmon, Little Salmon, and Middle Salmon–Chamberlain. Within the context of the Interior Columbia River Basin, subbasins within the Nez Perce-Clearwater support a significant percentage of remaining spawning and rearing habitats accessible to anadromous fish in the Snake River basin. A substantial number of the drainages on the Nez Perce-Clearwater were identified as supporting strongholds for at-risk fish species (Lee et al. 1997), which include bull trout and westslope cutthroat trout. Other assessments indicate watersheds on the Nez Perce-Clearwater with high potential to support strongholds for at-risk anadromous fish species, including spring and summer Chinook salmon and steelhead trout (U.S. Department of Agriculture 1998b, 2001b, 2003e).

The most notable alteration of upland and riparian conditions that has influenced stream process and function across the Nez Perce-Clearwater is road development (U.S. Department of Agriculture 1998b, 2001b, 2003c, Ecovista 2003, U.S. Department of Agriculture 2003e, 1999). Road development has been correlated to instream conditions including substrate composition, large woody debris, and number and quality of pools on both the Clearwater and Nez Perce National Forests (Huntington 1995, Meredith et al. 2012, U.S. Department of Agriculture 2003c).

High levels of deposited sediment and simplified habitat conditions are correlated with roaded development in watersheds, particularly in riparian areas. System roads cover an estimated 2,400 acres, or 600 road miles, within riparian management zones on the Nez Perce National Forest and an estimated 4,000 acres, or 1,000 road miles, within riparian management zones on the Clearwater National Forest. As long as road prisms persist on the landscape, there is little to no chance for recovery of complete floodplain function or condition. Routine maintenance, hydrologically disconnecting roads, stormproofing roads, and site-specific improvements, however, can be made to mitigate effects.

The specific effects of historical road development practices on watershed condition and their correlation to instream habitat, particularly deposited sediment, are well described in the literature. As described in Furniss et al. (1991), construction of roads and road networks can lead to greatly accelerated erosion rates in watersheds and increased sedimentation in streams following road construction can be dramatic and long lasting (Swanson and Dyrness 1975, Beschta 1978, Reid and Dunne 1984, Haupt 1959). These conditions were more broadly addressed in the Interior Columbia Basin Ecosystem Management Plan (Quigley and Arbelbide 1997c, b). Surface erosion from road surfaces, cut banks, and ditches represents a significant source, and in some landscapes the dominant source, of road-related fine sediment input to streams (Gucinski et al. 2001). Increased sediment delivery to streams after road building has been well documented in the research literature for the Pacific Northwest and Idaho (Bilby et al. 1989, Megahan and Kidd 1972, Reid and Dunne 1984). The negative effects of roads on physical instream habitat and aquatic biota have been summarized in a comprehensive review by Trombulak and Frissell (2000). However, many of the deleterious effects associated with historical road development specifically relate to practices that are no longer implemented (harvest next to streams, road crossings that restrict channels, roads built on least cost principles, etc.). Currently employed U.S. Forest Service Best Management Practices (U.S. Department of Agriculture 1994) have been shown to be largely effective at mitigating for negative effects of roads.

Other alterations of riparian and stream conditions include historic dredge mining and domestic livestock grazing. These activities are not as widespread as road development but in many cases have resulted in significant alterations of both the stream and riparian environment. Some riparian areas most altered by historic dredge mining are located within or adjacent to spawning and rearing habitat for anadromous fish with very high potential for high productivity of juvenile fish, most notably tributaries to the Upper South Fork Clearwater River, the mainstem South Fork Clearwater River, and reaches of Lolo Creek.

A substantial percentage of the Nez Perce-Clearwater's land base is contained within designated wilderness or is classified as roadless under the Idaho Roadless Rule. In these areas, it is assumed natural processes drive riparian and stream conditions. Exceptions could include watersheds that are developed in their headwaters, or those that contain non-native species.

Riparian Areas

In general terms, riparian areas are lands at the interface between land and a river or stream and wetlands are defined by the Environmental Protection Agency as "lands that are saturated with water all year or for varying periods of time during the year, including during the growing season." Both encompass unique and diverse vegetation types that are closely associated with lakes, streams, ponds, marshes, swamps, bogs, fens, and other areas of high or fluctuating water tables. Although they may occupy a small percentage of the landscape, riparian areas provide important habitat for many terrestrial and aquatic species, including connectivity of habitat from headwaters to downstream areas.

The composition of the vegetation and the structure and pattern of the riparian areas and wetlands across the Nez Perce-Clearwater are highly diverse. Plant communities may be dominated by shrubs with few trees, particularly in the Lower Salmon and Lower Little Salmon subbasins, or they may be forested. Forested riparian areas may be comprised of Western redcedar, grand fir, Douglas-fir, Western larch, and Western white pine on the warmer sites, and lodgepole pine, spruce, and subalpine fir on colder sites. Shrubs include alder, willow, red-osier dogwood, elderberry, buckthorn, thimbleberry, twinberry, and hawthorn. Forbs and grass-like plants that occupy these sites are quite diverse. The vegetative structure may include many decayed and dead trees and multiple layers of vegetation that include submerged vegetation along open water margins, as well as plants that grow in conditions with variable amounts of soil saturation. The pattern of riparian and wetland ecosystems varies from relatively narrow strips of land along perennial and intermittent streams in deeply incised, steep mountain valleys to adjacent wetlands to the wider valleys of the North Fork Clearwater River, Selway River, Lochsa River, and South Fork Clearwater Rivers, as well as the lower reaches of some major tributaries. They may be interconnected in a linear fashion down hillsides and in valleys, they may occur in clusters, or they may occur as isolated microsites in other ecosystems.

Riparian ecosystems are equally important habitat to wildlife for feeding, drinking, cover, breeding season habitats, and habitat connectivity. Many wildlife species are associated with riparian ecological systems, including neotropical migrant birds, native upland birds such as mountain quail and ruffed grouse, beaver, Canada lynx, and fisher. Rare and native plants are also associated with riparian areas.

Riparian Management Zones

Areas currently known and referred to as Riparian Habitat Conservation Areas will be called Riparian Management Zones under the Land Management Plan.

As previously discussed, PACFISH amended both the Nez Perce and Clearwater Forest Plans in 1995 (U.S. Department of Agriculture and U.S. Department of the Interior 1995a). INFISH also amended the Clearwater Forest Plan in 1995 (U.S. Department of Agriculture 1995c) applicable only to watersheds where anadromous fish are blocked but was extirpated on the Upper and Lower North Fork Clearwater subbasins above Dworshak Dam or historically absent in the Palouse River subbasin. The background behind these documents has been previously discussed in the Relevant Laws, Regulations, and Policy section and the Methodology section.

PACFISH and INFISH were designed to provide interim aquatic and riparian management guidance that would protect habitat for anadromous salmonids and bull trout, halt further degradation, and begin recovery. While these strategies were initially intended to be replaced in 18 to 36 months, they have now been in place on the Nez Perce-Clearwater for over 25 years. They established and defined interim Riparian Habitat Conservation Areas (RHCAs), prescribed specific standards and guidelines that limited activities within the Riparian Habitat Conservation Areas, and established Riparian Management Objectives (RMO). RMOs assigned numeric objectives for the following metrics: stream temperature, pieces of large wood per mile, number of pools per mile, lower bank angle, width to depth ratio, and percent undercut streambanks.

RHCAs identified four categories of stream or water bodies with the following standard widths:

Category 1: Fish-bearing streams. Interim Riparian Habitat Conservation Areas consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance (600 feet, including both sides of the stream channel), whichever is greatest.

Category 2: Permanently flowing non-fish-bearing streams. Interim Riparian Habitat Conservation Areas consist of the stream and the area on either side of the stream extending from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, or to the outer edges of riparian vegetation, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance (300 feet, including both sides of the stream channel), whichever is greatest.

Category 3: Ponds, lakes, reservoirs, and wetlands greater than 1 acre. Interim Riparian Habitat Conservation Areas consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of the seasonally-saturated soil, or to the extent of moderately and highly unstable areas, or to a distance equal to the height of one site-potential tree, or 150 feet slope distance from the edge of the maximum pool elevation of constructed ponds and reservoirs or from the edge of the wetland, pond or lake, whichever is greatest.

Category 4: Seasonally flowing or intermittent streams, wetlands less than 1 acre, landslides, and landslide-prone areas. This category includes features with high variability in size and site-specific characteristics. At a minimum the interim Riparian Habitat Conservation Areas must include:

- the extent of landslides and landslide-prone areas;
- the intermittent stream channel and the area to the top of the inner gorge;
- the intermittent stream channel or wetland and the area to the outer edges of the riparian vegetation;
- for Key (priority) Watersheds, the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest;
- for watersheds not identified as Key Watersheds, the area from the edges of the stream channel, wetland, landslide, or landslide-prone area to a distance equal to the height of one-half site potential tree, or 50 feet slope distance, whichever is greatest.

Current Condition of Riparian Management Zones

Riparian management zones on the Nez Perce-Clearwater have been affected by road construction. They have also been affected by past timber harvest, although only limited vegetation treatments have occurred in riparian management zones since PACFISH and INFISH amended the plans in 1995. Table 121 summarizes these activities at the subbasin scale and includes the number of road and stream crossings, as well as miles of roads within riparian management zones.

Table 121. Riparian management zones (RMZ) conditions related to roads and past timber harvest.

Subbasin	Acres in Nez Perce-Clearwater Area	Miles of Roads in RMZs	% RMZs with Past Timber Harvest	# of Road and Stream Crossings
Palouse/Hangman	55,547	67	5	344
Lower North Fork Clearwater	89,147	62	3	173
Upper North Fork Clearwater	776,015	320	2.4	877
Clearwater	139,553	181	16	586
Lochsa	722,316	155	1	363
Middle Fork Clearwater	67,563	25	2	103
Upper and Lower Selway	835,572	35	<1	132
South Fork Clearwater	516,497	288	1	1,017
Lower Salmon/Little Salmon	234,975	98	1	395
Middle Salmon-Chamberlain	422,658	42	<1	172

Data Source: Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a)

Riparian vegetation and condition have also been affected by domestic livestock grazing. Riparian areas most susceptible to the effects of grazing are generally low gradient with low confinement and drier climate, although higher confined streamside areas may be affected by trailing. Active grazing allotments are currently present in many areas of the Nez Perce-Clearwater, with the Lower Salmon and Lower Little Salmon supporting the most acres. Cattle and horses are the only livestock currently grazed. Fewer acres of the national forest lands are presently actively grazed than were grazed during the last planning cycle.

Substantial lengths of riparian areas on the Nez Perce-Clearwater were dredge mined in the early- to mid-1900s, particularly in tributaries in the South Fork Clearwater subbasin and the mainstem river itself. Watersheds exhibiting the most profound changes include Red River, Crooked River, Newsome, Leggett, and Cougar creeks.

Effects from past dredge mining activity are also present in specific areas in the following locations:

- Lower Salmon – Upper Little Slate Creek
- Middle Salmon-Chamberlain – Upper Crooked Creek and Meadow Creek
- Clearwater – Middle Lolo Creek, Orofino Creek
- Upper North Fork Clearwater –Vanderbilt/Bostonian, Moose Creek, Orogrande/French creeks
- Palouse River

Riparian areas across the Nez Perce-Clearwater have also been affected by natural disturbances, most notably floods, landslides, and wildfire. Floods, landslides, and debris torrents are natural events, often associated with wildfires, which are included in the disturbance regimes of many stream reaches on the Nez Perce-Clearwater. Although the short term effects may be deleterious, particularly in streams already degraded, streams on the national forest are dependent on these fire and disturbance events to sort gravels, create spawning habitat for salmonids, and recruit large amounts of woody debris in a pulse event, all of which can increase habitat complexity and productivity long-term (Reeves et al. 1995, Beechie and Bolton 1999).

Fire

One of the most widespread events that affected streams in many watersheds across the Nez Perce-Clearwater occurred in the winter of 1995 to 1997. It included a series of rain-on-snow and high precipitation events. Areas within the Selway, Lochsa, Lower Clearwater, and the notably low elevation portions of the North Fork Clearwater basins were most affected, resulting in a series of mass failure events in both natural landscapes and those with roads and timber harvest units.

Fire regimes in riparian areas are generally different from upland regimes. Fire in riparian areas tends to be less frequent and of lower intensity than surrounding uplands (Pettit and Naiman 2007, Dwire and Kauffman 2003), but longer fire intervals may result in higher accumulation of fuels, fuels, resulting in high fire severity if the riparian area burns under extreme conditions (Russell and Jones 2001, Everett et al. 2003). Agee (1998) observed a riparian zone in a high elevation tributary to the Salmon River that burned at higher severity than surrounding uplands on the Payette National Forest and surmised that fuels in riparian zones had accumulated at a higher rate due to less frequent fire, when compared to the uplands that burned at lower severity. However, others have observed that fire severity in riparian areas is dependent on upland severity (Halofsky and Hibbs 2008, Arkle and Pilliod 2010) or other factors unrelated to fuel type and distribution, such as landform features (Everett et al. 2003, Moore and Richardson 2012). Halofsky and Hibbs (2008) concluded that high fire severity in riparian areas in southwest and central Oregon was strongly associated with high fire severity in the adjacent uplands and steep slope gradients.

Within the Nez Perce-Clearwater, a substantial amount of acreage has been burned by wildfires since the last planning effort, particularly in tributaries to the Salmon River and particularly in the summer of 2007. That summer a combined acreage greater than 250,000 acres burned over a period of three months starting in mid-July. Substantial acreage burned in 2001 and 2005 in the Lochsa, Selway, South Fork Clearwater, Lower Salmon, and Middle Salmon-Chamberlain subbasins. In 2012, late season ignitions resulted in over 80,000 acres burned in tributaries to the Salmon, Middle Salmon-Chamberlain, South Fork Clearwater, and Lochsa subbasins during the month of September. In 2015, substantial acreage burned in most subbasins on the Nez Perce-Clearwater. Combined burned acreage for 2007 and 2015 approached 500,000 acres.

To assess how wildfires have affected riparian areas on the Nez Perce-Clearwater under more extreme fire conditions, a subset of the largest fires was selected from the 2007, 2012, 2013, 2014, and 2015 fire seasons. Fire severity within streamside riparian management zones was estimated using Burned Area Reflective Classification (BARC) satellite imagery mapping, subsequently refined by field observations. Acres of high, moderate, and low severity and unburned within riparian management zones were summarized for each fire to provide a gross estimate of the percentage within each category. The results of this analysis are displayed in Figure 35 and Figure 36.

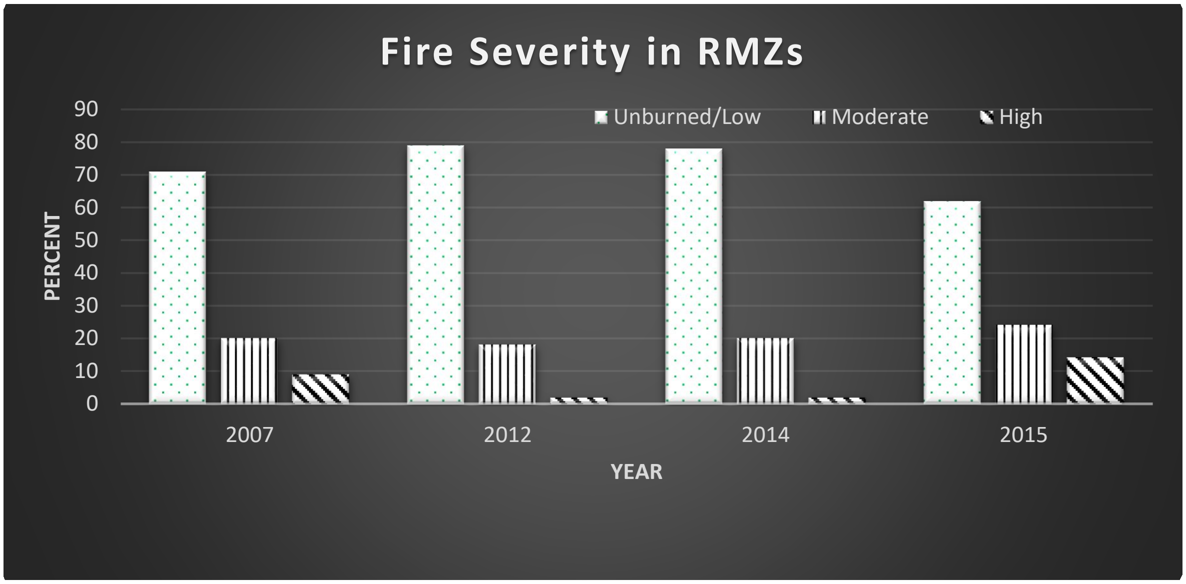


Figure 35. Riparian Management Zones fire severity in 2007, 2012, 2014 and 2015. All fires combined.

Data Source: Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a)

As Figure 35 illustrates the percent of high severity fire in riparian management zones has been low for the years included in the above analysis relative to the percent of unburned and low severity. These percentages can be compared to severity in uplands, or non-riparian management zones, as displayed in Figure 36, below. These indicate that upland areas in general have had a higher percentage of total fire acres that burn at high severity than riparian management zones from 2007 to 2015. This data suggests streamside riparian areas on the Nez Perce-Clearwater maintain an inherent resistance to high fire severity. Recent large wildfires have followed a consistent pattern of low to moderate fire severity with pockets of high severity in streamside riparian areas, with substantial portions remaining unburned. Unpublished Burned Area Reflective Classification maps from 2007 through 2015 indicate high severity fire in riparian areas was nearly always associated with high severity in adjacent uplands, which is consistent with the findings of Halofsky and Hibbs (2008). An exception was noted with the 2007 Poe Cabin Fire, where some riparian corridors along tributary streams to the Snake River burned at high and moderate severity, while surrounding uplands burned at low severity. In this case, surrounding uplands were grasslands, and riparian areas were comprised of brush and small hardwoods. Riparian corridors burning at higher severity than surrounding uplands were not evident in forested habitat types within this fire perimeter.

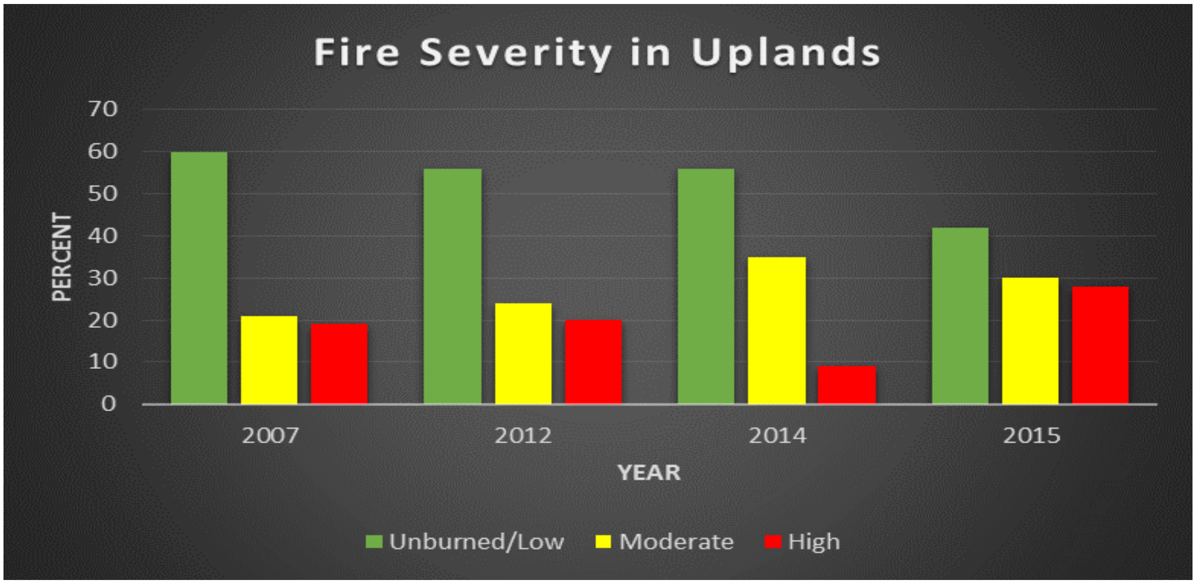


Figure 36. Upland fire severity in 2007, 2012, 2014 and 2015. All fires combined.

Data Source: Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a)

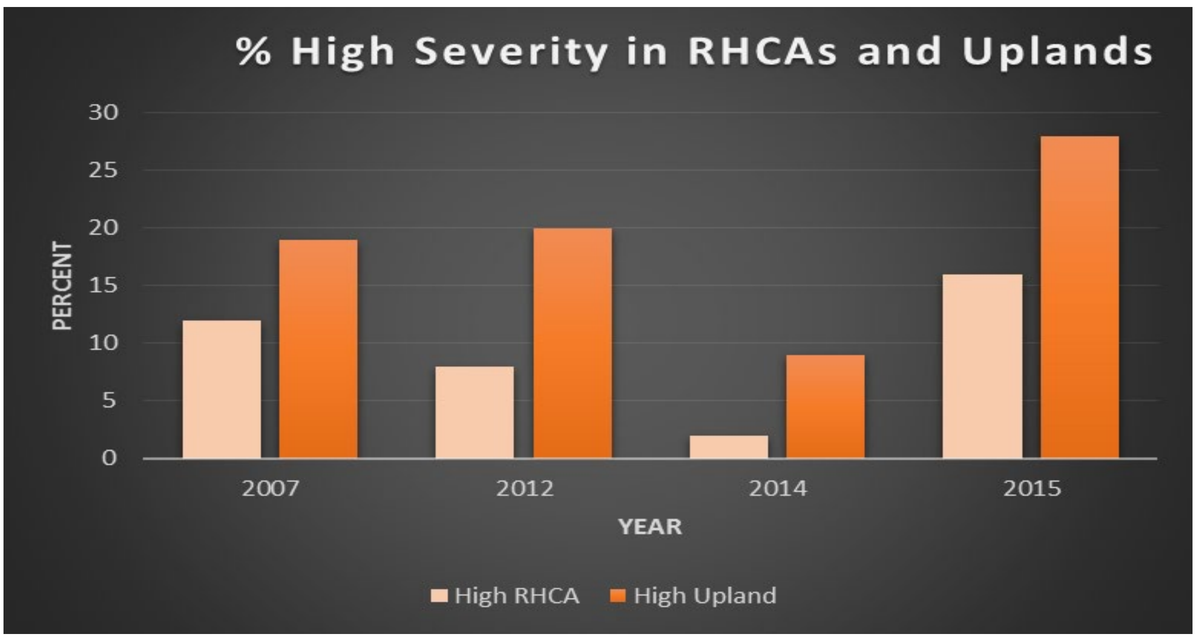


Figure 37. Comparison of high severity fire in uplands and riparian management areas.

Data Source: Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a)

Although the relative percentage of riparian acres burned at high severity has been consistently low within large fire perimeters, percent of high fire severity within individual HUC12 watersheds has been much more variable. In some cases, high severity fire in riparian management zones has resulted in short term adverse effects to fish and habitat. For example, the McGuire Fire caused direct mortality of fish, presumably from high water temperatures adjacent to very high severity fire as it burned through the adjacent riparian area. In the Sheep Fire, a series of intense, summer thunderstorms within the John Day

Creek drainage generated slope failures and debris torrents initiated in upland areas that burned at high severity. Some of these slope failures were associated with roads. In both cases, high severity fire in riparian areas was included within large blocks of high severity fire on the uplands. Therefore, even though the percent of high severity within riparian management zones is low at a broad scale, at finer scales it can be much higher and result in significant effects to riparian resources. Short-term deleterious effects are often followed in subsequent decades by beneficial effects, as habitat improves following fires. The species that occupy the Nez Perce-Clearwater have evolved within this landscape that is driven and shaped by fire.

Streams

The Nez Perce-Clearwater supports a wide range of stream types and highly variable stream habitats, depending on factors such as gradient, aspect, watershed size, geology, substrate, and upland and streamside disturbances. Streams can be highly dynamic. While the rates of change differ among streams, the concept of change applies across the landscape.

Current stream process and function are similar to historic processes in many streams but differ in others. Human activities have altered stream channels by direct modification such as channelization; removal of large woody debris; dams and diversions; historical log drives; and the building of infrastructure such as roads, railways, bridges, and culverts that have encroached on riparian areas and stream channels. Humans have also indirectly affected the incidence, frequency, and magnitude of disturbance events. This has affected the inputs and outputs of sediment, water, and vegetation. These factors have combined to cause changes in channel conditions throughout many parts of the Nez Perce-Clearwater, resulting in aquatic and riparian habitat conditions different from those that existed prior to human development. Natural disturbances, primarily wildfire, floods, and landslides, combined with human-caused disturbances, such as timber harvest, fire suppression, road construction, mining, dams, introducing non-native species, recreation, grazing, and altered food web, over the last century have led to changes in the physical watersheds and in the fish and amphibians dependent on them (Lee et al. 1997, Naiman et al. 2012, Naiman 2013, Poff et al. 2011, Rieman et al. 2015).

PACFISH and INFISH Biological Opinion (PIBO) Data Status Forestwide – Existing Condition

PACFISH and INFISH Biological Opinion (PIBO) data has been summarized for each subbasin on the Nez Perce National Forest where enough data was available to complete a statistically robust analysis. The following discussion of existing stream conditions is focused on a broader scale and includes data from all sites across the Nez Perce-Clearwater, as summarized in Table 122.

Table 122. Summary of Index Scores across the Nez Perce-Clearwater National Forest Stream conditions across the plan area.

Metric	Data/Site Type	Index Score	P-value	Significant Difference Between Managed and Reference?
Overall – All metrics combined	Managed	43.29	<0.01	Yes
Overall – All metrics combined	Reference EcoRegion	51.67	<0.01	Yes
Residual Pool Depth	Managed	4.32	<0.01	Yes
Residual Pool Depth	Reference EcoRegion	5.48	<0.01	Yes
Pool Percent	Managed	4.45	0.09	Yes

Metric	Data/Site Type	Index Score	P-value	Significant Difference Between Managed and Reference?
Pool Percent	Reference EcoRegion	5.01	0.09	Yes
Median Substrate (D50)	Managed	5.46	0.99	No
Median Substrate (D50)	Reference EcoRegion	5.47	0.99	No
Pool Fines	Managed	4.74	0.09	Yes
Pool Fines	Reference EcoRegion	5.45	0.09	Yes
Large Wood Frequency	Managed	5.71	<0.01	Yes
Large Wood Frequency	Reference EcoRegion	6.67	<0.01	Yes
Bank Angle	Managed	5.43	0.73	No
Bank Angle	Reference EcoRegion	5.3	0.73	No
Macroinvertebrate Assemblage	Managed	0.92	0.24	No
Macroinvertebrate Assemblage	Reference EcoRegion	0.95	0.24	No

Data Source:(Saunders et al. 2020) (PacFish/InFish Biological Opinion Monitoring Program) (statistical significance at p<0.10)

The data presented above indicates that overall stream conditions in 64 managed watersheds on the Nez Perce-Clearwater, when considered collectively, are outside the range of natural variability and in a less than desired condition. The data suggests that residual pool depth, pool percent, and large wood frequency are degraded and less favorable for salmonids when compared against reference subwatersheds. In addition, pool median substrate size, bank angle, and macroinvertebrate assemblage in managed subwatersheds are not statistically different than reference and that pool fines exhibit more favorable conditions than in reference watersheds. It should be noted that the term "reference" should not be confused with "undisturbed."

Additional discussion of data up to 2016 can be found in the Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a).

PACFISH and INFISH Biological Opinion (PIBO) Data Trends – Forestwide

As previously described, the PACFISH and INFISH Biological Opinion (PIBO) broad-scale monitoring program was initiated by the Forest Service and Bureau of Land Management in the late 1990s to assess the effectiveness of the PACFISH and INFISH amendments, as required by programmatic Endangered Species Act consultations for salmon, steelhead, and bull trout in the Interior Columbia River Basin. As in the preceding section, the following information is summarized from (Saunders et al. 2020)

Trends in stream conditions were assessed at managed sites on the Nez Perce-Clearwater using the same metrics used to assess existing conditions, with the addition of two metrics: percent undercut streambanks and streambank stability. However, unlike comparisons to reference conditions using index scores, raw data was used to assess trends comparing data collected at Year 1 to data collected in the last year the site was measured. A Wilcoxon Rank Sum Test, a non-parametric comparison of means, was used to determine statistical significance. Results are summarized in Table 123.

Table 123. Stream habitat attribute trends using actual values on all managed sites on the Nez Perce-Clearwater

Metric	Time Value First Year	Time Value Last Year	Sample Size (n)	% Change	P-value	Statistically significant improvement (P<0.10)	Desired vs. Actual Change
Overall Index*	40.52	42.47	65	4.8	0.228	No	+/NS
Residual Pool Depth	0.35	0.34	67	-2.9	0.428	No	+/NS
Pool Percent	47.44	47.15	67	-0.6	0.846	No	+/NS
Median Substrate (D50)	0.0398	0.0458	66	134.9	.04	Yes	+/+
Pool Fines	32.37	33.48	66	-1.23.4	0.68	No	-/NS
Large Wood Frequency	279.34	318.07	67	13.9	0.038	Yes	+/+
Bank Angle	100.61	103.54	67	2.9	0.112	No	-/NS
Macroinvertebrate Observed/ Expected	0.87	0.91	66	4.6	0.033	Yes	+/+
% undercut banks	38.65	41.1	67	6.3	0.302	No	+/NS
Bank Stability	84.21	85.33	67	1.3	0..478	No	+/NS

Data Source: (Saunders et al. 2020) Based on PIBO Monitoring 2001-2019.

* Overall Index is forestwide and is calculated independently of individual indices.

The above table shows overall trends in stream conditions at managed sites between the first year PIBO data was collected and the last. The specific metrics that indicated a statistically significant improvement include large wood frequency, median substrate (D50), and macroinvertebrate assemblage.

Trends in stream habitat attributes across the Nez Perce-Clearwater are shown in Table 123. There were three attributes, including Observed and Expected macroinvertebrate score, large wood frequency, and median substrate size that have improved since the implementation of PACFISH and INFISH Biological Opinion (PIBO), and all other metrics have not significantly changed at the national forest scale. Although the majority of metrics have not changed at this scale, none of the metrics have significantly degraded from 2001 to 2019. While some metrics remain below ecoregion reference benchmarks, the current Forest Plan as amended arrested further degradation, and in many cases allowed habitat conditions in streams to improve through passive restoration while allowing for forest management activities. In a 2018 Biological Opinion related to the effects of 26 forest plans on bull trout, including the current Plans for the Nez Perce-Clearwater National Forests, as amended, the U.S. Fish and Wildlife Service agreed that based on the results of the Aquatic and Riparian Effectiveness Monitoring Program (AREMP) and PIBO monitoring programs, changes in grazing activities have resulted in improvements to stream habitat conditions previously impaired by grazing, and that those improvements were likely to continue, as current plans as amended have allowed for passive recovery of instream conditions (U.S. Department of the Interior 2018a, 74, 78).

PACFISH and INFISH Biological Opinion (PIBO) Data Status at the Sub-basin Scale

To further identify areas that need improvement, PACFISH and INFISH Biological Opinion (PIBO) analyzes data at finer scales. PIBO data was summarized by subbasin when sample sizes were sufficient for statistical inference. The Nez Perce-Clearwater includes portions of 11 subbasins (HUC8), including Palouse/Hangman, Lower North Fork Clearwater, Upper North Fork Clearwater, Lower Clearwater, Middle Fork Clearwater, South Fork Clearwater, Lochsa, Upper Selway, Lower Selway, Lower Salmon, Little Salmon, and Middle Salmon-Chamberlain. Of the 11 subbasins, five have enough sites to monitor for status at this scale, including the Lower Clearwater, Lower Salmon, Upper North Fork Clearwater, Lochsa, and South Fork Clearwater. One additional site (Lower Selway) does not have enough sites for status but does have enough to monitor trends. Because the Palouse subbasin is not used by Endangered Species Act listed species and does not provide critical habitat, it is not discussed further in this document.

Clearwater Subbasin

Land ownership in this subbasin is highly mixed and comprised of private, state, federal, and tribal holdings. Potlatch Corporation and the Idaho Department of Lands manage (U.S. Department of the Interior 2018a) substantial portions of the land base, and properties managed by these two entities are highly intermixed with those administered by the national forest. On the Nez Perce-Clearwater, the three largest tributaries in the Clearwater River subbasin include the Potlatch River, Orofino Creek, and Lolo Creek.

Only 46 percent of the subbasin is managed by the Forest Service. Road density is high, averaging over four miles per miles squared (mi/mi^2). Of the 11 subbasins in the proposed action area, the Clearwater River is possibly the most departed from reference conditions. The mainstem Clearwater River provides spawning and rearing habitat for Snake River fall Chinook salmon. It serves as a migration corridor for steelhead trout and spring and summer Chinook salmon and provides overwintering habitat for both adult and juvenile salmon and steelhead. Westslope cutthroat trout, bull trout, and redband trout are present in the river as water temperatures allow. Cold water releases from Dworshak Reservoir in the mid-to-late summer may facilitate use of this section of river by these species while providing thermal refuge for returning adult fall Chinook salmon and steelhead trout in August and September.

PIBO data has been collected from 10 managed sites in the Clearwater subbasin and were last summarized in 2020 (Saunders et al.).When habitat indicators are combined to calculate the overall index value, managed sites scored lower than ecoregion reference sites (Figure 38). Of the seven indicators used, four were not significantly different from reference sites, and three — pool fines, median substrate size (D50), and macroinvertebrate Observed/Expected (OE score) — scored lower than reference sites (Table 124). All but one indicator had no significant trend, positive or negative. One indicator, streambank stability, showed a trend away from reference or desirable conditions (Table 125).

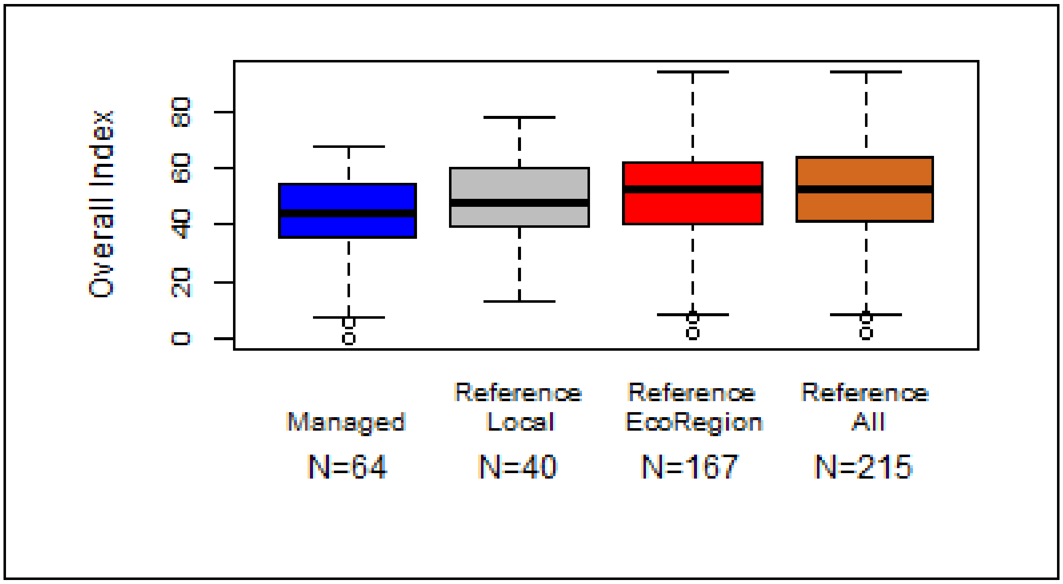


Figure 38. Overall index values in the Clearwater subbasin (Saunders et al. 2020). Median and range of index values for managed sites, reference sites within the ecoregion, and reference sites for the entire PACFISH and INFISH Biological Opinion (PIBO) study area.

Lower Salmon Subbasin

The Lower Salmon and Lower Little Salmon subbasins are intermixed with private, Bureau of Land Management, and State of Idaho lands. The national forests manage 57 percent of the subbasins' acreage. The Lower Salmon has enough managed sites for status and trends, while the Little Salmon does not.

Specific reaches in many watersheds have been affected by past and ongoing livestock grazing and mining activities. Mining has resulted in substantial effects to riparian conditions in Upper Little Slate Creek. The Lower Salmon and Lower Little Salmon subbasins support most grazing on the Nez Perce-Clearwater. The Nez Perce-Clearwater administers a relatively small portion of the lower Little Salmon subbasin, which mostly includes the Rapid River watershed. Some riparian reaches may be affected by streamside trails, dispersed camp sites, livestock grazing, and noxious weeds.

In the Lower Salmon and lower Little Salmon subbasins, 10 of the 22 sub-watersheds have road densities greater than 3 miles per miles squared (mi/mi^2), a level associated with worsening instream conditions. PACFISH and INFISH Biological Opinion (PIBO) assessed six managed sites in the Lower Salmon subbasin administered by the national forest, though only one site in the Little Salmon (Saunders et al. 2019a). All the metrics except one showed no departure from reference conditions (Table 124). Percent pools scored lower than reference conditions. Portions of this subbasin (Little Slate Creek drainage) have been heavily managed in the past, and Upper Little Slate Creek was also affected by mining. Cobble embeddedness was measured repeatedly under the former Forest Plan in the Slate Creek watershed and declined between 1988 and 1994 and between 2011 and 2016 (Thompson et al. 2019). Cobble embeddedness at the managed sites improved and came to resemble reference values. Of the nine metrics, most (five) showed no significant trend since PIBO monitoring began, while three (O.E., Large Wood Frequency, and D50) showed trends toward conditions observed at reference sites, and two (Uncut percent, Bank Angle) showed trends away from reference conditions (Table 125).

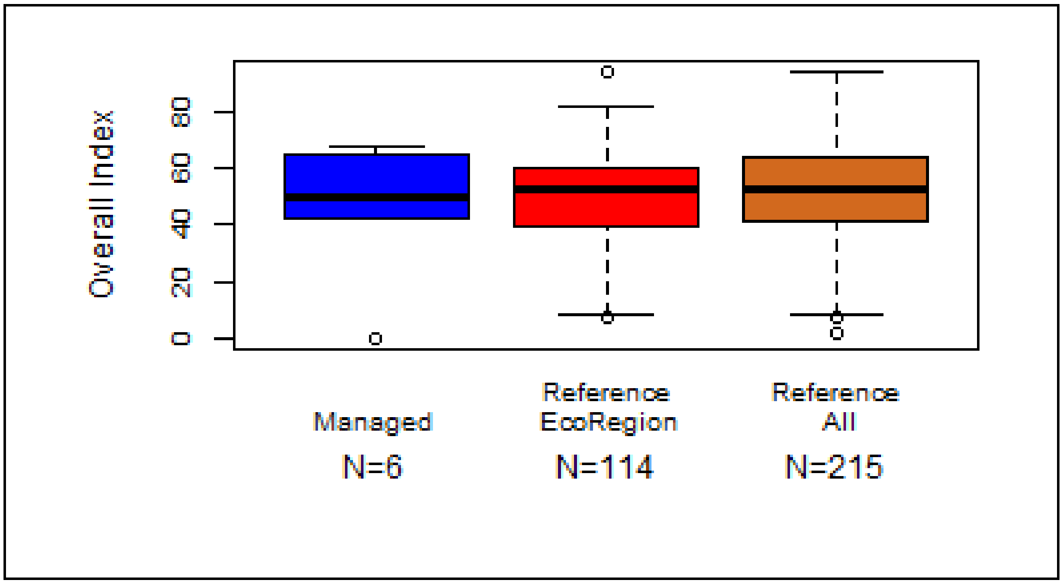


Figure 39. Overall index values in the Lower Salmon (Saunders et al., 2020). Median and range of index values for managed sites, reference sites within the ecoregion, and reference sites for the entire PACFISH and INFISH Biological Opinion (PIBO) study area.

Lower North Fork Clearwater Subbasin

Only 28 percent of the Lower North Fork Clearwater subbasin is managed by the Nez Perce-Clearwater. Riparian areas throughout the mainstem North Fork Clearwater River and its tributaries were affected by wildfires in the early 1900s. Road construction and timber harvest activities have decreased the riparian cover along many tributaries throughout the watershed. Mining, agricultural, and forestry activities have also changed the stream channel locations and morphology in some areas, particularly in watersheds with high percentages of mixed ownership, which includes nearly all of them. These changes have decreased the streamside shade, increased solar radiation to streams, increased sediment delivery, and generally decreased habitat complexity in streams. PACFISH and INFISH Biological Opinion (PIBO) sampling in this basin does not have a sufficient sample size to determine status and trends.

Upper North Fork Clearwater Subbasin

The Upper North Fork Clearwater HUC8 subbasin extends from the mouth of Beaver Creek up to the headwaters. The Nez Perce-Clearwater manages 93 percent of the subbasin. The Upper North Fork Clearwater was in the best overall condition on the national forests as summarized in the 2020 PIBO report Figure 43. One habitat metric (D50) scored higher than ecoregion reference benchmarks. One metric, pool depth, scored lower than reference values (Table 124). The overall trend since PIBO began was away from reference values; however the only individual metric that showed a significant trend was vegetation stability which moved toward reference conditions (Table 125).

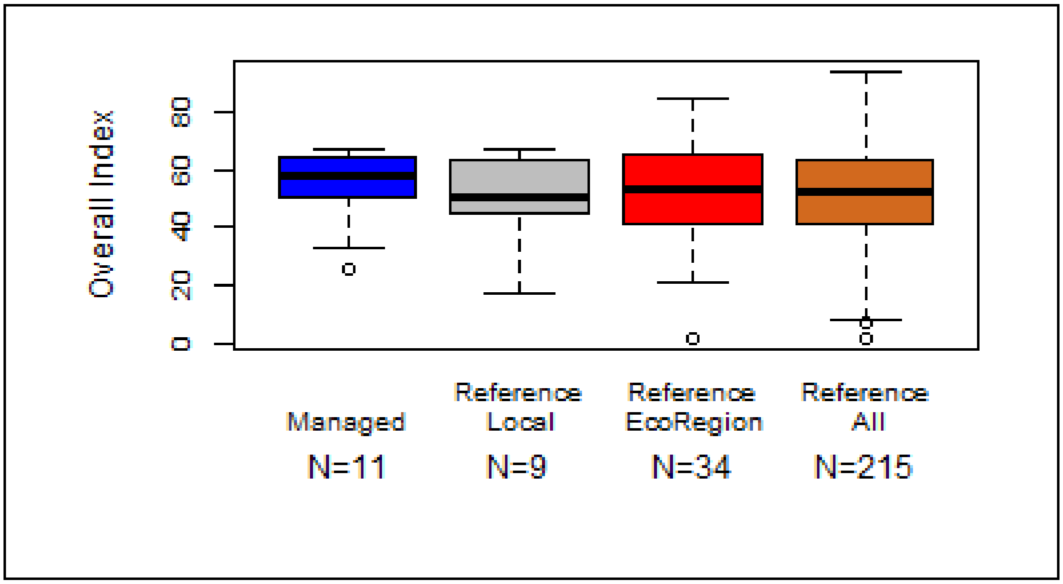


Figure 40. Overall index values in the Upper North Fork Clearwater (Saunders et al. 2020). Median and range of index values for managed sites, local reference sites, reference sites within the ecoregion, and reference sites for the entire PACFISH and INFISH Biological Opinion (PIBO) study area.

(Saunders et al. 2020)

Lochsa Subbasin

The Lochsa River joins the Selway River to form the Middle Fork Clearwater at Lowell, Idaho. The subbasin contains large portions of undeveloped forest land with 96 percent of the land base administered by the Nez Perce-Clearwater. Most of the Lochsa River is designated as a Wild and Scenic River and about half the subbasin south of the river is part of the Selway Bitterroot Wilderness Area.

Large fires occurred in the subbasin in 1910, 1919, 1924, and 1934 and may have occurred regularly before records were kept. Large fires have also occurred over the last 18 years, with many acres burning in 2000, 2007, and 2015. Some of these burned areas have not yet reforested and remain as brush fields. The combination of loose soils, steep slopes, and intense rain-on-snow events has produced landslides that dissect the subbasin with steep valleys and episodic delivery of sediment to streams. The subbasin landforms and the historic record confirm that these processes define the normal subbasin condition.

Road construction has created road densities of greater than 3 miles per miles squared (mi/mi^2) in 12 of 28 subwatersheds in this subbasin, likely reducing riparian cover and habitat quality. Larger streams in the Lochsa subbasin generally provide good to excellent spawning and rearing habitat.

Per the 2020 PACFISH and INFISH Biological Opinion (PIBO) report (Saunders et al. 2020), the Lochsa was the second least disturbed subbasin summarized (Figure 43). No metrics were significantly different than reference benchmarks (Table 124), though residual pool depths trended away from reference values over the measurement period, and O.E. significantly trended toward reference values (Table 125).

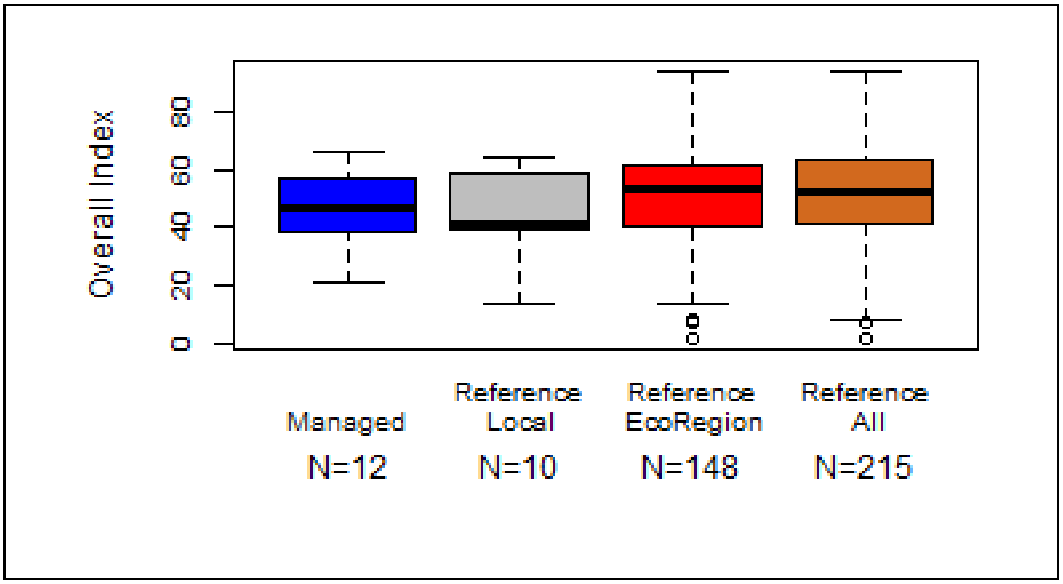


Figure 41. Overall index values in the Lochsa (Saunders et al. 2020). Median and range of index values for managed sites, local reference sites, reference sites within the ecoregion, and reference sites for the entire PACFISH and INFISH Biological Opinion (PIBO) study area.

The Forest Service Watershed Condition Class Assessment (U.S. Department of Agriculture 2011d) noted that of 38 HUC12s in the Lochsa, 29 (76 percent) were Properly Functioning, while nine were Functioning at Risk.

Selway River Subbasin

The Selway River extends from headwater areas administered by the Bitterroot National Forest to its confluence with the Lochsa River. Both the Upper and Lower Selway subbasins were priority watersheds under PACFISH/INFISH. Virtually all of the land in both subbasins is administered by the Forest Service.

Compared to the rest of the subbasins on the Nez Perce-Clearwater National Forests, the two Selway subbasins are the least disturbed by human development. Only two of the 43 subwatersheds have road densities above 2 miles per mile squared (mi/mi^2) and only four have road densities above 1 mi/mi^2. Available data from streams above the wilderness boundary are assumed to represent natural conditions and indicated very low levels of deposited sediment, such as percent fines below 10 percent and cobble embeddedness below 25 percent; moderate to high levels of large wood depending on channel gradient; and moderate to high habitat complexity, as indicated by the number of pools, large wood, diverse substrate composition, and diverse channel gradients (USDA-FS unpublished data, 1992 – 2003). In 2011, the Forest Service's Watershed Condition Class assessment (U.S. Department of Agriculture 2011d) noted that 42 out of 43 Selway HUC12s were Functioning Properly and one was Functioning at Risk. The Upper and Lower Selway subbasins do not have enough managed PACFISH and INFISH Biological Opinion (PIBO) sites to establish status, but the Lower Selway does have enough to determine trends of stream habitat attributes (Saunders et al. 2020). The overall index on the Lower Selway has trended toward reference conditions since PIBO began, as did the individual metrics D50 and large wood frequency (Table 125). All other metrics showed no significant trends.

Middle Salmon-Chamberlain Subbasin

The Nez Perce-Clearwater National Forests share the administration of the subbasin with the Payette and Bitterroot National Forests. The Payette National Forest administers National Forest System lands on the south side of the Salmon River while the Nez Perce-Clearwater National Forests administer the north side. The Bitterroot National Forest administers a portion of the north side. There is little private land.

Specific reaches of some watersheds have been affected by past and ongoing livestock grazing and mining activities. A substantial portion of the Middle Salmon-Chamberlain subbasin is within designated Wilderness or is roadless and riparian areas are largely unaffected by landscape scale human disturbances. The Middle Salmon-Chamberlain subbasin does not have enough managed PIBO sites to establish status or trend of stream habitat attributes (Saunders et al. 2020).

Middle Fork Clearwater Subbasin

The Middle Fork Clearwater subbasin is the smallest on the Nez Perce-Clearwater National Forests. Land ownership in this subbasin is comprised of private, state, federal, and tribal holdings. The national forests manage about 55 percent of the subbasin. Lands are generally heavily forested.

Clear Creek is a tributary to the Middle Fork Clearwater River and contains much of the stream habitat accessible to anadromous and resident fish in this subbasin. It has high habitat potential for spawning and early rearing for anadromous fish. In 2011, the Forest Service's Watershed Condition Class assessment (U.S. Department of Agriculture 2019a) noted that three of the four HUC12 watersheds in the Middle Fork were Functioning at Risk, and one was Properly Functioning.

Basin-wide surveys were conducted by contractor Stillwater Sciences in 2015 in the mainstem of Clear Creek and several tributaries, including Middle Fork Clear Creek, Brown Springs, Pine Knob, South Fork Clear Creek, and West Fork Clear Creek. Mean cobble embeddedness exceeded 30 percent across most surveyed reaches, although was less on reaches downstream of National Forest System lands (Stillwater Sciences 2015). Survey results indicated very low levels of large wood in many reaches, as well as other indicators of simplified habitat including low numbers of pools. Sediment levels that exceed desired conditions have likely affected the quality and quantity of habitat available for trout and salmon.

In 2015 and prior, the Clearwater National Forest contracted for six additional PIBO monitoring sites in Clear Creek, which is a tributary of the Middle Fork Clearwater (Archer and Ojala 2016). All of the metrics were not significantly different from reference conditions except large wood frequency, pool percent, and pool fines, which scored lower than reference sites. None of the metrics showed a significant change except bank angle, which moved away from reference conditions. (Archer and Ojala 2016). During the most recent sampling in 2019, the Middle Fork Clearwater subbasin did not have enough managed PACFISH and INFISH Biological Opinion (PIBO) sites to establish status or trends of stream habitat attributes (Saunders et al. 2020).

South Fork Clearwater Subbasin

The South Fork Clearwater contains a mix of ownerships, but the national forests administer over 88 percent of the land area. Many areas of the subbasin have been extensively managed.

When habitat indicators are combined for the overall index value, managed sites scored lower than ecoregion reference sites (Figure 42). Of the seven indicators used, five were not significantly different from current ecoregional reference sites, and two — pool depth and pool percent — scored lower than reference sites. The trend since PIBO began (Table 125) shows the overall index trending toward reference site values, as did D50. Table 124 shows P-values of PIBO status index values from forest sub-basins.

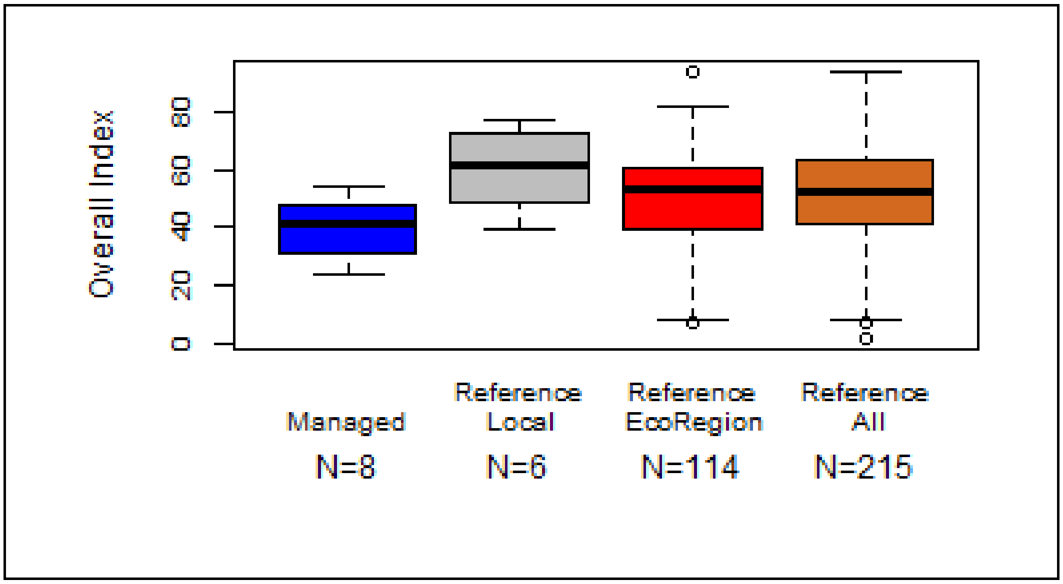


Figure 42. Overall index values in the South Fork Clearwater (Saunders et al. 2020). Median and range of index values for managed sites, local reference sites, reference sites within the ecoregion, and reference sites for the entire PACFISH and INFISH Biological Opinion (PIBO) study area.

Table 124. P-values associated with PACFISH and INFISH Biological Opinion (PIBO) status index values from managed sites at the subbasin scale on the Nez Perce-Clearwater Forest 2001 to 2019. P-values lower than 0.10 indicate a significant difference between managed sites and eco-regional reference sites

Managed Site	Overall	Pool Depth	Pool %	D_{50}	Pool Fines	Wood Freq.	Bank Angle	OE	Total Signif. Lower
Clearwater	<0.01[a]	0.81	0.29	0.09	0.03[a]	0.88	0.53	<0.01[a]	3
Lower Salmon	0.61	0.56	0.05[a]	0.3[a]	0.75	0.33	0.42	0.82	2
Upper North Fork	0.69	0.3[a]	0.79	0.02[b]	0.08 [b]	0.6	0.42	0.12	1
Lochsa	0.37	0.56	0.65	0.8	0.79	0.14	0.33	0.67	0
South Fork Clearwater	0.02[a]	<0.01[a]	0.05[a]	0.87	0.4	0.46	0.9	0.34	3
Lower Selway	0.08[b]	0.35	0.35	0.04[b]	0.69	0.08[b]	0.89	0.35	0
Total Significantly Lower	2	2	2	1	1	0	0	1	N/A

a= this value scored significantly lower than the eco-region reference value

b= this value scored significantly higher than the eco-region reference value

PIBO Data Trends at the Sub-basin Scale

A similar approach to trends at the subbasin scale can provide insight into how effectively PACFISH and INFISH Biological Opinion (PIBO) standards are facilitating movement toward reference values (Table 125).

Table 125. P-values associated with PACFISH and INFISH Biological Opinion (PIBO) trends from managed sites at the subbasin scale on the Nez Perce-Clearwater Forest 2001 to 2019. P-values lower than 0.10 indicate a significant difference between 2001 and 2019 either toward or away from the desired direction. NC = no change.

Managed Site	Overall	Pool Depth	Pool %	D50	Pool Fines	LWD Freq.	Bank Angle	OE	Veg Stab.	Uncut %	Total Toward	Total Away	NC
Clearwater	0.42	0.93	0.86	0.71	1	0.93	0.88	0.16	<0.01[b]	0.11	0	1	9
Lower Salmon	0.75	0.12	0.35	0.04[a]	0.75	0.04[a]	0.04[b]	0.08[a]	0.17	0.08[b]	3	2	5
Upper North Fork Clearwater	0.02[b]	0.24	0.35	0.48	0.93	0.64	0.2	0.31	<.01[a]	0.75	1	1	8
Lochsa	0.48	0.03[b]	0.88	0.66	0.94	0.18	0.51	0.06[a]	0.86	0.64	1	1	8
South Fork Clearwater	0.01[a]	0.21	0.33	0.01[a]	0.89	0.33	0.67	0.21	0.89	0.26	2	0	8
Lower Selway	0.08[a]	0.35	0.35	0.04[a]	0.69	0.08[a]	0.89	0.35	0.67	0.27	3	0	7
Total Toward	2	0	0	3	0	2	0	2	1	0	10	N/A	N/A
Total Away	1	1	0	0	0	0	1	0	1	1	N/A	5	N/A
Total NC	3	5	6	3	6	4	5	4	4	5	N/A	N/A	45

a= significant change toward desired direction

b= significant change away from desired direction

Overall, status index scores in each subbasin for which data was available were divided by their respective ecoregional reference score to obtain an index ratio to facilitate relative comparison of overall condition across subbasins. According to this analysis the Upper North Fork Clearwater was in the best overall relative condition, followed by the Lochsa, Lower Salmon, South Fork Clearwater, and the Clearwater (Figure 43).

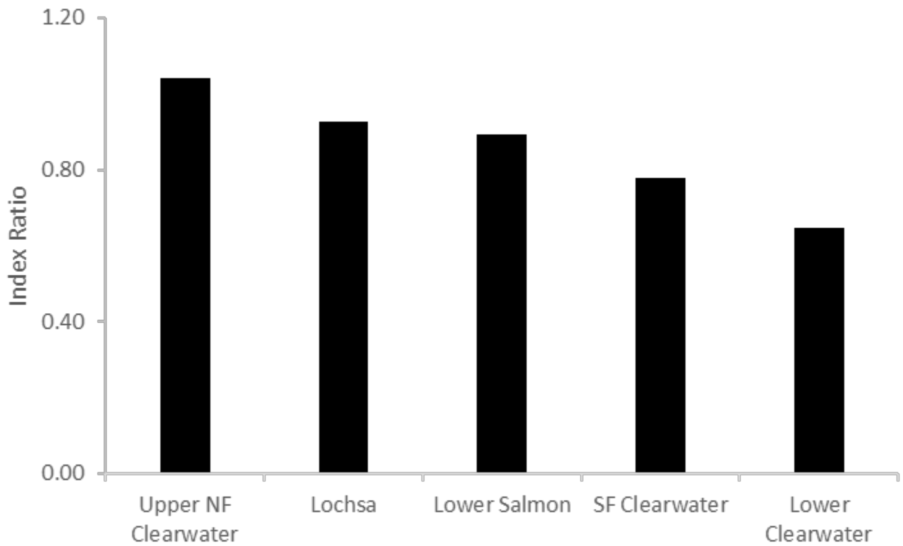


Figure 43. Ratio of 2020 PACFISH and INFISH Biological Opinion (PIBO) overall index score to ecoregional reference score for five subbasins on the Nez Perce-Clearwater National Forest. A value of 1 indicates equality with reference conditions.

Substrate Conditions Related to Sediment from Data Other Than PACFISH and INFISH Biological Opinion (PIBO)

Cobble Embeddedness – historic Nez Perce National Forest

The Nez Perce National Forest established a monitoring plan to evaluate the effectiveness of the Nez Perce Forest Plan in achieving aquatic objectives. The stream habitat and fish portion of this monitoring plan included periodic re-examinations of bio-physical conditions at 26 permanent monitoring reaches distributed across the Nez Perce National Forest. Stations were established in both managed and unmanaged reference watersheds and were located at lower elevations in watersheds, generally near the mouths of streams in reaches that were thought to indicate broader changes in habitat. In some cases, these stations were associated with gaging stations, and in all cases dominant geologic type—basalt, Idaho batholith, or belt—was identified.

Methodology and the results of cobble embeddedness monitoring are fully described in the Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a). The cobble embeddedness metric has served as a key indicator of stream conditions and habitat carrying capacity on the Nez Perce National Forest since the early 1980s. However, some concern that this indicator might not accurately represent conditions in some situations has been raised since the late 1990s (Sylte and Fischenich 2002). There was concern that it might not respond to the cessation of activities that caused the initial embeddedness, and that inconsistencies with how data was collected and analyzed could yield erroneous results. In order to provide a longer time series of monitoring data, the initial embeddedness monitoring that was completed from 1998 through the mid-1990s was repeated from

2011 through 2016 using the same protocols at a subset of monitoring locations. This ensured that the data could be reliably compared throughout both sampling periods.

In summary, results of the analysis suggest that statistically significant changes in measured mean cobble embeddedness have occurred and that it has declined since the mid-1990s in some streams on the Nez Perce National Forest. Streams in managed watersheds, including the Upper Red River, Lower Red River, Lower Newsome, Crooked River, O'Hara Creek, North Fork Slate Creek, and Little Slate Creek all exhibited decreased cobble embeddedness over time, as indicated by a comparison of data from 2011 to 2016 and 1988 to 1994. These sites are in watersheds with a history of human disturbance. Significant changes were not observed at unmanaged watersheds including Johns Creek and Upper Meadow Creek sites, although Lower Meadow Creek appears to indicate a statistically significant reduction in cobble embeddedness since the period of 1988 to 1994. These three sites are considered reference because they are in watersheds with minimal human disturbances.

These results are compelling for several reasons. First, a reduction in cobble embeddedness was observed at every managed site for which data was collected, substantially so for the Upper Red River, Lower Red River, Lower Newsome, and O'Hara sites. Second, dramatic declines in cobble embeddedness are not evident at the Johns or Upper Meadow reference sites, which display low levels of cobble embeddedness for all years when compared to the 1988 to 1994 data from the managed sites. These results suggest that land management practices implemented under the 1987 Nez Perce Forest Plan, as amended by PACFISH, were effective in reducing fine sediment in these streams.

The Lower Meadow site, however, did exhibit a statistically significant reduction in cobble embeddedness, possibly the result of cessation of human-caused disturbances since the early 2000s in the Horse Creek watershed, which enters Meadow Creek about two miles upstream of the site.

Percent Surface Fines and Fines by Depth – historic Clearwater National Forest

Similar to the Nez Perce National Forest, the Clearwater National Forest developed and implemented a monitoring plan to evaluate the effectiveness of the Clearwater Forest Plan in achieving aquatic objectives.

Long term monitoring data is available for the Lower Clearwater, Middle Fork Clearwater, and Palouse/Hangman subbasins on the Clearwater National Forest. The data is summarized in forest plan monitoring reports produced by the Clearwater National Forest from the 1990s through 2009. Deposited fine sediment was monitored using Wolman pebble counts to obtain an estimate of percent surface fines, and substrate core sampling was used to obtain an estimate of percent fines by depth. The complete methodology and analysis are included in the Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a).

In summary, substrate data collected in various watersheds across the Clearwater National Forest since the mid-1990s suggested that sediment conditions are improving in some places, improving more slowly than desired in other places, and not being responsive at all in a few places. For example, in Deadman and Pete King creeks, percent fines by depth in the last year they were measured were less than they were in the early 1990s, although inter-annual variation was high. In the Potlatch and Palouse River subbasins, available substrate monitoring data suggested either static conditions or slight declines, with surface fines levels remaining greater than 20 percent at all monitored sites, and in some cases substantially so. Surface fines appeared to be much lower in two sites in the Upper North Fork Clearwater, although it remained high in Elk Creek, a tributary of the Lower North Fork Clearwater River. However, it should be noted the number of monitored sites is small, and summarized data is only available up to 2009. Additional years of monitoring data would be helpful at these sites, as conditions may have changed since 2009; however, this is unlikely given current budget constraints, unless a cooperative monitoring program is established through partnerships with other stakeholders.

Summary of Trends in Stream Habitat across the Nez Perce-Clearwater

The information presented in previous sections suggests that improving trends have occurred in many watersheds since the last forest planning effort in 1987, but conditions in other watersheds may not have improved.

Espinosa et al. (1997) concluded the previous planning efforts and implementation of best management practices on the Clearwater National Forest failed to result in improved conditions in some of its most degraded watersheds, including Lolo, Eldorado, and Pete King creeks. Their publication, however, only considered data and information available through 1995, which was prior to PACFISH and INFISH amending the Clearwater Forest Plan. The previous discussion regarding trends, as well as the following assessment of Land Management Plan effectiveness, includes the older data, plus more contemporary data including PACFISH and INFISH Biological Opinion (PIBO).

For the Nez Perce National Forest, an improving trend is indicated by both forest plan monitoring substrate data at managed sites, as well as PIBO data, particularly in the South Fork Clearwater subbasin. At forest plan monitoring sites in managed watersheds, decreases in cobble embeddedness were evident from 1988 to 2016. Most notable among the decreases were sites in Red River and Newsome Creek. The 1987 Nez Perce Forest Plan identified these watersheds as the Nez Perce National Forest's "priority drainages" and specified that "management-derived sediment which could affect fish habitat will not be allowed until monitoring indicates habitat has recovered to plan levels." Cessation of large-scale development combined with watershed restoration activities initiated in the early 1990s and continuing through 2016, especially those associated with removal of chronic sediment sources, reduced overall sediment yield. This reduction is correlated with improved substrate conditions.

In the Lower Selway subbasin, PIBO data indicates a statistically significant improving trend in the overall index. One forest plan monitoring site in O'Hara Creek, a large, managed watershed below Selway Falls, indicates lower levels in cobble embeddedness from 2011 to 2016 when compared to 1988 to 1995. In the Salmon River subbasins, forest plan monitoring station data suggests substrate conditions may have improved from the early to mid-1990s to 2012 at two sites, both of which are located in the Slate Creek drainage of the Lower Salmon subbasin. Portions of Slate Creek have been heavily managed in the past, particularly Little Slate Creek.

In summary, available information suggests that implementation of land management planning under the Nez Perce Forest Plan, as amended by PACFISH, was successful at preventing long-term management-caused degradation in most watersheds on the Nez Perce National Forest. In addition, available information indicates substrate conditions in many, if not most, managed watersheds on the Nez Perce National Forest have improved since 1988, although the degree of improvement is variable. Improvement in Red River stream substrate conditions is most notable, considering very high levels of deposited fine sediment evident in the mid-to-late 1980s. This improvement is likely a combination of cessation of new permanent road construction and aggressive implementation of aquatic restoration from the 1990s to present. The requirement in the Nez Perce Forest Plan Appendix A to initiate an upward trend in habitat carrying capacity in degraded watersheds, combined with limits on sediment yield and entry frequency and standards and guidelines included in the PACFISH amendment, appear to have been effective in meeting the objective of improving degraded stream habitat, although in most cases streams remain below their objectives, and in many cases are less favorable than reference reaches, but are trending towards them.

For the Clearwater National Forest, substrate data collected in various watersheds across the Clearwater National Forest since the mid-1990s suggests that sediment conditions are improving in some places and improving more slowly than desired in other places. In some places, available data has not detected any improvement.

PACFISH and INFISH Biological Opinion (PIBO) monitoring data for the Lower Clearwater subbasin from 1999 through 2019 indicates stream conditions in managed watersheds are static and remain in a degraded condition when compared to reference. Median substrate, and macroinvertebrate index, both indicators of substrate condition, remain outside of ecoregional reference conditions in sampled reaches on the Nez Perce-Clearwater. However, trend data for this subbaasin indicates that vegetation stability has improved since 1999.

PIBO monitoring data from the Lochsa subbasin, conversely, suggests some habitat attributes have improved during the study period from 1999 to 2019. Even though trends are positive for some indicators, substrate conditions measured by the PIBO protocol appear to be static. The overall trend in PIBO data from the Upper North Fork Clearwater subbasin suggests conditions may have degraded since 1999, although overall conditions remain within the range of reference based on data through 2019.

Examination of departures from reference conditions of status scores at the subbasin scale can help to explain overall index scores by identifying either problem basins or common metrics across the national forest that need improvement (Table 124). For this exercise, the overall index value was included, as it is derived independently of the individual stream attributes and is informative in its own right. Two subbasins, the Lower Clearwater and South Fork Clearwater, each had three metrics that scored significantly lower than ecoregional reference sites, although they were different sets of metrics. The Lower Salmon had two metrics that showed departure, the Upper North Fork Clearwater showed two (one that scored lower and one that scored higher), and the Lochsa did not have any metrics that were different from reference conditions. Of those that were significantly departed, none of the metrics scored significantly lower across all subbasins, indicating that there are not standard problems across the national forest related to one metric. In addition, all the subbasins were not different from reference condition for most metrics. This indicates that "managed" watersheds exhibit a wide range of management effects, and that as a result, stream metrics differ among monitored watersheds.

From 2001 to 2019, most subbasin metrics across the Nez Perce-Clearwater (45 out of 60) had not changed significantly, indicating that in most places, and for most metrics, there has been a lack of degradation since the implementation of PIBO. Of those that did, most (10 out of 15) have been in the desired direction. All the subbasins showed more metrics trending toward desired conditions than away from desired conditions. Of those basins that exhibited trends away from desired conditions, only one (Lower Salmon) showed trends away from desired conditions in more than one metric.

In summary, available information suggests that implementation of land management planning under the Clearwater Forest Plan, as amended by PACFISH and INFISH, succeeded at preventing long-term management-caused degradation in most watersheds on the Clearwater National Forest. Improving trends are indicated in some areas on the Clearwater National Forest where focused aquatic restoration efforts have been implemented, including road decommissioning and riparian fencing. In addition, improvement has also occurred in areas where the implementation of standards and guidelines for roads and riparian habitat conservation areas (RHCAs) arrested continued degradation and facilitated passive restoration.

Aquatic Species

Fish

The Nez Perce-Clearwater supports four fish species that are federally listed as threatened under the Endangered Species Act (ESA) and one species that is listed as endangered. One fish Species of Conservation Concern has been identified on the Nez Perce-Clearwater, and one focal aquatic species has been identified. All are more fully described in the following text, with other aquatic species of interest, and non-native species are identified as well. Species on the regional forester's sensitive species list are also described.

Endangered Species Act Listed Fishes

Snake River Spring/ Summer Chinook Salmon (*Oncorhynchus tshawytscha*)

Status and Distribution: Spring and summer Chinook are two of three ecotypes (commonly called runs) of Chinook that occur in Idaho and are classified by seasonal designations reflecting when adult Chinook enter freshwater to begin their spawning migration. Spring and summer Chinook spawn and rear in most rivers on the national forest (Clearwater, Lochsa, Selway, Salmon) and their larger tributaries. The Snake River spring and summer Chinook Salmon Evolutionarily Significant Unit (ESU) was listed as Threatened on April 22, 1992 (57 FR 27160); Threatened status was reaffirmed May 26, 2016 (81 FR 33468) and July 26, 2022 (National Oceanic and Atmospheric Administration 2022b). The Snake River spring and summer Chinook Salmon ESU includes all naturally spawned populations of spring and summer Chinook salmon originating in the mainstem Snake River and the Tucannon River, Salmon River, Grande Ronde River, and Imnaha River). On June 28, 2005, National Oceanic and Atmospheric Administration Fisheries announced a final policy addressing the role hatchery origin salmon and steelhead in listing determinations under the ESA (70 FR 37204, Hatchery Listing Policy):

"This policy establishes criteria for including hatchery stocks in ESUs and [distinct population segments] DPSs. In addition, it:
(1) provides direction for considering hatchery fish in extinction risk assessments of ESUs and DPSs;
(2) requires that hatchery fish determined to be part of an ESU or DPS be included in any listing of the ESU or DPS;
(3) affirms our commitment to conserving natural salmon and steelhead populations and the ecosystems upon which they depend; and
(4) affirms our commitment to fulfilling trust and treaty obligations regarding the harvest of Pacific salmon and steelhead populations, consistent with the conservation and recovery of listed salmon ESUs and steelhead DPSs" (National Oceanic and Atmospheric Administration 2022a).

The Snake River spring and summer Chinook ESU now includes wild fish as well as fish cultivated from 14 specific hatchery programs, including the Tucannon River Program, Lostine River Program, Catherine Creek Program, Lookingglass Hatchery Program, Upper Grande Ronde Program, Imnaha River Program, Big Sheep Creek Program, McCall Hatchery Program, Johnson Creek Artificial Propagation Enhancement Program, Pahsimeroi Hatchery Program, the Sawtooth Hatchery Program, the Yankee Fork Program, the Dollar Creek Program, and the Panther Creek Program (70 FR 37159; 85 FR 81822). Spring and summer Chinook salmon in the Clearwater basin are not ESA listed or included in this ESU.

Endangered Species Act (ESA) listed Snake River spring and summer Chinook salmon on the Nez Perce-Clearwater are part of two major population groups, which include the South Fork Salmon River and the Middle Fork Salmon River. These major population groups are broad geographic groupings that include populations outside their named river basins. Populations with spring and summer Chinook salmon spawning and rearing on the Nez Perce National Forest include the Little Salmon population and the Chamberlain population, both of which are considered intermediate populations based on historical habitat potential (Interior Columbia Basin Technical Recovery Team 2003). Spring and summer Chinook salmon are distributed throughout the Salmon River and several tributaries, including the Wind River and Crooked Creek, and Bargamin Creek, as shown in the distribution maps in Appendix A.

Under the Magnusen-Stevens Act, as amended, the spawning and rearing habitat provided by rivers and streams on the Nez Perce-Clearwater, are designated as part of the Essential Fish Habitat for Chinook salmon.

Snake River Spring/Summer Chinook populations, like many anadromous fish on the forest, declined starting in the 1800's, due primarily to overfishing and lower productivity from loss of associated marine derived nutrients (Gresh 2000). This decline continued into the 1900's, exacerbated by land use practices. A much smaller decline occurred mid-century, leading to the ESA listing in 1992. Some have hypothesized that this decline was a direct result of the construction of the four lower Snake river dams in the 1970's, however, as noted by (Vendetti 2015), "this line of reasoning does little to explain the concurrent declines in relatively free flowing coastal systems". Further discussion of the coast-wide decline in Chinook populations is found in Atlas et al. 2023, Another explanation is be tied to several regime shifts (Rocha et al. 2015) in the Pacific Ocean in the 1970's and late 1980's (Stephens et al. 2001, Noakes and Beamish 2009) that likely impacted food webs for Snake River Spring/Summer Chinook and other western North American Chinook stocks during their marine residence (Anderson and Piatt 1999). Large-scale drivers such as this have much greater potential to cause population level effects across a wide geographical range than localized events. For example, a similar ocean regime shift is currently contributing to the collapse of a whale population in the North Atlantic (Meyer-Gutbrod et al. 2021).

Felts et al. (2019) reported that results from 2017 monitoring efforts indicate Idaho populations of spring and summer Chinook Salmon are functioning at low abundance relative to historical observations and recovery goals. The most recent status reviews for the Snake River spring and summer Chinook Salmon Evolutionary Significant Unit (ESU) concluded the majority of populations in the ESU were at a high overall risk and recommended no change in status (NOAA 2022, NOAA 2023). Low productivity has been observed since the 2015 status assessment, resulting in a decreased abundance throughout the ESU. Unprecedented warm sea surface temperatures in the Pacific Ocean caused by a major marine North Pacific Heat Wave from 2014 to 2016 (Bond et al. 2015), and in 2019 (Amaya et al. 2020), have been a major driver of recent downward Chinook population trends (NOAA 2022). Idaho populations exhibit a great deal of synchrony with other populations of West Coast salmon and steelhead (Dorner et al. 2017, Kilduff et al. 2015, Mantua 2015, Welch et al. 2021), and spring and summer Chinook Salmon likely remain at a low abundance, and ESA listed populations continue to be considered at a high overall risk as long as ocean conditions are poor. Changes in density independent factors (such as sea surface temperature) which affect productivity could quickly reverse downward trends. As noted by Idaho Department of Fish and Game (IDFG), "Chinook Salmon have a high maximum annual reproductive rate (Myers et al. 1999), meaning populations can quickly increase in abundance when exposed to favorable conditions" (Poole et al. 2022). In 2020 and 2021, ocean conditions began to improve[16] and population index increases were seen. However, 2022 ocean conditions, while still good, were not as strong as 2021[17]. Snake River Spring and summer Chinook abundance on the Nez Perce Clearwater national forest is expected to continue to fluctuate, increasing when ocean conditions remain favorable, and decreasing when they are unfavorable.

In addition to ocean conditions, there is evidence that other major factors likely producing population level effects to Chinook salmon (both abundance and age structure) are ocean mortality through predation by resident orcas (*Orcinus orca*) (Ohlberger et al. 2019) and salmon sharks (*Lamna ditropis*) (Seitz et al 2019, Manishin et al. 2021), as well as estuarine predation by pinnipeds (Chasco et al. 2017, Thomas et al. 2016). The ESA recovery plan continues to list several freshwater factors as limiting to this ESU, including degraded habitat, simplified stream channels, disconnected floodplains, impaired instream flow, and loss of cold water refugia. For more discussion of relative threats to salmonids and how they relate to forest activities, see the discussion in the environmental consequences section of this document.

Idaho Department of Fish and Game (IDFG) conducts spring and summer Chinook index redd (spawning nest) counts in Idaho to monitor trends by major population group (MPG). This information was summarized by Copeland et al. (2019), through 2018, and updated data was provided by IDFG through 2022 (Figure 44)Figure 44. The Nez Perce-Clearwater supports habitat for a portion of the Salmon River MPGs.

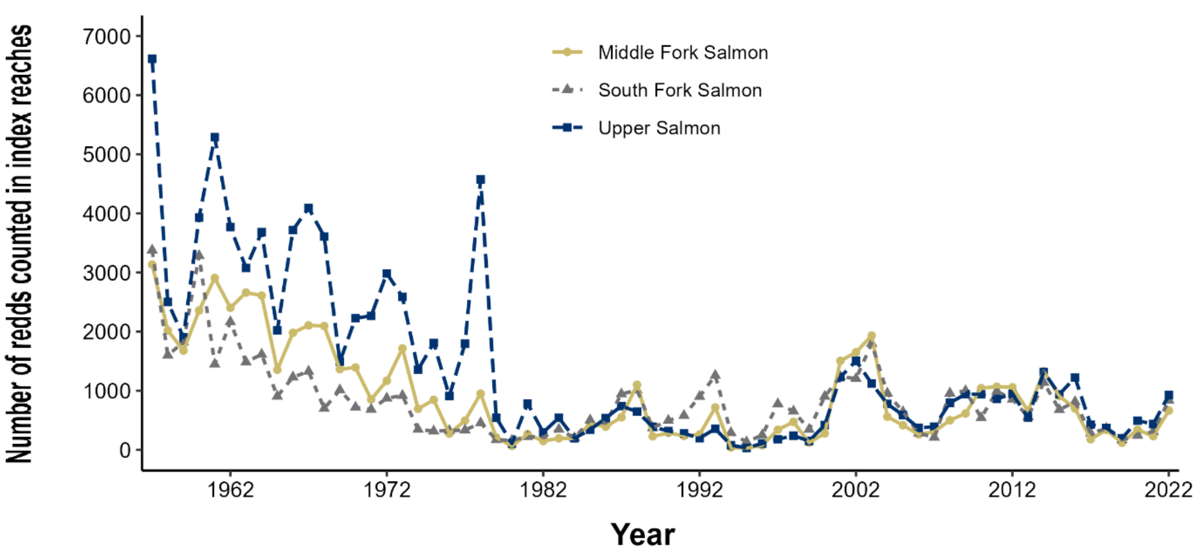


Figure 44. Snake River spring and summer Chinook salmon index redd count trends in Idaho, by major population group from 1966 to 2022. (Data from IDFG)

[16] (https://www.fisheries.noaa.gov/west-coast/science-data/ocean-indicators-summary-2020, https://www.fisheries.noaa.gov/west-coast/science-data/ocean-indicators-summary-2021)
[17] (https://www.fisheries.noaa.gov/west-coast/science-data/2022-summary-ocean-ecosystem-indicators)

Chinook salmon are currently identified as a management indicator species under both the 1987 Nez Perce and Clearwater Forest Plans, as amended.

Designated Critical Habitat: Critical habitat for Snake River spring and summer Chinook salmon was designated on December 28, 1993 (Federal Register, Vol. 58, 68543), effective on January 27, 1994. Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation.

Snake River Steelhead Trout (*Oncorhynchus mykiss*) & Redband Trout (*Oncorhynchus mykiss gairdneri*)

Status and Distribution: Steelhead and redband trout are present throughout the Salmon and Clearwater basins and in most tributaries that are accessible and of sufficient size to support fish. Although classified as the same subspecies, the term "steelhead" generally refers to the anadromous form, while "redband trout" refers to the stream resident form that does not migrate to the ocean (Behnke 1992). These two life histories are just two of many complex life histories expressed by *O. mykiss* (Behnke 2002). When they occur together in a stream, they often interbreed, and progeny from the same parents can exhibit either resident or anadromous life histories (Sloat and Reeves 2014, Courter et al. 2013). Because of these factors, and the difficulty in distinguishing between anadromous and resident fish in the juvenile stage (Thurow 1997; 2007), the term interior redband trout almost always refers to resident redband that are above impassable barriers or outside the range of anadromy (Mulfeld et al. 2015, Thurow et al. 1997). In the Snake River basin, only anadromous steelhead are Endangered Species Act (ESA) listed, while interior redband are not. Because the two life histories are indistinguishable where sympatric, sport fisheries in anadromous waters preclude non-tribal sport harvest of naturally produced fish (as evidenced by intact adipose fin) exhibiting either life history. Tribal anglers are allowed to harvest both clipped (hatchery produced) and some unclipped fish (naturally produced), with unclipped fish being authorized under an ESA take permit. The Snake River Steelhead Distinct Population Segment includes the anadromous form only and is currently listed as threatened under the ESA as of August 18, 1997 (62 FR 43937) and January 5, 2006 (71 FR 833); updated April 14, 2014 (79 FR 20802) and July 26, 2022 (United States National Oceanic and Atmospheric Administration 2022). The steelhead that spawn and rear in the Salmon and Clearwater basins on the Nez Perce-Clearwater are included in this distinct population segment.

The Snake River Basin steelhead distinct population segment (DPS) includes all anadromous populations that spawn and rear in the mainstem Snake River from its mouth to Hells Canyon Dam, and all tributaries except the North Fork Clearwater River above Dworshak Dam, which was completed in 1973. Following the final rule on including hatchery salmon and steelhead (85 FR 81822), the DPS now includes six hatchery programs, including Tucannon River, Dworshak National Fish Hatchery, East Fork Salmon River Natural, Little Sheep Creek/Imnaha, Salmon River B-run, and South Fork Clearwater B-run. The Snake River Basin steelhead distinct population segment is organized into six major population groups (five extant, one extirpated) that are subdivided into 26 populations (two of which are functionally extinct, leaving 24 remaining populations) (Interior Columbia Basin Technical Recovery Team 2003). The major population groups are defined by the following drainage basins: 1) Grande Ronde River, 2) Imnaha River, 3) Clearwater River, 4) Salmon River, 5) Hells Canyon Snake River, and 6) Lower Snake River. The Clearwater and Salmon River MPGs are those within the plan area. The Clearwater major population groups include six independent populations: the historic North Fork Clearwater (extinct), Clearwater River lower mainstem, Lolo Creek, Lochsa River, Selway River, and South Fork Clearwater River. Portions of these populations are located on the Nez Perce-Clearwater. The Lochsa, Selway, and Potlach rivers are managed as wild steelhead refuge areas with no hatchery releases or supplementation occurring within them (Idaho Department of Fish and Game 2013a). Clearwater River steelhead tend to spend an additional year in the ocean and return as larger B-run fish, while fish returning to the Snake and Salmon rivers tend to return earlier, and those populations are primarily classified as A-run fish. Wild steelhead returns from the Clearwater River major population group (MPG) are estimated annually by Idaho Department of Fish and Game (IDFG) using genetic stock indexing (GSI) of fish collected at Lower Granite Dam on the Snake River (Figure 45).

The Salmon River major population group includes portions of two independent populations out of a total of 12 that are found on the Nez Perce-Clearwater – the Lower Salmon River and Little Salmon River population and the Salmon River and Chamberlain population. Wild steelhead returns from the Salmon River MPG are estimated annually by IDFG using GSI of fish collected at Lower Granite Dam on the Snake River (Figure 46).

Populations in the Snake River Evolutionary Significant Units (ESUs) have mostly experienced declines since 2015, largely due to the same factors (warm sea surface temperatures) driving declines in spring and summer Chinook (National Oceanic and Atmospheric Administration 2022b). However, improved ocean conditions in 2020 and 2021 likely contributed to modest increases in wild adult steelhead returns to Lower Granite Dam observed in 2020, 2021 in Salmon River fish, and 2021 in Clearwater River fish (Figure 45 and Figure 46)). Positive responses in dam counts were presumably seen earlier in Salmon River fish because they tend to return to freshwater a year prior to Clearwater River fish.

Steelhead on and originating from the Nez Perce-Clearwater form a nationally renowned sport fishery of considerable socioeconomic importance, attracting anglers from all over the western United States and beyond. Spawning and rearing habitat provided by rivers and streams on the Nez Perce-Clearwater, along with large scale hatchery supplementation, are of utmost importance to the persistence and recovery of this species. The distribution of steelhead across the Nez Perce-Clearwater can be found on the steelhead distribution maps in Appendix A of the Final Environmental Impact Statement. Figure 45 and Figure 46 show the number of wild steelhead returns to the Clearwater and Salmon River Basins from 2009 to 2021, as well as the relative contribution of the different major population groups.

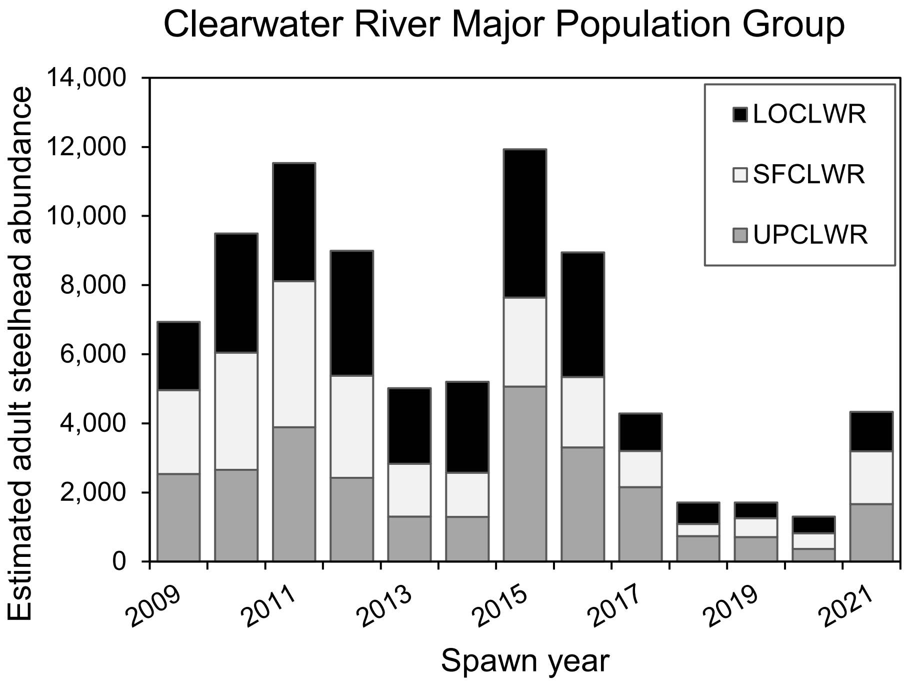


Figure 45. Wild steelhead returns in the Clearwater Basin, 2009 to 2021. Abbreviations are as follows: LOCCLWR is Lower Clearwater River, SFCLWR is South Fork Clearwater River, UPCLWR is Upper Clearwater River. Data from IDFG.

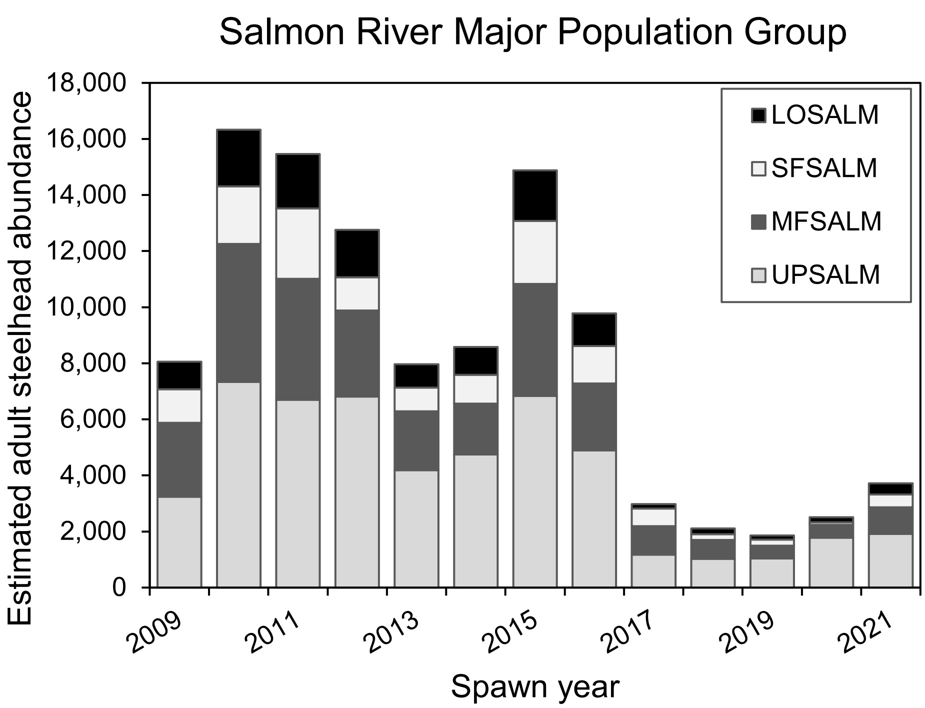


Figure 46. Wild steelhead returns in the Salmon River Basin, 2009 to 2021. Abbreviations are as follows: LOSALM is Lower Salmon River, SFSALM is South Fork Salmon River, MFSALM is Middle Fork Salmon River, UPSALM is Upper Salmon River. Data from IDFG.

Steelhead are currently identified as a management indicator species under both the 1987 Nez Perce and Clearwater Forest Plans, as amended.

Designated Critical Habitat: Critical habitat has been designated for the Snake River distinct population segment and includes the Potlatch, Clearwater, Lochsa, Selway, Middle Fork Clearwater, South Fork Clearwater, main Salmon River, and Little Salmon River mainstems in their entirety, in addition to accessible tributaries on the Nez Perce-Clearwater. Specific reaches were designated as critical habitat are outlined in Federal Register Vol. 70, No. 170 on September 2, 2005. See map in Appendix A.

Snake River Fall Chinook Salmon (*Oncorhynchus tshawytscha*)

Status and Distribution: Snake River fall Chinook salmon were listed as a threatened species under the Endangered Species Act on May 22, 1992 (Federal Register, Vol. 57, 14653).

Fall Chinook salmon migrate and spawn in the mainstem Snake, Salmon, and Clearwater rivers. Spawning has also been documented in the Middle Fork Clearwater, South Fork Clearwater, and Selway Rivers, as well as the lowest reaches of the Potlatch River. The U.S. Fish and Wildlife Service, The Nez Perce Tribe, and Idaho Power Corporation have conducted aerial and deep-water counts of fall Chinook redds in the Snake, Salmon, and Clearwater rivers since 1991. Since then, during most years, the majority of redds are counted in the Snake River below Hells Canyon Dam. During seven out of 31 years, there have been slightly more redds counted in the Clearwater River, due to supplementation efforts in that basin by the Nez Perce Tribe (Figure 47). Limited spawning and rearing by fall Chinook salmon occur in the Imnaha and Grande Ronde Rivers outside the boundaries of the Nez Perce-Clearwater.

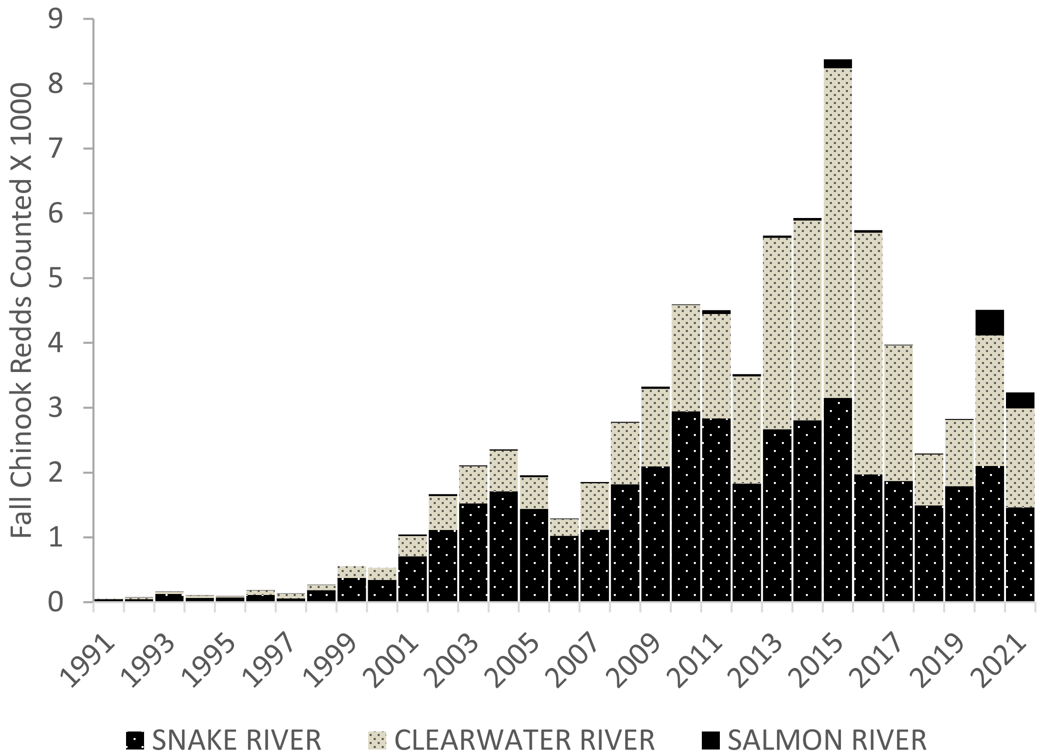


Figure 47. Aerial and deep-water Fall Chinook redd counts in rivers on or adjacent to the Nez Perce-Clearwater National Forest from 1991 to 2021. Data collected by U.S. Fish and Wildlife Service, Nez Perce Tribe, and Idaho Power Corporation

The Recovery Plan for Snake River fall Chinook salmon (National Oceanographic and Atmospheric Agency 2017) serves as a blueprint for the protection and recovery of Snake River fall-run Chinook salmon. It outlines the history of the species for each of seven tributary major spawning areas (MaSA):Tuncannon, Imnaha, Lower Salmon, Lower Clearwater, Grande Ronde, and two Snake River MaSAs. Two of these occur on or adjacent to the national forest: the Clearwater MaSA and the Salmon River MaSA. The recovery plan describes the current status, threats, and intended methods for increasing population sizes. The following is from the recovery plan concerning the Lower Clearwater River Major Spawning Area relevant to Snake River fall Chinook salmon (National Oceanic and Atmospheric Administration 2017).

“The Clearwater major spawning area] includes the 110-mile reach of the mainstem Clearwater River upstream from its confluence with the Snake River at Lewiston, Idaho, to Selway Falls and the lower reaches of the South Fork Clearwater, Middle Fork Clearwater, Potlatch, and Selway rivers. Snake River fall Chinook salmon return to the Clearwater subbasin from late August through December. Most of the [Clearwater River] fish spawn in the lower mainstem Clearwater below the confluence with the North Fork. However, spawning adults have been observed throughout the mainstem Clearwater River, the Middle Fork Clearwater River, and in the lower portions of the Potlatch, South Fork Clearwater, and Selway rivers. Spawning habitat is not considered a limiting factor for fall Chinook salmon in the lower Clearwater River but the impact of degraded water quality conditions could impact fall Chinook salmon spawning and rearing in the South Fork Clearwater River, Selway River, and other spawning areas.”

The recovery plan contains the following concerning the Lower Salmon River major spawning area:

"Data from 2000-2014 redd counts indicate that the lower Salmon River contributes a small percentage (0.8 percent ± 0.1 percent) of the basin-wide Snake River redd counts… Limited information exists on potential factors that could be limiting fall Chinook salmon use of the lower Salmon River. The lower Salmon River flows through both private and public lands, draining steep forested mountain slopes and then shrubs and grasses along the Salmon River canyon. Habitat conditions in the lower Salmon River and lower South Fork Salmon River are affected by excess fine sediment and reduced riparian vegetation from land use activities on adjacent lands and in upstream areas. Water temperatures drop in the lower Salmon River during the fall, and the plume created by cold water from the Salmon River where it enters the Snake River can provide thermal refugia for fall Chinook salmon."

Designated Critical Habitat: Critical habitat was designated on December 28, 1993 (Federal Register, Vol. 58, No. 247, p 68543), effective on January 27, 1994. Designated critical habitat for Snake River fall Chinook includes all Columbia River estuarine areas, the Columbia and Snake rivers, all Snake River reaches upstream to Hells Canyon Dam, the Palouse River up to Palouse Falls, the Clearwater River from its confluence with the Snake River upstream to its confluence with Lolo Creek, and the North Fork Clearwater River from its confluence with the Clearwater River upstream to Dworshak Dam, and the Lower Salmon subbasin. All HUC8 subbasins managed by the Nez Perce-Clearwater except for the Upper and Lower North Fork Clearwater are Essential Fish Habitat (EFH) for Chinook salmon under the Magnuson-Stevens Act (1976, as amended). There were 5-year status reviews released by National Oceanic and Atmospheric Administration fisheries in 2016 (National Oceanic and Atmospheric Administration 2016) and 2022 (National Oceanic and Atmospheric Administration 2022a), and the most recent one determined that listed status was still warranted still warranted, and that although the extant population met viability criteria, and extinction risk had improved and was low, that the Evolutionary Significant Unit (ESU) was still not meeting recovery goals.

Columbia River Bull Trout (*Salvelinus confluentus*)

Status and Distribution: Bull trout are present throughout the Clearwater and Salmon River basins and spawn and rear in many tributaries. Bull trout in these basins are included in the Columbia River bull trout distinct population segment, which was listed as threatened under the Endangered Species Act in 1998 (Federal Register Vol. 63 No. 111, p 31647). A 5-year status update was completed in 2008 (USFWS 2008) and 2015 (USFWS 2015), and another status update is currently underway (March 11, 2020 85 FR 14240).

Life history strategies present on the Nez Perce-Clearwater include resident, fluvial, and adfluvial. A significant adfluvial population is located in the North Fork Clearwater River (Hanson et al. 2014). It developed following construction of Dworshak Dam and establishment of Dworshak Reservoir. Two smaller potential adfluvial populations were thought to be associated with high mountain lakes, coincidentally both named Fish Lake. Fish Lake #1 is located in the Upper North Fork Clearwater subbasin and Fish Lake #2 is located in the Lochsa subbasin. Both populations are small. Although both populations have previously been thought to be adfluvial (CBTRT 1998), data from Idaho Department of Fish and Game (IDFG) suggests that Fish Lake #1 bull trout may be resident rather than adfluvial (Schriever and Schiff 2001 *in* NPCC 2003). There is currently ongoing genetic research at the University of Idaho that intends to help identify the life histories of bull trout residing in this lake. Preliminary results of that research indicate that bull trout in Fish Lake #1 are a small resident population (Alexandra Fraik, USFS, personal communication).

Fluvial populations are present in the Lochsa, Selway, South Fork Clearwater, Lower Little Salmon, and Middle-Salmon Chamberlain subbasins. In the Lower Salmon, there is one watershed in which fluvial bull trout are known to spawn and rear, Van Buren Creek, which is a high elevation stream in the Slate Creek watershed. A large fluvial bull trout population is also present in Rapid River, in the Lower Little Salmon subbasin. The status of bull trout distribution across the Nez Perce-Clearwater can be found on the bull trout distribution maps in Appendix A.

Both the Salmon Mid-Columbia Recovery Unit and Upper Snake Recovery Unit are designated as recovery units by the U.S. Fish and Wildlife Service for this distinct population segment, as well as local populations and potential local populations. A local population is defined as a group of bull trout using spawning and rearing habitat in stream complexes where there is a high probability of mating between these same individuals. A potential local population is defined as a population that may inhabit a stream complex, but sufficient data is lacking.

Bull trout are currently a management indicator species under the 1987 Clearwater Forest Plan, as amended. Bull trout are not a focal species under the new Land Management Plan, because focal species cannot be Endangered Species Act (ESA) listed.

In November 1999, all populations of bull trout were listed by the U.S. Fish and Wildlife Service within the coterminous United States as a threatened species pursuant to the ESA of 1973, as amended (U.S. Department of the Interior 2015c). The Columbia River distinct population segment occurs throughout the entire Columbia River basin within the United States and its tributaries. Critical habitat was designated for bull trout in 2010.

Bull trout core areas within the Clearwater River likely contain some of the most robust populations within the Lower Snake Region of the Mid-Columbia Recovery Unit. Most core areas within the Clearwater River basin are strongholds (U.S. Department of the Interior 2015d). The Clearwater River is one of four basins that contain the healthiest and most stable bull trout populations in the recovery unit.

The Clearwater River basin includes four core areas: South Fork Clearwater River, North Fork Clearwater River, Lochsa River, and Selway River. Bull trout are distributed throughout most of the large rivers and associated tributary systems within the Clearwater River core areas and exhibit adfluvial, fluvial, and resident life history patterns.

Bull trout are widely distributed throughout the South Fork Clearwater River. Trend data for the South Fork Clearwater River core area (Meyer et al. 2014) has been previously cited to indicate that bull trout are exhibiting a declining trend in this core area (Meyer et al. 2014, U.S. Department of the Interior 2015a, d). This was an erroneous interpretation of that data and ignored the study author's analysis and discussion of data quality. Screw trap data from the South Fork Clearwater Core Area showed an increasing trend in abundance, while snorkeling data from the same area showed a decreasing trend in abundance. However, the snorkeling data was found by the authors to have a high level of observation error that influenced its reliability, while the screw trap data had zero observation error and therefore a high level of reliability. For these reasons, a more appropriate interpretation of that study is the one made by the study authors that the South Fork Clearwater Core area showed an increasing trend in abundance based on screw trap data (Meyer et al. 2014). Fluvial and resident bull trout are the predominant life history forms known to occur within this core area. Bull trout are currently known to use habitat in five stream complexes within the South Fork Clearwater local populations. These local populations include Red River Complex, Crooked River Complex, Newsome Creek Complex, Tenmile Creek Complex, and Johns Creek Complex.

Bull trout are widely distributed within the North Fork Clearwater River core area, with bull trout redds documented in at least 33 streams associated with the 12 stream complexes since 1994 (Hand et al. 2018). Bull trout are currently known to use habitat in at least 12 streams or stream complex local populations. These local populations include the Kelly Creek Complex, Cayuse Creek Complex, Moose Creek Complex, Upper North Fork Clearwater River Complex, Weitas Creek Complex, Quartz Creek, Skull Creek, Isabella Creek, Little North Fork Clearwater River Complex, Floodwood Creek, Fourth of July Creek, and Fish Lake. Fish Lake, which was thought to support a small adfluvial population (which may actually be a resident population), was formerly a separate core area and is now included within this core area. Based on redd counts as an indicator of abundance, populations in this core area are increasing.(U.S. Department of the Interior 2015d, Meyer et al. 2014, Erhardt and Scarnecchia 2014).

The Salmon River basin includes two core areas within the Nez Perce-Clearwater: Little Lower Salmon River Core Area and the Middle Fork Salmon River–Chamberlain Core Area. Within the Little Lower Salmon River Core Area, bull trout are currently known to use spawning and rearing habitat in three streams or stream complex local populations on the Nez Perce-Clearwater. These local populations include Slate Creek, John Day Creek, and Rapid River. The mainstem Salmon River provides for migration, adult and sub-adult foraging, and rearing and wintering habitat. The Little Salmon River also provides for foraging and adult rearing habitat and connectivity between local populations in the core area. The most recent trend information for this core area showed that the population is stable (Meyer et al. 2014) (U.S. Department of the Interior 2015d).

Within the Middle Fork Salmon River–Chamberlain Core Area, bull trout are currently known to use spawning and rearing habitat in four streams or stream complex local populations on the Nez Perce-Clearwater. These local populations include Bargamin Creek, Wind River, Sheep Creek, and Sabe Creek. The mainstem Middle Fork Salmon River provides for migration, adult and sub-adult foraging, and rearing and wintering habitat. Bull trout spawning and rearing occurs in the upper reaches of the creeks and subadult and adult rearing occurs in the remainder of the drainages. The most recent trend data from Idaho Department of Fish and Game (U.S. Department of the Interior 2015d) indicates that this core area's population is increasing.

Bull trout are currently known to use habitat in 17 streams or stream complexes within the Lochsa River drainage (i.e., local populations).These local populations include Fishing, Legendary Bear, Boulder, Fox, Shotgun, Crooked Fork/Hopeful, Rock, Haskell, Colt Killed (White Sands), Beaver, Storm, Brushy Fork, Spruce, Twin, Walton, and lower Warm Springs Creeks and Fish Lake . Bull trout are currently known to use habitat in at least 10 streams or stream complexes (i.e., local populations) within the Selway River drainage These local populations include Meadow Creek Complex, Moose Creek Complex, Little Clearwater River Complex, Running Creek Complex, White Cap Creek Complex, Bear Creek Complex, Deep Creek Complex, Indian Creek Complex, Magruder Creek, and Upper Selway River Complex (U.S. Department of the Interior 2015d).

There has been some concern about introgression from non-native brook trout (Peterson, Reiman, and Young 2009), but a recent study in the plan area (Voss et al. 2023) found that

"Brook Trout and Bull Trout rarely co-occurred in reaches where they had the geographic and physiological opportunity to do so, and this pattern was consistent across a wide range of abiotic conditions".

This spatial separation may be effective in limiting interactions between them.

The Idaho Department of Fish and Game (IDFG) has completed extensive analysis of bull trout trend data throughout the state. Using models that accounted for the variation in data quality has provided insight into trends statewide and within the national forest. The state's analysis of state space model parameters has indicated that bull trout are stable or increasing in most IDFG surveyed streams on the national forest and determined that most streams are likely at or near carrying capacity for bull trout (Meyer et al. 2014). The lack of strong bull trout population trends on the national forest is consistent with the notion that bull trout populations are stable and are at or near carrying capacity, which is not surprising for a wide-ranging predatory fish that functions at a high trophic level (High et al. 2008) (Meyer et al. 2014).

Designated Critical Habitat: There are 1,680.25 miles of designated critical habitat for bull trout within the boundary of the Nez Perce-Clearwater. The Clearwater River basin contains 1,282.35 miles of critical habitat within five subbasins: the Lochsa River contains 303.14 miles, the Middle-Lower Clearwater contains 22.88 miles, the North Fork Clearwater contains 355.21 miles, the Selway River contains 290.42 miles, and the South Fork Clearwater River contains 310.72 miles. The Salmon River basin contains 397.90 miles of critical habitat within the national forest boundary. The Little-Lower Salmon contains 201.65 miles, and the Middle Salmon River-Chamberlain River contains 196.25 miles.

Critical habitat for bull trout was designated most recently on October 10, 2010 (Federal Register Vol. 75, No. 200). See map in Appendix A. The U.S. Forest Service received a Biological Opinion from the U.S. Fish and Wildlife Service for bull trout rangewide on federal lands in 2018 (U.S. Department of the Interior 2018a).

Snake River Sockeye Salmon (*Oncorhynchus nerka*)

Status and Distribution: Snake River sockeye salmon were listed as an endangered species on November 20, 1991 (Federal Register, Vol. 56, p 58619). A 5-year status review was released in 2016 (National Oceanic and Atmospheric Administration 2016). On the Nez Perce-Clearwater, sockeye salmon are found in the mainstem Salmon River only, which functions as a migratory corridor for this species. No spawning or rearing habitat is located on the Nez Perce-Clearwater. Sockeye salmon are not found in the Clearwater Basin.

Designated Critical Habitat: The mainstem Salmon River, from its headwaters to the confluence with the Snake River, is included as critical habitat for Snake River sockeye salmon. Critical habitat for Snake River sockeye salmon was designated on December 28, 1993 (Federal Register, Vol. 58, No. 247, p 68543), effective on January 27, 1994. Other than the mainstem Salmon River, there is no designated critical habitat for this species on the Nez Perce-Clearwater.

Species of Conservation Concern

Pacific Lamprey (Entosphenus tridentatus)

Status and Distribution: Pacific lamprey are not listed under the Endangered Species Act (ESA) but have been proposed as a Species of Conservation Concern under this Land Management Plan and are a State of Idaho endangered species. They are listed on the state endangered list in part because they have low and declining populations. Pacific lamprey were petitioned for ESA-listing along with three other lamprey species in 2003, but the U.S. Fish and Wildlife Service 90-day determination, released in 2004, was that listing was unwarranted (69 FR 77158). Historically they were widely distributed in the Snake River below Shoshone Falls, and juveniles were commonly seen in Idaho streams in the 1960s; now lamprey are only found in the Salmon and Clearwater drainages and tributaries to the Snake River below Hells Canyon Dam. They are irregularly distributed in the

Clearwater drainage (Cochnauer and Claire 2004, Idaho Department of Fish and Game 2011). These prehistoric fish are anadromous and spend at least a year and half in the ocean as parasites attached to fish and marine mammals. Adults migrate to tributary streams and spawn in the spring and summer, dying soon after spawning. Juveniles burrow in sand and silt and can live in freshwater for up to seven years before migrating to the ocean. Larval lamprey rear in tributary streams with high water quality, large woody riparian vegetation, and overhanging banks, and low velocity areas with fine substrate (Cochnauer and Claire 2004, Idaho Department of Fish and Game 2011). Areas where juvenile lampreys are known to exist include Red River, Newsome Creek, the mainstem South Fork Clearwater River, the mainstem Selway River, the mainstem Salmon River, the mainstem Lochsa River, Crooked Fork Creek, the mainstem Clearwater River, the Potlatch River watershed, and Lolo Creek (Figure 48).

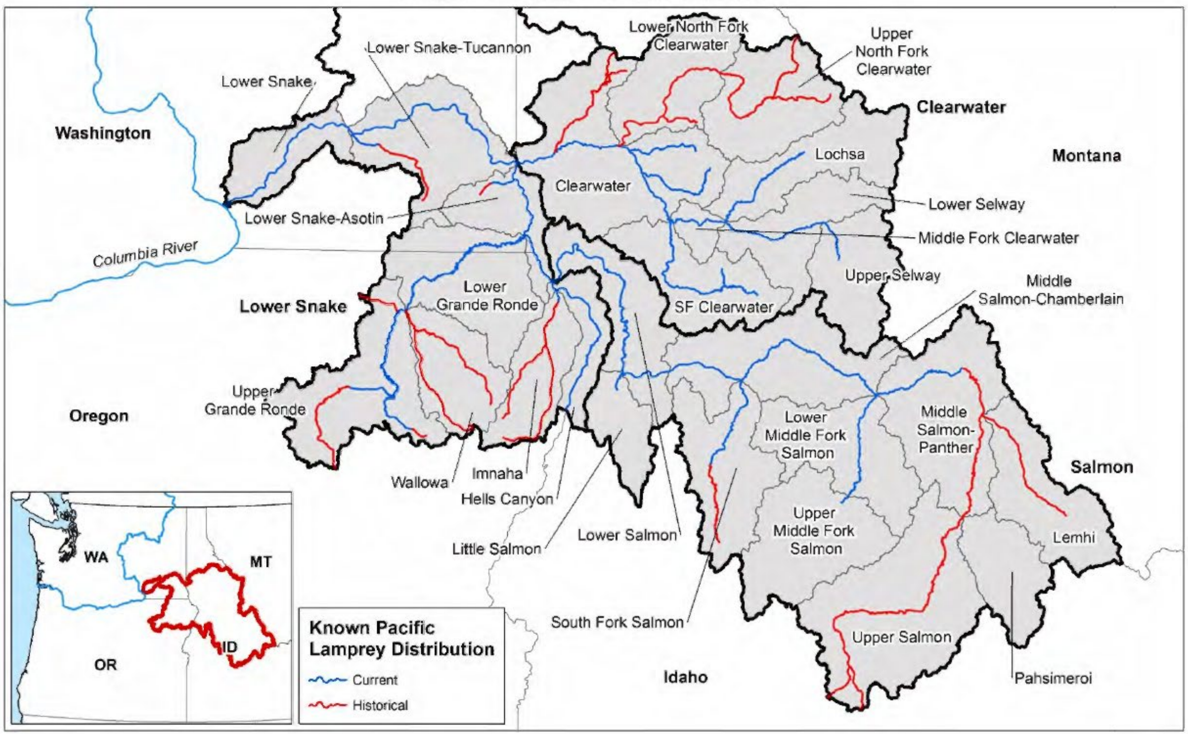


Figure 48. Current Pacific lamprey distribution and location of 16 4th HUCs in the Snake River Regional Management Unit (USFWS Data Clearinghouse 2017) (reproduced from US Department of Interior 2018)

In Idaho, Pacific lamprey are listed as endangered under Idaho Code but not under the federal Endangered Species Act (ESA) (Idaho Department of Fish and Game 2019a). Species listed as threatened and endangered wildlife under Idaho Code have no statutory protection in contrast to the federal ESA. Their classification as threatened or endangered is a policy statement for management and not for legal purposes.

Pacific lamprey are native to Idaho. The Idaho Department of Fish and Game is a signatory to the Conservation Agreement for Pacific lamprey in the states of Alaska, Washington, Oregon, Idaho, and California (Pacific Lamprey Conservation Agreement 2012). The agreement is designed to promote implementation of conservation measures for Pacific lamprey throughout its range. Historic abundance of Pacific lamprey in Idaho is not well documented; however, in recent years, rangewide abundances have been increasing due to improvements in upstream passage at hydropower facilities and translocations by tribal programs in the Snake River basin. The primary management focus in

Idaho will be continued monitoring of habitat occupancy within rivers and streams accessible to anadromous fish and continued cooperation with Tribal entities on translocations programs in Idaho. Towards that end, a collaborative effort between the U.S. Fish and Wildlife Service, the Idaho Department of Fish and Game, and tribes using eDNA sampling was initiated in 2018 that spans the extent of potential Pacific lamprey habitats in Idaho. Information regarding species occurrence from the new eDNA data sets can be used with historical survey information to develop distribution models and better describe status and trends (Idaho Department of Fish and Game 2019a).

The Nez Perce Tribe supplements adult Pacific lamprey that are collected from three lower mainstem Columbia River dams, overwintered at the Nez Perce Tribal Hatchery on the Clearwater River at Cherry Lane, and released into target tributaries in the Snake, Clearwater, and Salmon basins. In 2019, the Nez Perce Tribe expanded their efforts and began releasing adult lamprey into the East Fork of the Potlatch River. These adults were not overwintered but directly released in the fall. Additional summer releases occurred in the Lolo Creek, Orofino Creek, Newsome Creek, and Red River drainages in central Idaho. The Nez Perce Tribe and the Columbia River Inter-Tribal Fish Commission are monitoring movements of the supplemented adults using passive integrated transponder (PIT) tags and detections at PIT tag arrays (Erhardt et al. 2020).

Pacific lamprey is currently designated a sensitive species in the Forest Service Northern Region. This category of designation will be eliminated in the revised plan. The regional forester will create and maintain a new list based on a category known as Species of Conservation Concern (SCC). The Pacific lamprey was recommended to be listed by the regional forester as a SCC on the Nez Perce Clearwater National Forest.

Other Fishes of Interest

This section contains fishes present on the national forest that may be of interest to stakeholders but do not currently have federal status under the Endangered Species Act (ESA) or the revised forest plan. Some of these species are included in management plans by state or tribal authorities, and most are part of important sport fisheries that occur on the national forest. As such, they are economically and culturally important to stakeholders in the plan area and region. To be comprehensive within the plan area, and because they occur within the national forest boundary, status of these species will be discussed, but effects analysis and effects determinations will not be made, with the exception of coho, which lack ESA listing status but retain Essential Fish Habitat under the Magnuson-Steven Act (1976, as amended). However, it is worth noting that since these species of interest are sympatric with fish species that have federal status, they are expected to receive similar benefits from plan components designed to address aquatic habitat and stream function.

Clearwater Spring and Summer Chinook (*Oncorhynchus tshawytscha*)

Status and Distribution: Clearwater spring and summer Chinook are not listed under the ESA, nor are they considered a SCC. They are a hatchery origin stock that is released at several locations within the plan area, and as such are widely distributed throughout the Clearwater Basin, offering regionally renowned sport and tribal fisheries in several areas, including the Lower Clearwater, Middle Clearwater, South Fork Clearwater, North Fork Clearwater (below Dworshak Dam), and the Middle Fork Clearwater.

Spring and summer Chinook salmon in the Clearwater Basin historically were part of two (Wet and Dry Clearwater) out of seven Major Population Groups that are considered extirpated. They are not listed under the Endangered Species Act (ESA) because Lewiston Dam, constructed in the 1920s, had inadequate fish passage and eliminated the native run because very few fish were successful at passing the dam Mathews and Waples 1991 (Waples, Johnson, and Jones 1991, Waples, Jones, et al.

1991). Incidentally, the earliest recorded fish passage records from Lewiston Dam observed only summer-run fish, indicating that the Clearwater run may have been primarily a summer run (Holmes 1961). Following fish passage modifications that were completed around 1940, spring Chinook salmon from out-of-basin stocks were reintroduced by the State of Idaho and U.S. Fish and Wildlife Service, primarily through egg outplants into gravel rearing channels established at state-operated facilities on the Nez Perce-Clearwater. These egg outplants did not result in high numbers of adult returns in the 1950s (mean 35 per year) and began to increase in the early 1960s (mean 52 per year), with more fish returning in the late 1960s and early 1970s (mean 1215 per year) (Lindland 1979). Following removal of the dam in 1973, Chinook salmon reintroduction efforts were expanded by the State of Idaho with smolt releases in the 1970s and joined by the U.S. Fish and Wildlife Service with smolt releases in the 1980s. These reintroduction efforts used fish from out-of-basin sources, primarily Rapid River (state programs) and the lower Columbia River (federal programs), and a hatchery-origin run was established throughout most of their historic range in the Clearwater Basin, with the primary objective of providing sport and tribal harvest opportunities. Spring and summer Chinook salmon continue to be released into the Clearwater basin through an extensive hatchery program primarily coordinated through the Lower Snake Compensation Plan, with the goal of mitigating for lost harvest opportunities due to the federal Lower Snake River Dams. Annual smolt or parr release targets for these hatcheries are currently 6,874,000 fish released into the Clearwater basin (Leth and Noyes 2022). Adult hatchery fish that escape harvest and spawn in the Clearwater River have created a small, naturalized component of this stock that is not considered distinct (from an ESA perspective) from the hatchery produced component and now occupy rivers and streams throughout the Clearwater Basin, as shown in the distribution maps in Appendix A. Most hatchery fish released in this basin receive an adipose fin clip to distinguish them from naturally produced fish. Intentional releases of unclipped hatchery fish occur in this basin, with rates varying by year, but averaging approximately 10 percent. For example, in 2021 unclipped hatchery releases totaled 10.7 percent of total spring and summer Chinook releases in the Clearwater basin (2021 Clearwater AOP). In 2021, estimated returns of unclipped adult Chinook to this basin were also approximately 10 percent (2021 Clearwater AOP), and although some of these fish are presumably naturally produced, this proportion includes unclipped hatchery fish. Spring and summer Chinook salmon occupy rivers and major tributaries throughout the Lochsa, Selway, Middle Fork, and South Fork Clearwater rivers and many of their tributaries.

Foreign populations of anadromous salmonids frequently perform poorly compared to stocks within their original range, presumably due to lack of local adaptation (Taylor EB 1991, Waples 1991, Fraser et al. 2011, McConnell et al. 2018). Increased hatchery supplementation in the Clearwater has failed to produce lasting increases in abundance or productivity (Vendetti et al 2018). Clearwater spring and summer Chinook have routinely exhibited lower smolt-to-adult return rates (approximately half) compared to South Fork Salmon River fish, even though South Fork Salmon River fish were one of the primary original broodstock sources used by Idaho Department of Fish and Game facilities to establish Clearwater stocks (Leth and Noyes 2022). Similar results are also reported in wild populations, for example, Peterson et al. (2014) reported that lack of local adaptation in a wild sockeye salmon stock resulted in half as many offspring. These results underscore the importance of local adaptation in cultivating population resilience in recovery of salmonid populations, which is likely to be even more important in the face of climate change. The uncertainty of the original run timing (likely primarily summer run), as well as the lack of local adaptation in Clearwater spring/summer Chinook are unlikely to be advantageous in the populations' probability of resilience in the future as they experience the effects of climate change. This is evident in predictions of adult pre-spawn mortality based on Northwest temperature predictions through 2040 found in Bowerman et al. (2021), who, although they erroneously included Clearwater fish with the Snake River Evolutionary Significant Unit (ESU), predicted that hatchery fish, and Clearwater fish would be likely to exhibit higher temp related pre-spawn mortality than Endangered Species Act (ESA) listed wild fish

Although Clearwater spring and summer Chinook were not included in the Snake River ESU of ESA listed fish (Good et al. 2005), The Interior Columbia Technical Recovery Team does continue to monitor hatchery populations within the Wet and Dry Clearwater major population groups (MPGs)(which are both extirpated MPGs) (Figure 49), as well as the other extirpated MPGs, in order to provide ongoing assessment of the conservation value that these populations may have in the future (U.S. Department of Commerce 2007). In the latest 5-year review for the Endangered Species Act listed stock (National Oceanic and Atmospheric Administration 2022), National Oceanic and Atmospheric Administration Fisheries detailed the current relationship that Clearwater spring and summer Chinook have with the ESU:

"Four non-ESA-listed hatchery programs operate in the Clearwater River basin: Kooskia spring Chinook, Clearwater Fish Hatchery spring/summer Chinook salmon, Nez Perce Tribal Hatchery spring/summer Chinook salmon, and Dworshak spring Chinook salmon programs. Chinook salmon in the Clearwater River are not part of the listed Snake River (SR) spring/summer Chinook salmon ESU, and critical habitat for the ESU was not designated in the Clearwater River basin. The hatcheries in the Clearwater basin are operated as segregated programs and focus on keeping hatchery fish separate from natural-origin populations. NMFS completed a consultation on these programs in 2017 and determined that the programs are not likely to appreciably reduce the likelihood of survival and recovery of the (Snake River) spring/summer Chinook salmon ESU (NMFS 2017d). These hatchery programs have implemented new strategies to limit straying of program fish into areas where ESA-listed fish are present (NMFS 2017d). Straying effects and population-level pHOS values of all programs do not constitute a serious threat to the (Snake River) spring/summer Chinook salmon ESU. They are considered negligible since all of the population level pHOS values from the proposed programs are below 0.05."

To provide more fisheries in the Clearwater basin, the State of Idaho has operated a hatchery summer Chinook program since 2009, utilizing hatchery broodstock from the South Fork Salmon River. Smolts were originally released in 2011 from Crooked River, but poor returns prompted a move in 2014 to release fish from the Powell satellite facility on the upper Lochsa (IDFG et al. 2022).

Clearwater spring and summer Chinook salmon are no longer present in the North Fork Clearwater River above Dworshak Dam, as this population was already extirpated before construction of Dworshak Dam in the late 1960s and early 1970s. Dworshak dam was completed in 1973. Although they were previously a sensitive species under the 1987 plan, spring and summer Chinook salmon in the Clearwater basin are a not a Species of Conservation Concern, primarily because the original stock was extirpated, and the reintroductions utilized out-of-basin fish that do not currently meet the criteria of being native (Matthews and Waples 1991, Waples 1991) to the plan area. The decision to consider them non-native provides consistency between federal agencies, in this case between Forest Service and National Oceanic and Atmospheric Administration Fisheries.

The lack of local adaptation, in combination with continued use of out-of-basin eggs to supplement shortages, and low observed percentage of natural origin broodstock (pNOB) values within the Clearwater Basin (Horn et al. 2023) suggest that this stock is likely to remain dependent on hatchery supplementation. As there are federal hatchery programs (Lower Snake Compensation Plan and Mitchell Act) in place to provide funding for that supplementation, it is expected that this stock will persist over the life of the plan. The importance of the sport and tribal fisheries that are provided by this stock to the region cannot be understated. They are vastly important culturally and economically to the area. Although these fish benefit from forestwide plan components designed to protect aquatic habitat and fisheries, they are also expected benefit from a "fine filter" plan component (FW-GL-WLMU-02) that is designed to promote collaboration with partners for conservation of this population, which provides culturally and economically important fisheries in the Clearwater basin.

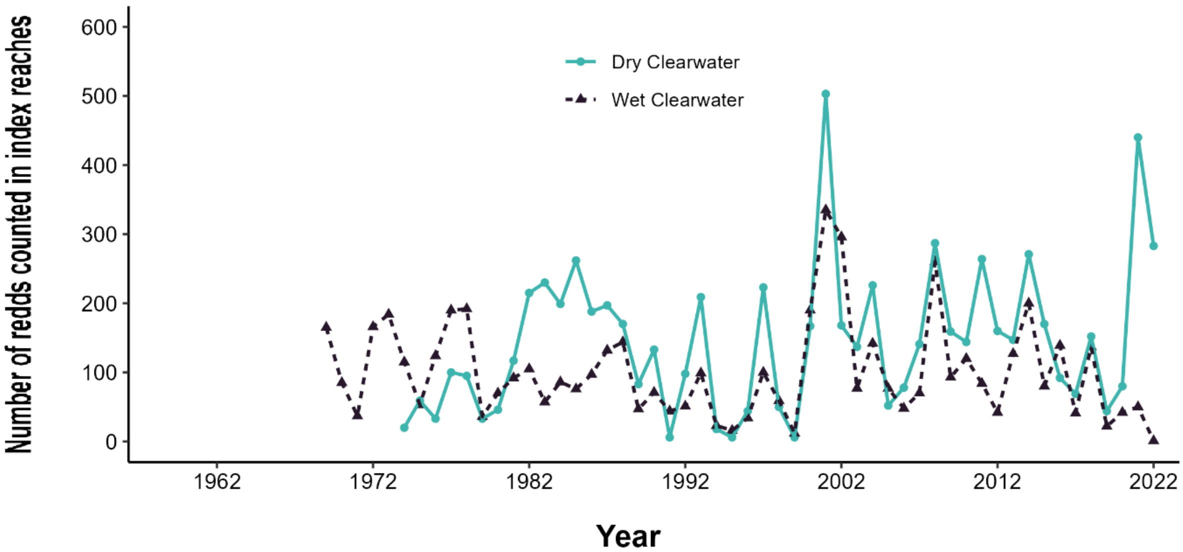


Figure 49. Spring and summer Chinook salmon index redd count trends in the Clearwater River Idaho, by major population group (in this instance these are considered extirpated major population groups) from 1966 to 2022. (Data from IDFG).

Westslope Cutthroat Trout (*Oncorhynchus clarki lewisi*)

Status and Distribution: Westslope cutthroat trout is not listed under the Endangered Species Act nor is it proposed as a Species of Conservation Concern. It is the Idaho state fish. The species is widely distributed across the Nez Perce-Clearwater. It provides a regionally renowned sport fishery in several areas, including the Lochsa, North Fork Clearwater, and Selway rivers and the Kelly Creek tributary to the North Fork Clearwater River.

Kennedy and Meyer (2015) found that westslope cutthroat trout are generally stable or increasing in abundance across much of Idaho. In the Clearwater River subbasin, the population growth was positive or stable. No samples showed statistically negative population growth. Data was collected through screw traps, snorkeling, and angling in the Lochsa River, including Colt Killed Creek and Crooked Fork Creek; the South Fork Clearwater River, including Red River and Crooked River; and the Selway River, including tributaries. Mallet and Thurow (2022) recently characterized the successful westslope cutthroat trout recovery in Idaho as an example and pattern of conservation success for others to follow. There has been concern in the past about the potential for non-native rainbow trout introgression with westslope cutthroat trout on the North Fork Clearwater River (Weigel et al. 2003) and competition with non-native brook trout, however, non-native rainbow trout stocked above Dworshak by IDFG have been sterile triploids since the 1990's, and non-triploid brook trout are no longer stocked on the forest. Where they do overlap, modelling suggests that warming temperatures expected to occur due to climate change may be beneficial to cutthroat and detrimental to brook trout (Wenger et al. 2011).

Westslope cutthroat trout were designated as a sensitive species on the Nez Perce and Clearwater national Forests in 2011 but will not be included on the SCC list in part because of high abundance and a revision in the State of Idaho NatureServe ranking to S4 – Apparently Secure. They were also a management indicator species under both the 1987 Nez Perce and Clearwater Forest Plans. The SCC category under the new plan has different criteria from the old sensitive species list (77 FR 21162, April 9, 2012). Westslope cutthroat trout will not be included in the SCC species list for the Nez Perce-Clearwater National Forest under the revised plan, as they do not meet the criteria.

Sculpin (*Cottus* spp.)

Several species of sculpin have been described in the Clearwater basin, including Mottled (*C. bairdi*), Torrent (*C. rhotheus*), Paiute (*C. beldingi*), which were reported to be distributed primarily in lower and middle elevations, and Shorthead (*C. confusus*), which were reported to be distributed higher in the Clearwater watershed ((Maughan 1978), (Maughan and Saul 1979). Hubbs and Schultz reported a distinct sculpin in 1932 (*C. tubulatus*) in what was presumably the Potlatch River from the narrative description (most likely misidentified in publication as "a tributary to the North Fork Clearwater" by the study authors, but this error was corrected by Maughan in 1974)(Young et al. 2022). Young et al. (2013), in examining the genetic structure of various populations of sculpins, noted that "sculpins in the Clearwater River may warrant additional taxonomic attention due to indication of high intraspecific divergence." There are likely similar assemblages of sculpin in the Salmon River, however, none have been described in the literature. It is worth noting here that sculpin species are notoriously difficult to differentiate, and genetic techniques will likely improve sculpin taxonomy in the future, but sculpin assemblages on the Nez Perce-Clearwater are widely distributed and important to the ecology of streams on the national forest.

Coho Salmon (Oncorhynchus kisutch)

Coho salmon were historically native to the Clearwater basin but were extirpated. Reintroduction efforts by the State of Idaho began in the 1960s but were abandoned after years of poor success, and coho were declared extirpated in 1985 (Galbreath et al. 2014). In 1994, as part of the Snake River Basin Adjudication, the Nez Perce Tribe began reintroduction efforts in the Clearwater River using surplus eggs from Lower Columbia River hatchery programs. Tribal reintroduction efforts in the basin have been very successful, with a new reintroduction program expanding into the Lostine River in the Wallowa watershed in the Grande Ronde basin (adjacent to the plan area) in Washington in 2018. With the addition of the Wallowa program the Tribe release goals are over 1.2 million smolts into watersheds above Lower Granite Dam. Figure 50 shows adult coho returns by year to Lower Granite Dam. Except for fish destined for the Wallowa basin, these fish originated from, and will return to, streams and hatcheries within the plan area. Because the original stock was extirpated, and subsequently re-introductions used out-of-basin stocks, coho within the plan area are not eligible for Endangered Species Act listing. However, under the Magnuson-Stevens Act, their historic range in the Clearwater basin is still designated as essential fish habitat (EFH) for coho, primarily because it is done for an aggregate of all United States stocks, and because EFH is determined at the subbasin (HUC 8) scale. The plan component FW-GL-WLMU-02 is designed to promote collaboration and conservation of this species, which provides culturally and economically important fisheries in the Clearwater basin.

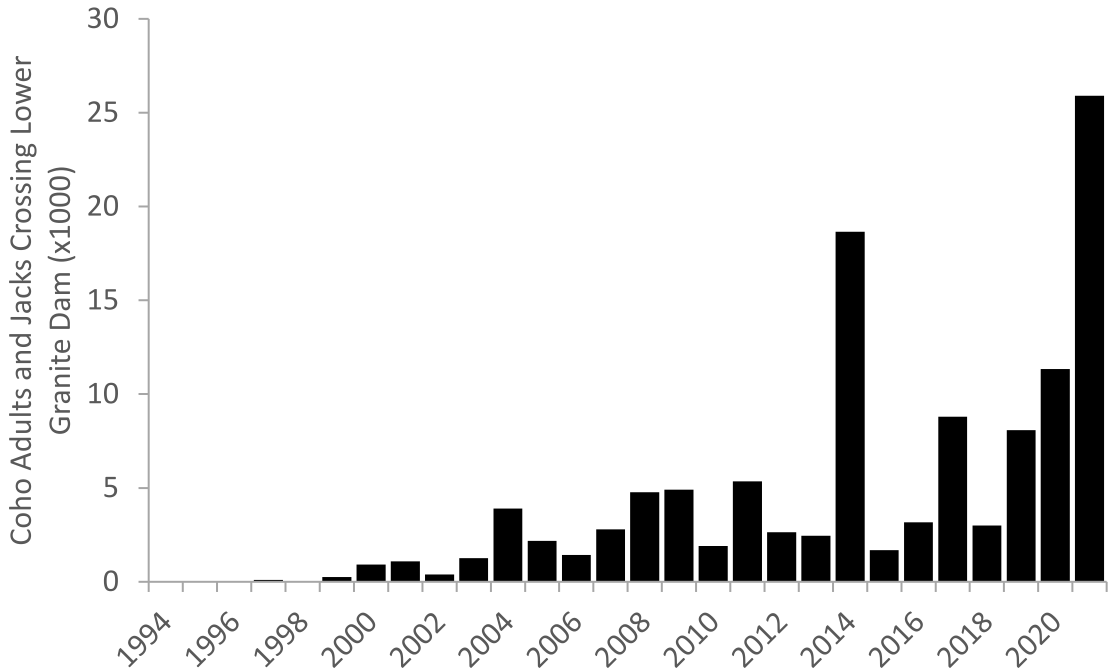


Figure 50. Total adult and jack coho returns to Lower Granite Dam, Washington by return year from 1994 to 2021. Data from the fish passage center (FPC.org).

Non-Native Fish Species

Most waters on the Nez Perce-Clearwater have a history of fish stocking, and populations of non-native gamefish have become established in many areas. Most notable include brook trout (*Salvelinus fontinalis*) which are widely distributed and abundant in many streams and mountain lakes, and kokanee (*Oncorhynchus nerka*), which is the landlocked form of sockeye salmon. Kokanee were introduced into Dworshak Reservoir and are well established above Dworshak dam. They spawn in the Upper North Fork Clearwater River and tributaries. Smallmouth bass (*Micropterus dolomieui*) are present in the North Fork Clearwater, Mainstem Clearwater (primarily above Orofino as hypolimnetic releases from Dworshak dam limit bass abundance between Orofino and Lewiston), Middle Fork Clearwater, South Fork Clearwater, and Salmon Rivers, as well as Dworshak Reservoir. All these species provide economically important sport fisheries on the Nez Perce-Clearwater.

Mollusks

Pristine Pyrg (*Pristinicola hemphilli*)

Status and Distribution: This species is a rare aquatic snail known to occupy a narrow range of habitats associated with springs and seeps. The species has a broad distribution in the lower Columbia and Snake River basin in Washington, Idaho, California, and Oregon (Hershler et al. 1994). Colonies are scattered through the Columbia and Snake River basins into western Idaho, and it can also be found in interior Oregon in the Deschutes, Umatilla, and John Day River basins and in the Rogue, Umpqua, and Smith River basins in southern Oregon and Del Norte counties in northern California. It once occurred in Montana, but recent surveys suggest it is now extirpated from this region (Richards et al. 2005). Throughout its range, it was assigned a “vulnerable” classification in a conservation assessment by (Johnson et al. 2013). In Idaho, it has an S3 NatureServe rank, meaning that it is rare or uncommon but not imperiled.

This species is typically found inhabiting small springs, seeps, occasionally larger springs, spring outflow channels, and spring influenced stream reaches (Stagliano et al. 2007). The springs in which it is found are usually in semi-arid areas where sagebrush is dominant on a basalt substrate, though it has also been found in areas that are dominated by Douglas-fir (Frest and Johannes 1995).

On the Nez Perce-Clearwater, discrete and extremely small populations are suspected to exist in the Lower Salmon subbasin. Surveys are needed to establish specific distribution.

Western Pearlshell Mussel (*Margaritifera falcata*)
Status and Distribution: The Western pearlshell mussel is a filter feeding mussel that is widely distributed throughout the Pacific Northwest. The larval form is an obligate parasite that requires a specific fish host, usually a salmonid (*Oncorhynchus* sp). They occur in sand, gravel, cobble, and boulders in a variety of stream habitats ranging from low to moderate gradient streams up to larger rivers (Stagliano et al. 2007). Both biotic factors such as host species abundance, and abiotic factors such as water quality, substrate size, and stream geomorphology influence abundance and distribution. In a well-known study in the Salmon River, Vannote and Minshall (1982) noted large populations and characterized geofluvial processes affecting distribution and abundance in larger rivers.

"Mussels attain maximum density and age in river reaches where large boulders structurally stabilize cobbles and interstitial gravels. Boulders tend to prevent significant bed scour during major floods, and these boulder-sheltered mussel beds, although rare, may be critical for population recruitment elsewhere within the river, especially after periodic flood scour of less protected mussel habitat" (Vannote and Minshall 1982).

Western pearlshell mussels have been the subject of concern in several western states, as researchers have observed large-scale die off events in some rivers and streams. The cause of these die offs is unknown, and current research is ongoing to determine the responsible pathology. Several hypotheses have been advanced regarding potential causes, including bacteria (Thomas 2008), viruses (Richard et al. 2023), water temperature (Stagliano 2023), toxic algae (Thomas 2008), and contaminants (Helmstetler er al. 2008), but a common etiology has not yet been reported.

This species is widely distributed and has been reported to be abundant in a variety of habitat types, including large river (up to 192 mussels/m2 in boulder reaches in a 40 km section of the mainstem Salmon River (Vannote and Minshall 1982), and small streams (up to 47,468 mussels/100m in Lolo Creek (Erhardt et al.) across the Nez Perce-Clearwater (Figure 51). Large populations are known to exist in the mainstem Selway River, mainstem Salmon River, mainstem Clearwater River, South Fork Clearwater River, Lolo Creek, Crooked River, and American River, Ruby Creek, Musselshell Creek, Jim Brown Creek, Eldorodo Creek, and a small population is known to exist in the Palouse River Drainage (Meadow Creek) on private land within the administrative boundaries of the national forest. Surveys of these populations indicate multiple size classes are present (Vannote and Minshall 1982, USDA 2008, USDA 2009, Erhardt et al. 2022), and existing data suggest populations are stable. The U.S. Fish and Wildlife Service is currently working on establishing and monitoring long-term index-of-abundance sites on several streams on the national forest. The State of Idaho records Western pearlshell mussel observations through their Idaho Species Diversity Database, and to date has reported 642 observations of Western pearlshell mussels (most reports are of multiple individuals) in Idaho. Western pearlshell mussels have been designated as a Species of Greatest Conservation Need under Idaho's State Wildlife Action Plan.

The species is designated a sensitive species in the Forest Service Northern Region. This category of designation will be changed in the revised plan. The sensitive species category will be eliminated under the new plan, and a new category, Species of Conservation Concern (SCC), will be established. Criteria for SCC is outlined in the 2012 Planning Rule. Western pearlshell mussel is not listed as a SCC under the revised plan, however it will be a focal species under the monitoring plan.

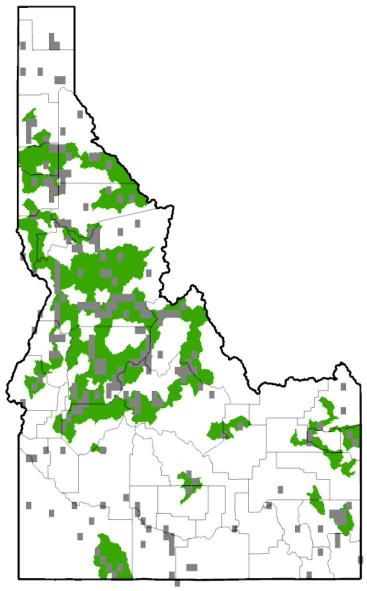


Figure 51. Western pearlshell mussel observations in Idaho. Gray represents observation locations, and green is the modeled range. (Data from Idaho Species Diversity Database accessed 1/10/2023).

Western Ridged Mussel (*Gonidea angulata*)

Status and Distribution: Western ridged mussel is a large, native mussel that occurs primarily in larger mainstem rivers in the plan area (Figure 52). The larval form is an obligate parasite that requires a specific fish host, usually sculpin (*Cottus* spp.). Records of Western ridged mussels on the national forest are sporadic and so far limited to large mainstem rivers such as the mainstem Clearwater and Salmon Rivers. They have been reported to occur near 6 Mile Creek on the mainstem of the Clearwater by the U.S. Fish and Wildlife Service (John Earhardt, USFWS, personal communication), and at several locations on the mainstem Salmon River by Vannote and Minshall (1982), who reported densities up to 183 mussels per square meter in sand and gravel habitat types, and predicted that this species would probably replace pearlshell in more aggraded habitats in that system. The State of Idaho records western ridged mussel observations through their Idaho Species Diversity Database, and to date has 271 reported observations of Western ridged mussels (in most cases reports are of multiple individuals) in Idaho. The U.S. Fish and Wildlife Service was petitioned by the Xerces Society to list the mussel under the Endangered Species Act (ESA) in 2020, and in June 2021 the service published its 90-day finding in the federal register stating that the mussel may warrant listing, and that they would undertake a 12-month status review. The Western ridged mussel was not selected as a SCC species on the national forest because the most current information on abundance and trends indicates stable populations. Past records indicate that this mussel was abundant in larger mainstem rivers on the national forest. In 2021 and 2022, Idaho Department of Fish and Game conducted statewide surveys for Western ridged mussels in order to provide information for the U.S. Fish and Wildlife Service species status assessment. They found them to be widely distributed throughout the state, and found no evidence of mass die-offs like those that have been reported in other West Coast states that prompted the current ESA-listing petition, and in fact, Idaho Department of Fish and Game observed one exceptionally large population in the Salmon River (Joel Sauder, Idaho Department of Fish and Game, personal communication). Idaho Department of Fish and Game is continuing monitoring of Western ridged mussels throughout the state and on the national forest.

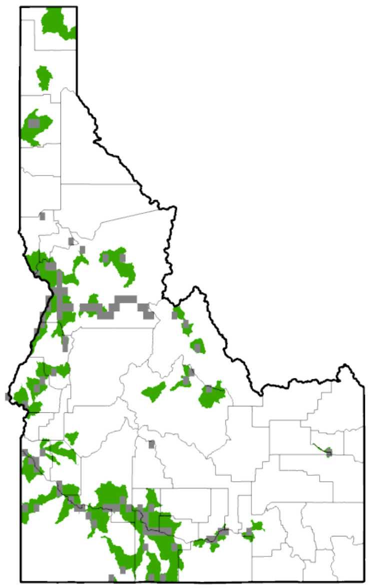


Figure 52. Western ridged mussel observations in Idaho. Gray represents observation locations, and green is the modeled range. (Data from Idaho Species Diversity Database accessed 1/10/2023).

Ashy Pebblesnail (*Fluminicola fuscus*)

This species is known to occur on the national forest and is widely distributed throughout Idaho. As such, it has a S3 state NatureServe ranking (vulnerable), meaning that it is uncommon but regularly occurring and not imperiled. It was evaluated for inclusion on the Species of Conservation Concern (SCC) list but was omitted because it did not meet the criteria.

Shortface Lanx (*Fisherola nuttalli*)

This species is known to occur on the national forest and is widely distributed throughout Idaho. As such, it has a S3 state ranking (vulnerable), meaning that it is uncommon but regularly occurring and not imperiled. It was evaluated for inclusion on the SCC list but was omitted because it did not meet the criteria.

Green River Pebblesnail (*Fluminicola coloradensis*)

This species is known to occur on the national forest and is widely distributed throughout Idaho. As such, it has a S3 state ranking (vulnerable), meaning that it is uncommon but regularly occurring and not imperiled. It was evaluated for inclusion on the SCC list but was omitted because it did not meet the criteria.

Great Basin Ram's Horn (*Helisoma newberryi*)

This species is known to occur in Idaho (in Bear Lake) but is not known to occur in the plan area. There was one reported observation of this species on the South Fork Clearwater River in 1940, however, it was initially or subsequently identified as a different species (*Carinifer newberryi*). Other than that single report, it has not been reported to occur on the national forest. As such, it was not included on the SCC list.

Rotund Physa (*Physella columbiana*)

This species was described in Idaho in the 1800s and is thought to be extirpated from Oregon and British Columbia but has not been observed on the Nez Perce-Clearwater since 1983. The 1983 observation was of very low locational precision and could reflect an observation outside of the plan area. It is known to occur in the State of Idaho, but not in the plan area, and was omitted from the Species of Conservation Concern (SCC) list.

Pondsnail Group (*Ladislavella* spp.)

This species group consists of eight Ladislavella species: *Ladislavella apicina*, *L. caperata*, *L. elodes*, *L. emarginata*, *L. hinkleyi*, *L. idahoensis*, *L. traski*, and *L. utahensis*. These species are all cold water stenotherms found in cold streams with coarse substrates. All of these species have no state NatureServe ranking and are not known to occur on the national forest. As such, they were not included on the SCC list.

Other Native Aquatic Species on the Nez Perce-Clearwater

There are many additional native aquatic invertebrates, macroinvertebrates, amphibians, and fish on the Nez Perce-Clearwater other than those described above, some of which have some sort of past or existing management status or emphasis. They will not all be discussed in detail but are listed here: *Acrocheilus alutaceus* (chiselmouth), *Ptychocheilus oregonensis* (northern pikeminnow), *Rhinichthys cataractae* (longnose dace), *Rhinichthys osculus* (speckled dace), *Richardsonius balteatus* (redside shiner), *Percopsis transmontana* (sand roller), *Catostomus macrocheilus* (largescale sucker), *Catostomus columbianus* (bridgelip sucker), *Catostomus platyrhynchus* (mountain sucker).

Mountain whitefish (*Prosopium williamsoni*) are widely distributed in rivers and streams on the Nez Perce-Clearwater.

Aquatic Insects

There are no Endangered Species Act (ESA) listed aquatic insects on the national forest, nor are there any aquatic insects that meet the criteria for Species of Conservation Concern (SCC). However, the regional forester maintains a list of sensitive species (SS) for each national forest in the region as required by the 1982 Planning Rule. An update of that list took place concurrently to the writing of the Final Environmental Impact Statement. The Nez Perce-Clearwater reviewed status and distribution information of aquatic species that are listed on the State of Idaho's State Wildlife Action Plan and submitted recommendations to the regional office for inclusion on the regional sensitive species list. Although the sensitive species list will be eliminated under the new plan, the SS list is still updated and maintained in the interim, until the record of decision for the new plan is released. The species that are on the SS list were also considered for inclusion on the new SCC list based on the new criteria. The national forest reviewed and submitted the SCC list recommendations for several aquatic insects including a click beetle (*Beckerus barri*); a skiff beetle (*Hydroscapha redfordi*); several mayflies (*Parameletus columbiae*, *Paraleptophlebia traverae*); Autumn Springfly (*Pictetiella expansa*); Lolo Mayfly (*Caurinella idahoensis*); several caddisflies, including Northern Rocky Mtns. Refugium Caddisfly (*Sericostriata surdickae*) and several without common names (*Georeeilla baumanni*, *Manophylax annulatus*, *Eocosmoecus schmidi*); Paiute Dancer (*Argia alberta*); Idaho Snowfly (*Capnia zukeli*); Strait Snowfly (*Capnia lineata*); Cascades Needlfly (*Megaleuctra kincaidi*); Giant Needlefly (*Megaleuctra stigmata*); Idaho Forestfly (*Soyedina potteri*); Umatilla Willowfly (*Taenionema umatilla*); and Cordilleran Forestfly (*Zapada cordillera*). After regional office review, only two species of aquatic insects were included on the draft SS (as required under the 1982 Planning Rule) list as "suspected" or "known distribution" on the national forest: the Northern Rocky Mtns. Refugium Caddisfly and the Lolo Mayfly. Species that were excluded from the SCC or SS list usually did not have any recent information on abundance and distribution (as required by the planning rule criteria) and had not been observed for decades. For example, *P. columbiae* has not been observed on the national forest since 1965, *P. traverae* has not been observed since the 1930s, and *C. zukeli* and *C. lineata* have not been observed in Idaho since the 1980s (Idaho Department of Fish and Game State Wildlife Action Plan). Both *Capnia* species were petitioned for Endangered Species Act listing by the Xerces Society in 2010, and the U.S. Fish and Wildlife Service found the petition to be unwarranted in 2011 (76 FR 46238). None of the aquatic insect species evaluated for the Species of Conservation Concern (SCC) list were found to meet the criteria for inclusion on that list. A fuller description of the SCC process can be found within the "Rationale (species evaluations) used to select animal and plant species as SCC for NPC draft plan and draft environmental impact statement." None of the aquatic insects that were on the SS list were included on the SCC list. Documentation and rationale for SCC determinations can be found on the Northern Region's Species of Conservation Concern website.[18]

Environmental Consequences

Introduction

To provide context for the discussion of effects for each aquatics resource area in this section, a summary of the history of environmental effects and regulations pertaining to the plan area, as well as best available science related to fisheries and aquatic ecosystems, primarily riparian areas, is provided below. Sections also discuss situations where land allocations or suitability decisions could create varying effects between alternatives, as well as how implementation would differ under different alternatives.

In response to studies in the 1960s and 1970s that documented the harmful effects of timber harvest methods and road building on streams, state and federal agencies began passing a series of management requirements for activities on state and federal lands near streams. These are referred to as "best management practices." Everest and Reeves (2007) disclosed the following regarding the development of best management practices for the Pacific Northwest: "The [best management practices] were developed through the normative process that weighed, evaluated, and incorporated many types of information. The best available scientific information for protection of riparian and aquatic habitats was not always incorporated into forest practice rules." This cycle of not including best available science was repeated several times over the decades, even as successive monitoring efforts continued to document degraded stream conditions (Reeves, Olson, et al. 2016).

A crisis point was reached in the early 1990s in the western United States when several stocks of salmon and trout were reaching critically low numbers (Nehlsen et al. 1991) and ultimately were listed as threatened or endangered under the Endangered Species Act. By the mid-1990s, the Forest Service and Bureau of Land Management had completed three broad-reaching documents—The Northwest Forest Plan (U.S. Department of Agriculture 1994), Decision Notice/Decision Record for Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon, and Washington, Idaho and Portions of California (PACFISH) (U.S. Department of Agriculture 1995c), and Inland Native Fish Strategy Environmental Assessment Decision Notice and Finding of No Significant Impact (INFISH) (U.S. Department of Agriculture 1995c)—hereafter referred to collectively as "the strategies," that amended forest plans across much of the public lands in the West to improve their conservation function. The Northwest Forest Plan and PACFISH (U.S. Department of Agriculture and U.S. Department of the Interior 1995a) addressed the protection of migratory

[18] http://bit.ly/NorthernRegion-SCC

salmon and steelhead; INFISH addressed the protection of habitat and populations of resident native fish outside of anadromous fish habitat.

These strategies departed significantly from past management philosophy and established more stringent requirements to protect species' habitat. One feature of the new strategies was the extension of the distance from the stream to the boundary of riparian management zones, referred to as riparian reserves in the Northwest Forest Plan and riparian habitat conservation areas in PACFISH and INFISH, compared to previous direction, to better protect ecological processes next to streams. Also, the precautionary principle was invoked. Reeves et al. (2016) described this principle as, "Forest managers who wanted to alter the comprehensive default prescriptions for riparian management under the Northwest Forest Plan (NWFP) in order to pursue other management goals were required to demonstrate through watershed analysis that changes would not compromise established riparian-management goals." Not only did the burden of proof shift, but these new strategies also required managers to consider ecological processes at the watershed scale. The components used in the Northwest Forest Plan, including the concept of the precautionary principle, were included in PACFISH and INFISH.

Riparian management has remained controversial, in part because of competing values and uses (Lee et al. 2004). Strategies employed by the Northwest Forest Plan, PACFISH, and INFISH appear to have been successful at halting the loss of old growth due to timber harvest within riparian areas and at preventing damage to aquatic systems in the Pacific Northwest (Thomas et al. 2006) and the intermountain region. However, some suggest a protection mindset emerged that has prevented management within riparian areas that would be desirable to sustain and promote ecological processes beneficial to aquatic or terrestrial ecosystems. Warren et al. (2013) found that reaches with complex old-growth riparian forests had frequent canopy gaps, which lead to greater stream light availability compared to adjacent reaches with simpler second-growth riparian forests. Light availability strongly influences stream primary production, water temperatures, and resource availability at the base of stream food webs.

Speaking on the need to restore ecological conditions and make good on social, economic, and ecological commitments in the Northwest Forest Plan, Thomas et al. (2006) wrote, "Minimization of short-term risks (the modus operandi of regulatory agencies and the federal courts) has a price tag, and a very big one, related to significantly increased longer-term risks of failure to meet objectives over very long time frames. Unless the federal agencies consider the peril of inaction equal to the peril of action, the goals of the NWFP [Northwest Forest Plan] will not be reached." Richardson et al. (2012) wrote: "In an increasingly complicated management arena, the challenge will be to find alternatives to fixed width buffers that meet the multiple objectives of providing clean water (minimizing nutrient and sediment inputs), aquatic habitat, habitat for riparian species, connectivity across landscapes, and related responses." Riparian zones and ecological functions regarding the widths of management areas next to streams, the interim minimum 300 feet distances listed in INFISH for fish-bearing streams and 150 feet in perennial streams, arguably remain the most controversial components of the existing strategies. Numerous studies have been completed since the strategies were first published that investigate how management affects the different ecological processes that are a function of riparian management zones. The ecological processes that function within riparian zones are first discussed individually below and then in combination, as they affect both aquatic and riparian conditions and biota.

Among the more commonly studied management concerns as they relate to ecological processes near streams are the effects of nearby timber harvest on stream temperature. Initial studies completed by

Chen et al. (1993) and the Forest Service's Ecosystem Management Assessment Team (1993) found that streamside buffers of over 400 feet were needed to protect ecological processes such as wind speed and humidity near streams, which at the time were thought to be able to increase stream temperature. This finding contributed to the recommendation for two site potential tree height buffer areas, equaling approximately 300 feet, applied to riparian reserve and riparian habitat conservation area widths in the existing strategies (Everest and Reeves 2007, Reeves, Pickard, and Johnson 2016).

Several studies have been conducted around the width of riparian buffers as it relates to stream temperature, large woody debris in streams and within riparian zones, and sediment filtering to streams. A study conducted in northern Idaho by Gravelle and Link (2007) found that when 50 percent of riparian canopy cover was harvested in the first-order reaches, temperature increased by up to 38.5°F in the directly impacted nonfish-bearing reaches but there was no significant increase in water temperature maxima at the downstream fish-bearing sites. Stream heating depends on multiple environmental variables: net solar and thermal radiation and the degree of shading by riparian vegetation, local air temperature, wind velocity, relative humidity, groundwater inflow, and amount of hyporheic flow. Groundwater can play an important role in maintaining relatively low temperatures in small streams. Timber harvest affects water temperature in streams in two ways: removal of canopy cover that increases incoming solar but reduces incoming thermal radiation and modification of hydrologic processes that regulate the timing and amount of streamflow. Although incoming solar radiation is thought to be one of the most influential factors, investigations of the cumulative effects of largescale timber harvest found that it is a complex set of factors, rather than a single factor, such as shade or air temperature, that governs stream temperature dynamics.

Additional studies have occurred throughout the Pacific Northwest. One study that modeled the effects of riparian reserves on stream temperature in Washington found that the first 33 feet were the most important in protecting stream temperature and that buffers greater than 100 feet did not appreciably lower stream temperatures (Sridhar et al. 2004). A study on headwater stream microclimate by Anderson et al. (2007) found that the first 30 feet had the most effect on microclimate above the stream and that temperatures in the streambed increased only when streamside vegetation closer than 50 feet to the edge of the stream was removed (Anderson and Poage 2014). A study by Sugden et al. (2019) in western Montana found no significant effect to water temperature or fish populations from timber harvest when streamside management zones of 50 to 100 feet exclusion areas were retained. A review of studies by (Moore et al. 2005) suggested that a riparian reserve that was the width of one tree height was likely large enough to protect the ecological processes that control stream temperature. Recently, many researchers have suggested that a 100 foot buffer next to fish-bearing and perennial streams is generally likely to be sufficient to protect against stream temperature increase (Anderson and Poage 2014, Reeves, Pickard, and Johnson 2016, Sweeney and Newbold 2014). Even so, consideration of context and geography is also appropriate. In a discussion of fixed-width riparian buffers, Richardson et al. (2012) acknowledged that although these types of protections are administratively simple to implement at a reach scale, watershed considerations and location within the catchment provide additional important context. Reeves et al. (2016) suggested that with the tools currently available, widths can be more easily adjusted and justified for both wider and narrower buffers. Janisch et al. (2012) found that the amount of canopy cover retained in the riparian buffer was not a strong explanatory variable with regard to temperature in their study of forest harvest in small headwater catchments.

The fate of large wood in streams has been an important focus for aquatic scientists and managers in the western United States for decades (Richardson et al. 2012). Up until the 1980s, many managers were concerned about how wood in streams affected water quality and about how accumulations of wood in streams could sometimes block fish migration. These concerns led to instream wood removal programs (Mellina and Hinch 2009). By the 1980s, scientists more fully recognized wood's role in channel formation and maintenance (Forest Ecosystem Management Assessment Team 1993). As with stream temperature, the precautionary principle applied by the strategies to riparian reserves and riparian habitat conservation areas also ensured that the interim widths were set wide enough to encompass any trees that could be delivered to streams, especially the two-tree width for fish-bearing streams (Everest and Reeves 2007). Regarding the riparian width needed to ensure streamside wood delivery to streams, debate and scientific inquiry has continued since the strategies were adopted. Studies have been completed to help identify where wood in streams comes from (Reeves et al. 2003, Benda and Miller 2003) and the fate of wood once it is delivered above or to the stream (Beechie et al. 2000).

In addition to streamside delivery of large wood, disturbance combined with topography can deliver a significant percentage of wood from outside riparian management zones, especially steeper watersheds that are more dissected. Models have also been developed to help identify the likelihood of riparian trees being delivered to the stream channel (Benda and Miller 2003, Meleason et al. 2003, Pollock et al. 2012, Spies et al. 2013, Welty et al. 2002). Models focused on wood delivery from the riparian areas consider distance from the stream, median tree height, and the direction that trees fall. Benda et al. (2016) also discuss how to implement tree tipping, or manually felling trees into a stream, to balance the effects of thinning dense second growth stands to accelerate large wood development. Burton et al. (2016) found that instream wood loading is dominated by legacy wood during the late stages of decay and that silvicultural practices may be used to augment wood loading in headwater streams. Modeling completed by Meleason et al. (2003) found that greater than 90 percent of wood was contributed from within 100 feet of the stream edge for modeled conifer riparian stands in western Oregon and Washington.

Sediment and nutrient forest management practices such as road building and timber harvest have long been a concern regarding their potential to generate fine sediment and the subsequent effects on water quality (Beschta 1978). Altered sediment rates have also been linked to changes in stream condition and ultimately trout and salmon survival in cold-water streams (Jensen et al. 2009). Some activities that have led to degraded stream conditions and water quality, such as clearcutting next to streams and aggressive forest road building, are highly unlikely to occur today on National Forest System lands in the Forest Service Northern Region. Reductions in sediment and nutrient delivery have resulted from sequentially improving best management practices (Everest and Reeves 2007) and from regional strategies that have offered greater protection (U.S. Department of Agriculture and U.S. Department of the Interior 1995b). In recent decades, researchers interested in forest management and water quality have investigated the effectiveness of management policy and law (Brown et al. 1993, Cristan et al. 2016, Rashin et al. 2006). In general, more recent forest practice reviews have found very little unnatural introductions of total suspended sediments and nutrients when best management practices are properly installed before activities begin and are maintained throughout management efforts (Cristan et al. 2016, Sugden et al. 2012) NCASI 2012, Sudgen 2018. Depending on the geology of the planning area, sediment introduction from roads receiving little use can be quite low (Al-Chokhachy et al. 2016). Increased nitrogen levels may be an exception and may still contribute to levels outside of expected natural conditions (Gravelle et al. 2009). Standards and guidelines carried forward from existing strategies combined with conservation, restoration, and improvement strategies discussed elsewhere in this document should help to continue improving trends. Management practices that maintain suitable stream temperature, amounts of large wood, and levels of sediment and nutrients are also beneficial to aquatic and terrestrial wildlife species associated with riparian management zones.

Wildlife use riparian zones and wetlands disproportionately more than other areas and the density and diversity of wildlife are greater in riparian zones and wetlands than in other habitats (Oakley et al. 1985). Riparian zones strongly influence wildlife populations. Wildlife, including amphibians, reptiles, small mammals, and large mammals, use riparian habitats either year around or seasonally. Many amphibians and reptiles are restricted to aquatic and riparian habitats, while large mammals use riparian habitats seasonally. Some mammals, such as beaver and moose, rely on riparian and riverine habitats. The density, diversity, and structure of vegetation, combined with the landforms found in riparian zones and wetlands, provides wildlife with woody plant communities, surface water and soil moisture, structural diversity, and linear structure that creates migration corridors for many species.

Differences in Plan Direction and Land Allocation Between Alternatives

Land Allocation – Management Areas

Although some of the alternatives vary in pace or scale (for example yearly vegetation treatment targets), all of the work that will be done under any of the action alternatives will be subject to the same constraints. Although plan components are the same for action alternatives, land allocation and suitability, including recommended wilderness, Recreational Opportunity Spectrum (ROS), and Wild and Scenic Rivers do differ between some alternatives. Although actions likely to be taken and activities likely to occur under these alternatives may differ, the effects of are not expected to be different to aquatic habitat or organisms because of the universal application of ecosystem plan components under all action alternatives. The primary difference between each of the action alternatives is the pace at which forest restoration to natural range of variation is achieved. This pace varies somewhat between action alternatives, and the temporal aspect of this restoration was paramount in selecting a preferred alternative. The uncertainty associated with climate change necessitates reasonably rapid progress toward desired conditions if habitats and organisms on the national forest are to persist and acquire resilient adaptations.

Within the administrative boundary of the Nez Perce-Clearwater National Forest, approximately 30 percent of land is already in Management Area 1 (MA1), which includes designated wilderness areas, designated wild and scenic rivers, and national historic landmarks. Being in MA1 protects aquatic species and habitats by restricting management actions in these areas.

Approximately 36 percent of land is in Management Area 2 (MA2), which includes Idaho Roadless Areas, recommended wilderness, eligible and suitable wild and scenic rivers, designated research natural areas, proposed research natural areas, and the Gospel-Hump MA2 area. MA2 are unsuitable for timber production but can allow timber harvest for resource benefit. In practice, timber harvest generally does not occur in these areas. Between alternatives, the total number of acres in MA2 differs by 0.6 percent on the national forest, ranging from 36 percent to 36.6 percent. In addition, all areas recommended as wilderness or wild and scenic rivers under any of the action alternatives are already in the Idaho Roadless Rule areas and most of them have a wildland recreation or primitive theme, so being recommended as wilderness applies more restrictions on land use and provides more protection. Therefore, these areas are already largely protected from the management activities that would be likely to cause effects, and by becoming recommended wilderness areas, or wild and scenic rivers, a higher level of protection is applied.

Approximately 30 percent of land is in Management Area 3 (MA3). Between the alternatives, this amount varies 0.7 percent on the Nez Perce-Clearwater, ranging from 29.8 percent to 30.5 percent. The differences between the amount of land in MA3 between the alternatives is due to varying amounts of land allocated to MA2 (this is land in the one-quarter mile buffer for suitable Wild and Scenic Rivers) that was previously in MA3. Although riparian protection zones in these instances would increase in width to include one-quarter mile buffers, the existing stream buffers have been shown to be adequate to protect stream habitat. Although size of riparian management zones changes with these recommendations, the effective protection to stream function is expected to be similar between the existing buffers and future changes. MA3 lands are suitable for timber production and represent the area of the national forest that could potentially experience the vast majority of management effects to aquatic habitats and species. It is the MA3 that is most vulnerable to management effects. It is also the area that benefits least from land allocation decisions, which generally do not offer sweeping protections as in MA1 and MA2. Because so much land area (MA1 and MA2) in the national forest is already under protective measures through land allocation, MA3 receives the most benefits from the strong protections that the ecosystem plan components are designed to afford.

Because the ecosystem and species plan components in the revised forest plan do not differ between action alternatives, the guidance and protection that they afford will be the same under any of the action alternatives. In any cases where land allocation decisions may create threats or risks to aquatic species, the plan components of the revised forest plan are designed to provide ecological conditions to prevent habitat degradation, facilitate recovery of Endangered Species Act listed species, as well as allow for Species of Conservation Concern species to persist over the long term in the plan area. As a result, the suite of plan components in the revised plan are designed to provide the capacity to "maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area" (2012 Planning Rule § 219(a)(1)), as well as the capacity to "maintain or restore the diversity of ecosystems and habitat types throughout the plan area" (2012 Planning Rule § 219(a)(2)). As such, this section will primarily focus on how plan components are designed to carry forward or improve upon PACFISH and INFISH Biological Opinion (PIBO) direction that has been shown to have been effective in halting aquatic degradation at landscape scales. The effects section will be focused on seven categories of effects, including the current section, Differences in Plan Direction and Land Allocation Between Alternatives, Riparian Management Zones Environmental Consequences, Aquatic Habitat Environmental Consequences, Aquatic Species Environment Consequences, Cumulative Effects, Effects to Resource from Other Resources, and Comparison of No Action Alternative vs. Action Alternatives.

Recommended Wilderness

The different alternatives recommend varying numbers of rivers for Recommended Wilderness eligibility. The number of miles of stream that contain critical habitat for Endangered Species Act listed species range between 0 miles in Alternative X to 557 miles in the Alternative W (Table 126). The Preferred Alternative contains an intermediate amount of fish critical habitat, with 165 miles total in proposed Wild and Scenic River reaches. It is expected that stream habitat will benefit from being in Recommended Wilderness because of the restrictions on management associated with that land allocation.

Table 126. Miles of critical habitat for Endangered Species Act listed species that would be included in proposed wilderness areas by alternative in the revised forest plan for the Nez Perce-Clearwater National Forests.

Species	No Action	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternate
Bull Trout	82	437	0	175	261	127
Steelhead	4	120	0	47	155	38

Species	No Action	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternate
Sockeye	0	0	0	0	0	0
Fall Chinook	0	0	0	0	0	0
Total	**86**	**557**	**0**	**222**	**415**	**165**

Recreational Opportunity Spectrum (ROS) Suitability

The revised plan includes both summer and winter Recreational Opportunity Spectrum (ROS). Winter ROS is not expected to affect fish and aquatic species or their habitats because any activities that may occur would be done over a cover of snow and ice, with no potential for ground disturbance or sediment delivery to streams. As a result, the rest of this discussion will concern summer ROS. Suitability for summer recreational motorized trail travel is different between alternatives under ROS. Under the current 1987 Forest Plans, there were no ROS decisions. The Clearwater National Forest has a travel plan, and it essentially designates all of the national forest as closed to motorized travel unless there is a travel plan designated opening. The Nez Perce National Forest does not have a current travel plan and therefore is open to motorized travel except where specific closure orders are in place. Because there is no formal ROS for either national forest, suitability decisions under the action alternatives sometimes represent a change from the No Action Alternative. For the sake of discussion, this section will refer to suitability changes between the No Action Alternative and various alternatives; however, because there is currently no official suitability decision under the 1987 plans, these discussions must be understood in that context. Although these changes do not have direct or indirect effects (as no federal action occurs), the differences in suitability decisions between alternatives construct different frameworks designed to guide future land management decisions. For example, areas where suitability will change allowable use from motorized to non-motorized (Table 127) would be expected to see either beneficial or no effects due to an incremental increase in protection offered by that suitability determination. Areas where a suitability decision will change allowable use from non-motorized to motorized (Table 128) could potentially, in the future, experience potential adverse effects if subsequent management decisions establish motorized trails in those areas, and if those trails cross streams or are otherwise located where they present risk to aquatic organisms.

The number of stream miles containing critical habitat in areas where suitability would lead to a change from open for motorized to not suitable for motorized varies between alternative and ranges from 0 miles of sockeye and fall Chinook salmon critical habitat in Alternative X to 231 miles of bull trout habitat in Alternative Z. The Preferred Alternative contains various amounts of miles of critical habitat that would be affected (Table 127). Because these areas are already in Idaho Roadless Rule Area, they are already subject to some level of protection based on their designated theme, and the change to non-motorized is expected to strengthen protections.

The number of miles of critical habitat in areas where suitability would change use from closed to motorized to suitable for motorized varies between alternatives and ranges from 0 in several alternatives to 165 miles of bull trout habitat in the preferred alternative, which also contains 107 miles of steelhead habitat that would be affected (Table 128). For bull trout, when changes both directions are combined, it represents a net change that ranges from 7 percent less non-motorized in Alternative X to 9 percent more non-motorized bull trout critical habitat in Alternative W. The Preferred Alternative results in 3 percent less bull trout habitat being in areas not suitable for motorized recreation. For steelhead, when changes both directions are combined, it represents a net change that ranges from 1 percent less steelhead critical habitat being in areas not suitable for motorized in Alternative X to 10 percent more in Alternative Z. The Preferred Alternative results in 1 percent more steelhead habitat being in areas not suitable for motorized recreation. This analysis was only relevant for these two species because there is no official critical habitat layer available for Snake River spring and summer Chinook, and Recreational Opportunity Spectrum (ROS) did not affect any Snake River Sockeye or Snake River Fall Chinook critical habitat.

Table 127. Miles of critical habitat for Endangered Species Act listed fishes that would change from motorized to non-motorized under Recreational Opportunity Spectrum by alternative. NA = not applicable.

Species	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Columbia River Bull Trout	NA	231	94	147	148	128
Snake River Spring/Summer Chinook	NA	NA	NA	NA	NA	NA
Snake River Fall Chinook	NA	0	0	0	0	0
Snake River Summer Steelhead	NA	147	106	144	149	114
Snake River Sockeye	NA	24.5	24.5	24.5	24.5	24.5

Table 128. Miles of critical habitat for Endangered Species Act listed fishes that would change from non-motorized to motorized under Recreational Opportunity Spectrum by alternative. NA = not applicable.

Species	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Columbia River Bull Trout	NA	97	188	47	41	165
Snake River Spring/Summer Chinook	NA	NA	NA	NA	NA	NA
Snake River Fall Chinook	NA	0	0	0	0	0
Snake River Summer Steelhead	NA	101	114	30	30	107
Snake River Sockeye	NA	0	0	0	0	0

Table 129. Percent change in critical habitat miles affected by Revised Plan Recreational Opportunity Spectrum suitability on the Nez Perce-Clearwater National Forest.

Bull Trout	Species	Percent Change to Motorized Suitability	Percent Changing to Non-Motorized Suitability	Net Change (Percent Non-Motorized)
Preferred Alternative	Bull Trout	12	9	-3
Alternative W	Bull Trout	7	16	9
Alternative X	Bull Trout	13	7	-7
Alternative Y	Bull Trout	3	10	7
Alternative Z	Bull Trout	3	10	8
Alternative P	Steelhead	9	9	1
Alternative W	Steelhead	8	12	4

Bull Trout	Species	Percent Change to Motorized Suitability	Percent Changing to Non-Motorized Suitability	Net Change (Percent Non-Motorized)
Alternative X	Steelhead	9	9	-1
Alternative Y	Steelhead	2	12	9
Alternative Z	Steelhead	2	12	10

Because Recreational Opportunity Spectrum (ROS) suitability does not have any effects on aquatic habitat until subsequent project level decisions are made, any potential effects and effects analysis would happen at the project level. However, there are several considerations that can provide context and direction for future project decisions. One is that under the preferred alternative, the miles of critical habitat that could be adversely affected by ROS suitability decisions (represented by a negative value in Table 129) are very small (3 percent) and are limited to bull trout. It is important to note that this analysis does not give exact, finite numbers or percentages that would change, because of some overlap between critical habitat layers for bull trout and steelhead, but it is useful for comparison purposes between alternatives, and must be interpreted in that context. In addition, there are not only protective aquatic plan components, but recreation (aquatic and riparian) plan components that are specifically designed to address management of any potential environmental consequences, including FW-GDL-ARREC-03, FW-GDL-ARREC-04, FW-GDL-ARREC-05, FW-GDL-ARREC-06, as well as a suitability plan component (FW-SUIT-ROS-01) which are all designed to provide protection by constraining or guiding motorized trail construction.

Idaho Roadless Rule Areas

Although the forest plan does not make Idaho Roadless Rule (IRR) decisions, many of the plan decisions tier to or build upon previous decisions made under the IRR. These decisions include recommendations for wilderness, as well as Recreational Opportunity Spectrum (ROS) suitability decisions.

Areas recommended for wilderness under all action alternatives are all in IRR areas. It is important to understand the relationship between IRR, recommended wilderness, and forest plans. Idaho Roadless Rule is federal law and supersedes forest plans. However, forest plan decisions that recommend wilderness tier to the Wilderness Act of 1964, which supersedes by virtue of restrictions on anything that affects wilderness character. Therefore, although technically the national forest could build roads and harvest timber in IRR, and IRR still applies to recommended wilderness, it would have to be approved by the regional forester, and exceptions and permissions depend somewhat on the IRR theme. The Final Rule and record of decision pertaining to the IRR is clear that the intent of exceptions to timber harvest restrictions were expected to be limited to less than 4 percent of harvest volume from National Forest System lands in Idaho, with most of that expected to occur in the adjacent Panhandle National Forest (FR: 61456, 36 CFR 294). In practice, that projection has been close to accurate on the Nez Perce-Clearwater National Forest, where timber harvested on IRR lands has represented approximately 180 acres per year, or 0.016 percent of National Forest System lands annually. For more information about this, refer to the Special Areas section of this document. However, when recommended for wilderness, the intent is that the land will be designated by Congress, added to the list of designated wilderness, and subsequently, the Wilderness Act of 1964, prevents any activities that affect wilderness character. So, although IRR lands were already included in MA2, upon wilderness recommendation, the land remains in MA2, and there is theoretically increased protection in the recommended wilderness plan decision. All of the recommended wilderness areas in the preferred alternative are already IRR primitive or backcountry restoration themes (the most restrictive themes, which require regional forester approval for treatments or ground disturbing activities) except West Fork Meadow Creek, which is currently wildland recreation (the most permissible), so once recommended, it is expected that a request would be submitted to the IRR council for a change of theme to make it consistent with the forest plan decision.

In practice then, the difference between the more restricted IRR themes and recommended wilderness regarding motorized use is that IRR themes do not restrict motorized use, while it is restricted under recommended wilderness except for administrative use and is prohibited once designated by Congressional action. On the Nez Perce-Clearwater National Forest, there have been limited instances of old skid roads being converted into motorized trail loops in IRR themes, but this activity has not been widespread. Future locations of new roads and trails on the national forest would be determined by programmatic decisions such as a travel plan or individual project level decisions. These would undergo the appropriate consultation with U.S. Fish and Wildlife Service and National Marine Fisheries Service if required, as well as National Environmental Policy Act (NEPA). As a result of plan component requirements that preclude retarding progress toward attainment of desired conditions, as well as the need for individual project level consultation and NEPA analysis, it is expected that any potential negative effects will be explored, disclosed, and mitigated for at the project level if future projects expand motorized trail use in these areas. In addition, there are specific suitability plan components including MA2-GL-IRA-01, MA2-DC-IRA-01-05, MA2-STD-IRA-01 that are designed to direct management of IRR areas on the national forest in order to minimize environmental consequences that could occur through management of IRR areas. For more discussion of the Idaho Roadless Rule, see the Sustainable Recreation section of this document.

Wild and Scenic Rivers

The different alternatives recommend varying numbers of rivers for Wild and Scenic suitability and eligibility ranging from 0 to 37 suitable and 0 to 29 eligible. Miles of stream that contain critical habitat for Endangered Species Act listed species range between 391 total in Alternative X to 980 in the No Action Alternative (Table 130). The Preferred Alternative contains an intermediate amount of fish critical habitat, with 502 miles total in proposed Wild and Scenic River reaches. This is primarily because the Preferred Alternative proposes fewer rivers for wild and scenic status; the number of rivers eligible for wild and scenic river designation would decrease from 29 under the 1987 plan to 12 under the proposed plan (11 suitable and 1 eligible). However, stream and riparian protections would not be compromised because the quarter-mile protection corridor (cumulatively equates to the 22,658 acres that would change from Management Area 2 to Management Area 3) afforded by the National Wild and Scenic Rivers System Act is larger than necessary to protect stream functions, and the proposed riparian management zone (RMZ) distances would offer sufficient protection as determined by PACFISH/INFISH. Furthermore, RMZ plan components provide guidance for management activities to reestablish disturbance patterns in areas where it is lacking to restore riparian processes according to proposed RMZ desired conditions (FW-DC-RMZ-01, 02). Physical or biological feature (PBF) 4 in particular would indirectly benefit from management area allocations as larger areas of recommended wilderness and RMZ guidelines that are equally as protective as PACFISH/INFISH protections would contribute to the types of natural processes that provide complex habitat, natural cover, and refugia.

Table 130. Miles of critical habitat for Endangered Species Act listed fish that on the Nez Perce-Clearwater National Forest that would be located in proposed Wild and Scenic Rivers under each forest

plan revision alternative. Snake River spring and summer Chinook were not included because there is no critical habitat shapefile available from National Marine Fisheries Service.

Species	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Alternative P
Columbia River Bull Trout	547	272	285	362	488	264
Snake River Steelhead	348	152	106	187	290	154
Snake River Fall Chinook	11	11	0	11	11	11
Snake River Sockeye	73	73	0	73	73	73
Total	980	508	391	633	863	502

By Alternative

No Action Alternative

Several species of fish would continue to experience an increase in risk of habitat destruction from high severity fires due to forest succession, fire suppression, and climate change. Timber harvest targets are currently set at 50 to 60 million board feet (MMBF) annually, and the maximum opening size is 40 acres without approval from the regional forester. Emphasis for Endangered Species Act listed fishes would continue to be on minimizing sediment input to streams and continuing to provide shade through riparian buffers. Fish habitat security would remain high throughout Idaho Roadless Rule areas, wilderness areas, and recommended wilderness. Management would continue with PACFISH/INFISH as the guidance that ensures maintenance of aquatic ecosystem integrity. These measures would continue to maintain the current amount secure fish habitat and are expected to continue to provide for passive restoration in degraded streams.

Aquatic habitats would be provided for in a similar manner as in the proposed plan components and alternatives because PACFISH and INFISH provide similar levels of protection for aquatic habitats as those in the Aquatic Ecosystems section of the Land Management Plan. Several rivers would remain eligible for wild and scenic status and management of these eligible rivers would continue to provide habitats for aquatic species. Eligible acres of wild and scenic river corridors would be 172,710 acres. These rivers would continue to be managed to protect the outstandingly remarkable values that make them eligible. This direction may help some aquatic species and may hinder active restoration for them in other areas. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would remain the same with the Hoodoo, Mallard-Larkin, and Selway additions remaining recommended wilderness. The Hoodoo area would stay intact in its current form and not be reduced, as in other alternatives. The amount of recommended wilderness proposed under the No Action Alternative is intermediate to other alternatives for recommended wilderness.

Within recommended wilderness, activities to restore vegetation would continue to be restricted. This would continue to inhibit most restoration activities in the current recommended wilderness. This would impact the national forest’s ability to proactively restore these habitats. However, restoration activities in many other Idaho Roadless Rule (IRR) areas that are currently in the backcountry restoration theme would remain in this theme, which allows restoration and improvements. Restoration would only be achieved in recommended wilderness through wildfire, which can vary in severity and effects to Endangered Species Act (ESA) listed fish. Under the 1987 plans, the management direction for wildfire is to confine, contain, and control wildfire. Under the new plan direction, wildland fire would be more permissive in many areas of the Nez Perce-Clearwater.

Both current recommended wilderness and IRR areas would continue to provide for ESA listed fishes and aquatic sensitive species. Use of game carts, chainsaws, mechanized travel such as bicycles, and aircraft would continue to be prohibited in recommended wilderness.

Alternative W

Alternative W proposes the most wilderness areas (totaling 856, 932 acres), designates 12 rivers as suitable for wild and scenic rivers, provides for motorized access in all IRR with a backcountry restoration theme. It also provides for the most non-motorized access because of the high amount of recommended wilderness. It establishes a potential timber harvest of 221 to 241 million board feet (MMBF) annually, has a maximum opening size of 207 acres, and is designed to meet forest vegetation desired conditions within 30 years when timber harvest, prescribed fire, and natural disturbance are accounted for.

Alternative W reaches desired vegetation conditions faster than the No Action Alternative and slightly slower than Alternative X. Thus, it has a relatively more aggressive schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation (NRV). For fish, this quicker paced schedule would reduce the risk of high severity wildfire quicker than the No Action Alternative. While the pace may be quicker, the total amount of restored forest does not differ much overall among the alternatives.

This makes sense because the desired conditions for vegetation do not vary by action alternatives, rather the pace or the methods of achieving those desired conditions vary. However, vegetation management would contribute substantially to forage as well, especially within Management Areas 2 and 3. Under Alternative W, forest conditions would trend towards NRV and are expected to meet the needs of many aquatic species. The more proactive schedule in Alternative W would allow more areas to be targeted to increase the amount of the national forest restoration which moves the landscape toward the natural range of variation (NRV). Proactive management through wildland fire would occur more proactively under Alternative W in Idaho Roadless Rule (IRR) areas, especially within backcountry restoration themed areas. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative. The ability of the Nez Perce-Clearwater to achieve desired amounts of stream restoration would be hindered within recommended wilderness as explained below.

In Alternative W, slightly more areas were identified as suitable for motorized uses compared to the No Action Alternative. This could affect fish security in some areas, especially those that would be suitable for motorized uses, because public access for fishing could be increased. The percentage of the planning area that is suitable for summer motorized uses would be 47 percent, an increase of about 2 percent suitable for motorized use from the No Action Alternative. Forty-eight percent of the plan area would be suitable for winter motorized travel, while 52 percent would be unsuitable. Maps of the alternatives for the summer and winter recreation opportunity spectrum (ROS) can be found in Appendix A. Areas suitable for various durations and seasons of motorized uses could allow more access by anglers and recreationists.

Endangered Species Act (ESA) listed and Species of Conservation Concern (SCC) aquatic species would be provided for in a similar manner in all alternatives as measures in aquatic ecosystem plan components are similar to those in PACFISH/INFISH. However, under a more aggressive schedule of treatments, more potential impacts could occur under this alternative. Alternative W proposes the greatest number of rivers as suitable wild and scenic rivers. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Eligible acres of wild and scenic river corridors would be 172,710 acres under the No Action Alternative versus 65,650 acres under Alternative W. This direction may help some fish species but may hinder active restoration for them in other areas under this alternative compared to in the No Action Alternative. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would increase the most under Alternative W. In addition to the Hoodoo, the Mallard-Larkin, and the Selway additions, this alternative would add Bighorn-Weitas, North Lochsa Slope, East Meadow Creek, Moose Mountain, Rapid River, North Fork Spruce-White Sands, Sneakfoot Meadows, Meadow Creek-Upper North Fork, and West Meadow Creek. This amount of recommended wilderness would be the most compared to the other alternatives. The amount of recommended wilderness would have environmental consequences on ESA listed fishes and aquatic sensitive species, as described below.

Under Alternative W, more fish populations would be included in recommended wilderness than other alternatives with the addition of 10 recommended wilderness areas, totaling approximately 857 acres. More spawning and rearing habitat will thus be included in recommended wilderness under this alternative. Fish populations in these populations would benefit from the additional recommended wilderness area because they would not be subject to managements decisions that could allow motorized use under Alternative W. Although all recommended wilderness is already in IRR themes, some IRR themes allow motorized trails, whereas recommended wilderness does not. This would decrease the potential for sediment input from motorized trails, and access to fish by anglers would be more difficult. On the other hand, the ability to connect fisheries habitats within the plan area or the ability to improve fisheries habitat conditions through active management would be constrained within recommended wilderness under this alternative.

Alternative X

Alternative X recommends zero areas for wilderness, and zero suitable wild and scenic rivers. It allocates the most land as suitable for motorized access in summer and winter. It establishes a potential timber harvest of 241 to 261 million board feet (MMBF), has a maximum opening size of 207 acres, and is designed to meet forest vegetation desired conditions within 20 years when timber harvest, prescribed fire, and natural disturbance are accounted for.

Alternative X reaches desired vegetation conditions the fastest out of all the alternatives and slightly faster than Alternative W. Thus, it has the most aggressive schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation (NRV). For fish, this quicker-paced schedule would improve aquatic resources quicker than any other alternative. While the pace may be quicker, all alternatives seek to achieve the same desired forest conditions.

Under Alternative X, forest conditions would trend towards desired conditions at a rapid pace. Proactive management through wildland fire would occur more under Alternative X in Idaho Roadless Rule (IRR) areas, especially within backcountry restoration themed areas. As no areas would be identified as recommended wilderness, this alternative has the least constraints on improving stream habitat. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative.

In Alternative X, more areas were identified as suitable for motorized uses compared to the No Action Alternative. This could contribute to public access and more risk of sediment delivery to streams use in some areas, especially those that would be suitable for motorized uses. The percentage of the planning area that is suitable for summer motorized uses would be 58 percent, an increase of about 13 percent suitable for motorized use compared to the No Action Alternative. Seventy percent of the plan area would be suitable for winter motorized travel, while 30 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum (ROS) can be found in Appendix A. Areas suitable for motorized uses could see an increased risk of construction of unauthorized routes, which could potentially degrade stream conditions if such routes are near to or cross streams.

Aquatic habitats would be provided for in a similar manner in all alternatives as measures in aquatics plan components are similar to PACFISH/INFISH. However, under a more aggressive schedule of treatments, there is an increased risk of potential impacts that could occur under this alternative. Alternative X proposes no rivers as suitable for wild and scenic rivers. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Eligible acres of wild and scenic river corridors would be 172,710 acres under the No Action Alternative versus zero acres under Alternative X. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would be none under Alternative X, which would reduce the amount of recommended wilderness compared to the No Action Alternative. The Hoodoo, the Mallard-Larkin, and the Selway additions would no longer be recommended wilderness. The amount of recommended wilderness would be the least compared to the other alternatives. The amount of recommended wilderness would have environmental consequences to fish, as described below. The amount of designated wilderness would not change under this alternative.

Under Alternative X, no new fish major population groups or critical habitat would be included in recommended wilderness. On the other hand, the ability to do stream restoration projects through active management would be the most permissible in this alternative.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be most proactive under this alternative. Therefore, the ability of the national forest to conduct stream restoration activities intended to move toward desired conditions would be maximized. Under this alternative all areas are open to mechanized travel. Allowing mechanized travel, such as bicycles, could have slight detrimental consequences to fish if mountain bikes increase access to stream reaches farther from roads. Under this alternative, this activity would be allowed in the largest area. However, mechanized travel is not intensive in the plan area at the present time.

Alternative Y

Alternative Y recommends four Idaho Roadless Areas (IRR) for wilderness (309,332 acres) and finds suitable 14 wild and scenic rivers. Motorized access would be expanded by opening backcountry themed roadless areas including Bighorn Weitas and Pot Mountain. It establishes a potential timber harvest of 130 to 150 million board feet (MMBF) annually with a maximum opening size of 207 acres and is designed to meet forest vegetation desired conditions within 50 years when timber harvest, prescribed fire, and natural disturbance are accounted for.

The less proactive schedule in Alternative Y would allow fewer areas to be targeted to increase the quality of the stream habitat by restoring forests to towards their natural range of variation (NRV). Proactive management through wildland fire would be moderate under Alternative Y in IRR areas compared to Alternatives W and X. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative.

In Alternative Y, slightly fewer areas were identified as suitable for motorized uses compared to the No Action Alternative. This could benefit fish habitat in some areas, especially those that would not be suitable for motorized uses. The percentage of the planning area that is suitable for summer motorized uses would be 44 percent, a decrease of about 1 percent suitable for motorized use from the No Action Alternative. Sixty-two percent of the plan area would be suitable for winter motorized travel, while 39 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum (ROS) can be found in Appendix A. Areas suitable for motorized uses could affect fish and stream quality.

Aquatic habitats would be provided for in a similar manner in all alternatives as aquatics plan components and contain similar protections as measures in PACFISH/INFISH. Under a less proactive schedule of treatments, fewer potential impacts could occur under this alternative. Alternative Y proposes intermediate amounts of rivers as suitable as wild and scenic. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Suitable acres of wild and scenic river corridors would be 100,623 acres under Alternative Y. These acres would benefit fish species, but may be neutral to others, as the quarter-mile riparian buffer is much larger than what has been shown to be effective to protect stream resources. Wild and Scenic suitability is not expected to hinder habitat enhancement for aquatic species because riparian treatments can still occur for resource benefit to move toward desired conditions in the larger stream buffer widths. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would decrease under Alternative Y versus the No Action Alternative because the Hoodoo area would decrease from a boundary change. The change in the amount of recommended wilderness would have environmental consequences on fish and aquatic species, as described below.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be similar to the No Action Alternative, more than Alternative W, and less than in Alternative X. The ability of the national forest to do active stream restoration in Management Area 2, as a result of achieving desired vegetation conditions, would be allowed under this alternative. Restoration would be achieved in recommended wilderness through wildland fire, which may not occur in areas expected to produce the best aquatic response.

Current recommended wilderness, designated wilderness, and Idaho Roadless Rule (IRR) areas would continue to provide high levels of protection for Endangered Species Act listed and Species of Conservation Concern species in Management Areas 1 and 2. Under Alternative Y, these species would be slightly more accessible to the public than in the No Action Alternative. Under this alternative, mechanized travel is prohibited in recommended wilderness, as well as game carts. The prohibition of mechanized travel, such as bicycles, would have slight benefits to fish because mountain bikes can increase public access to streams farther from roads. Under this alternative, this activity would be prohibited. However, mechanized travel is not intensive in the plan area at the present time.

Alternative Z

Alternative Z recommends 10 IRR areas (totaling 569,755 acres); however, they would be managed to allow winter motorized and mechanized travel, which would change if Congress designated them as wilderness. It designates 37 rivers as suitable for wild and scenic rivers. It contracts motorized access by finding that West Meadow Creek is not suitable for motorized travel. It establishes timber harvest levels of between 8 and 100 million board feet (MMBF) annually with a maximum opening size of 207 acres and is designed to meet forest vegetation desired conditions within 100 or more years when timber harvest, prescribed fire, and natural disturbance are accounted for. It also has additional snag requirements for timber sales.

Alternative Z would reach desired vegetation conditions at a similar rate to the No Action Alternative but slower than Alternatives W and X. Thus, it has a relatively more relaxed schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation (NRV). For fish, this more moderately paced schedule would continue to expose aquatic habitats to an increased risk of high severity fire.

Proactive management through prescribed fire and managed wildland fire would be similar to the No Action Alternative under Alternative Z but slower in Idaho Roadless Rule areas compared to Alternatives W and X. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative.

In Alternative Z, slightly less areas were identified as suitable for motorized uses compared to the No Action Alternative. This could aquatic habitat in some areas, especially those that would not be suitable for motorized uses. The percentage of the planning area that is suitable for summer motorized uses would be 43 percent, a decrease of about 2 percent suitable for motorized use from the No Action Alternative. Seventy percent of the plan area would be suitable for winter motorized travel, while 30 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum (ROS) can be found in Appendix A.

Aquatic habitats would be provided for in a similar manner in all alternatives as aquatics plan components provide similar protection to measures in PACFISH and INFISH. Under a less proactive schedule of treatments, fewer potential impacts could occur under this alternative. Alternative Z proposes the most amounts of rivers as suitable as wild and scenic. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Suitable acres of wild and scenic river corridors would be 149,691 acres under Alternative Z. These acres would help some aquatic species, be neutral to others, and active habitat enhancement efforts in streams would be more difficult. There would be no change in the amount of designated wild and scenic rivers.

Alternative Z is the second highest alternative for the amount of recommended wilderness compared to the other alternatives. The alternative would include the Hoodoo, Mallard-Larkins, East Meadow Creek, Rapid River, Meadow Creek-Upper North Fork, North Fork Spruce-White Sands, Sneakfoot Meadows, Rawhide, and Pot Mountain Idaho Roadless Rule (IRR) areas. This is the only alternative that would include Pot Mountain. The change in the amount of recommended wilderness would have environmental consequences on fish and aquatic species as described below.

Under Alternative Z, more fish populations would be included in recommended wilderness than in all but Alternative W. Access to fish by anglers would be more difficult in these recommended wilderness areas. The ability to connect fish habitats within the plan area or the ability to improve fish habitat conditions through active management would be constrained within recommended wilderness under Alternative Z. Thus, this alternative restricts anglers' access and contains the opportunity for the national forest to conduct active stream restoration.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be constrained in this alternative more than all but Alternative W because of the high amount of recommended wilderness, which would change many areas that are currently in the backcountry restoration theme to the backcountry recreation theme. Active management for restoration purposes is strongly restricted in this theme. Therefore, the ability of the national forest to do active stream restoration in 474,288 acres of recommended wilderness would be highly restricted under this alternative. This would not be an insignificant amount. This would impact the Nez Perce-Clearwater's ability to proactively restore these habitats for fishes. Restoration would only be achieved in recommended wilderness through wildfire, which may not occur in areas expected to produce the best habitat response. In addition, wildland fire would be largely unsuppressed, which increases the risk of fires burning riparian areas.

Current recommended wilderness, designated wilderness, and IRR areas would continue to provide for Endangered Species Act listed and Species of Conservation Concern species. Under Alternative Z, the higher amounts of recommended wilderness would be better for these species because of the limited access it would provide.

Under this alternative, mechanized travel is allowed in recommended wilderness, as well as game carts. Allowing mechanized travel, such as bicycles, would have slight detrimental effects to fish because mountain bikes have been documented to increase public access to streams farther from roads. Under this alternative, this activity would be allowed. However, mechanized travel is not intensive in the plan area at the present time.

Preferred Alternative

The preferred alternative recommends three wilderness areas, including parts of four IRR areas (totaling 258,210 acres). It finds 11 rivers suitable for wild and scenic rivers, and one river, the Little North Fork Clearwater, would remain eligible. It expands motorized access in both summer and winter, establishes timber harvest of between 190 and 210 million board feet (MMBF) annually with a maximum opening size of 207 acres, and is designed to meet forest vegetation desired conditions in 30 to 35 years when timber harvest, prescribed fire, and natural disturbance are accounted for.

The preferred alternative adopts a quicker pace to achieve desired vegetation conditions and would reach desired conditions faster than all alternatives except Alternative X. As a result, it is expected to restore the landscape back to conditions based on natural range of variation (NRV) in a shorter time frame. For fish, this more aggressively paced schedule is expected to improve habitat by changing the hydrologic cycle to one that more closely resembles historical conditions on the national forest. As objectives for fisheries habitat improvement are nested within efforts to restore vegetation back to a natural range of variability, the alternatives that accelerate the pace of aquatic restoration are expected to be more beneficial to fish than alternatives with a slower restoration pace.

In the preferred alternative, more areas were identified as suitable for motorized uses which could affect fish habitat use in some areas. For example, there is anecdotal evidence that in recent years there has been an increase of anglers targeting bull trout in the North Fork Clearwater River. Joubert et al. (2019) found that a greatly increased duration of air exposure (that they felt replicated anglers photographing memorable fish) can greatly increase bull trout mortality. However, their air exposure (112 seconds) was likely much longer than what fish typically undergo in a catch and release fishery (McCarrick et al 2019). However, if increased motorized access could lead to higher angling effort, more anglers could hypothetically lead to some measure of higher mortality of bull trout. Although apparent declines in bull trout redds were observed for several years in the North Fork for unknown reasons, the most recent data from Idaho Department of Fish and Game (IDFG) suggests that a static trend in that drainage. However, under the Preferred Alternative, motorized trail suitability increases in the North Fork, and therefore, if trails are planned that cross or otherwise provide access to streams, fishing access may increase, which could increase bull trout mortality if anglers remove memorable or trophy fish from water for prolonged periods, or if trails contribute sediment to rivers. However, even if trails were planned and constructed, the plan component (MA2-GDL-WL-05) would protect against spur trails and would likely limit most tributary access. In addition, float anglers generally rely on the main North Fork Road for river access, because it is impractical to transport boating equipment for a float trip via all-terrain vehicle, so an increase in motorized trails may not facilitate a meaningful increase in access because of the logistics associated with transporting boats.

The Preferred Alternative recommends an intermediate amount of land for recommended wilderness (3 additional) for a total of 258,210 acres. The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be constrained in this alternative more than all but Alternative W because of the high amount of recommended wilderness, which would change many areas that are currently in the backcountry restoration theme to the backcountry recreation theme. Active management for restoration purposes is strongly restricted in this theme. Therefore, the ability of the national forest to do active stream restoration in 258,210 acres of recommended wilderness would be somewhat restricted under this alternative. This would not be an insignificant amount. This would impact the Nez Perce-Clearwater's ability to proactively restore these habitats for fishes. Restoration would only be achieved in recommended wilderness through wildfire, which may not occur in areas expected to produce the best habitat response. In addition, wildland fire would be largely unsuppressed, which increases the risk of fires burning riparian areas.

Riparian Management Zones Environmental Consequences

Background

Riparian Habitat Conservation Areas in the No Action Alternative and Riparian Management Zones in the action alternatives are portions of watersheds where riparian-associated resources receive primary emphasis, and management activities are subject to specific standards and guidelines. These areas consist of riparian and terrestrial vegetation adjacent to streams, wetlands, and other bodies of water, helping to maintain the integrity of aquatic ecosystems and provide for wildlife habitat use and connectivity. Ponds, lakes, wetlands, streams, and other water features have been identified and mapped across the Nez Perce-Clearwater.

Effects of Forestwide Direction on Riparian Areas

No Action Alternative

PACFISH amended the Nez Perce and Clearwater Forest Plans and is unchanged from its original wording in the No Action Alternative. INFISH amended the Clearwater Forest Plan in areas not supporting anadromous fish, which included the Upper and Lower North Fork Clearwater subbasins above Dworshak Dam and the Palouse River. Both strategies underwent programmatic consultations in 1995 for listed salmon and again in 1998 for listed steelhead and bull trout and additional requirements in the resulting Biological Opinions legally became part of the strategies and were implemented on the Nez Perce and Clearwater National Forests. Both the strategies and their Biological Opinions reduce the risk to watersheds and riparian and aquatic resources by improving riparian zone protections. Riparian habitat conservation areas are established as management zones bordering streams, wetlands, and other water features. They are not mapped as designated management areas, but their delineation at the site-specific level is described in plan direction, including their minimum width. Table 131 displays the riparian habitat conservation area widths. These widths could be adjusted in some cases, based on site-specific conditions, but these are the widths that would be used for the purpose of analysis at the programmatic level.

Table 131. Minimum width of riparian habitat conservation areas under the No Action Alternative.

Water Feature Type	Minimum Width (ft) on each side of the stream, pond, wetland, or landslide-prone area
Category 1 – Fish bearing stream	300
Category 2 – Perennial non-fish bearing stream	150
Category 3 – Constructed reservoirs, ponds, lakes, and wetlands >1 acre	150
Category 4 – seasonally flowing or intermittent streams, pond, lakes, wetlands < 1 acre, landslides and landslide prone areas in KEY/PRIORITY watersheds	100
Category 4 – seasonally flowing or intermittent streams, pond, lakes, wetlands < 1 acre, landslides and landslide prone areas NOT in KEY/PRIORITY watersheds	50

Data Source: 1987 Forest Plans (U.S. Department of Agriculture 1987b, a), as amended by PACFISH and INFISH.

It is important to note that the 1998 PACFISH and INFISH Biological Opinions required all streams within the range of Endangered Species Act listed steelhead to be considered a Key or Priority watershed, so, following 1998, nearly all Category 4 riparian habitat conservation areas were 100 feet. Exceptions were in the North Fork Clearwater subbasins in subwatersheds not considered priority for bull trout and the Palouse River.

Riparian habitat conservation areas are classified as not suitable for timber production based on the determination that a scheduled flow of commercial timber products using a rotation age could not be expected to occur on these lands because of management requirements and desired conditions for other resources associated with riparian habitat conservation areas. Timber harvest is allowable within riparian habitat conservation areas if conducted to achieve objectives for the stream and riparian habitat conservation areas.

Riparian areas are considered their own management area in both the Nez Perce and Clearwater Forest Plans. Forestwide goals and direction in the 1987 plans address water quality, stream channel integrity, diversity of plant communities, riparian-dependent wildlife, and other features associated with aquatic and riparian areas that provide protection for the riparian-associated resources and values. They include direction allowing no management in riparian areas that would cause detrimental changes in water temperature or chemical composition, blockages of water courses, or deposits of sediment that seriously and adversely affect streams or fish. Also included is direction to manage riparian areas to maintain cover and security for riparian-dependent species with emphasis on maintaining and enhancing habitats for threatened and endangered species.

Nothing in the PACFISH and INFISH amendments and their Biological Opinions contradicts this 1987 plan direction. Rather, PACFISH and INFISH provided more refined and detailed standards and guidelines, established interim widths for riparian habitat conservation areas that required Watershed Assessment to adjust. These interim widths were generally much wider than those used during project planning and implementation prior to the amendments, described the concept of Watershed Analysis and appropriate use, and included detailed riparian goals and riparian management objectives. Implicit in these amendments was the concept of "do not retard;" in other words, they were used to maintain aquatic conditions until such time as site-specific direction were developed through forest planning. Originally, they were intended to provide temporary guidance for 18 to 36 months until a restoration decision similar to Northwest Forest Plan could be completed (Interior Columbia Basin Ecosystem Management Project [ICEBMP]). A decision was never made, and instead, ICEBMP guidance was developed in 2003 (amended in 2014) to guide management actions until further direction was provided through future forest plan revisions.

Under the No Action Alternative, these protections would stay in place, and the terrestrial and aquatic habitats within the riparian habitat conservation areas would continue to be protected. In addition, riparian habitat conservation areas established for wetlands and lakes would continue protecting wetland values such as shade, temperature, and downed wood.

As summarized previously and described in detail in the Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a), PACFISH and INFISH Biological Opinion (PIBO) monitoring data, as well as the Nez Perce-Clearwater's own monitoring under the 1987 plans, suggest that this direction achieved the goal of preventing additional degradation at the forest scale, considering all indicators collectively.

Effects common to action alternatives

The Nez Perce-Clearwater Aquatic Ecosystems plan components are part of all five action alternatives and replaces PACFISH and INFISH. Plan components directly related to riparian management are shown in Table 132. The action alternatives would rename and redefine riparian widths, instead of keeping them the same as under the No Action Alternative, replacing riparian habitat conservation areas terminology with riparian management zones (RMZs). As is the case under the No Action Alternative, RMZs are not specifically allocated as a management area in the plan but are instead defined through plan direction. This direction includes a standard that describes the delineation of RMZs and defines their minimum width (FW-STD-RMZ-07). The reason they are not allocated as a management area is because RMZs are intimately linked to water features and to the unique terrain and site characteristics associated with each feature. They can only be accurately determined at the site-specific scale during project analysis.

Table 132. PACFISH/INFISH riparian/channel management standards and guidelines crosswalk with Land Management Plan standards and guidelines.

PACFISH/INFISH	Land Management Plan
RA-3. Apply herbicides, pesticides, and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on listed anadromous and inland native fish. RA-5. Locate water drafting sites to avoid adverse effects to inland native fish and instream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.	FW-STD-WTR-03. Portable pump set-ups and fuel containers in riparian management zones shall include appropriate containment and cleanup provisions for fuel spills. FW-STD-WTR-05. When drafting water, pumps shall be screened to prevent capture or harm of fish and aquatic organisms. Pumping sites shall be located away from spawning gravels. To prevent the spread of invasive species, pumps, charged hoses, and drafted water shall not be backflushed or discharged into stream channels, wetlands, or other water bodies. FW-GDL-WTR-04. To avoid adverse effects to spawning and staging fish, their eggs, and embryos, instream activities, and near-stream activities with the potential to disturb spawning fish and directly deliver sediment to spawning habitat, should be implemented in accordance with State of Idaho instream work window guidelines. FW-STD-RMZ-03. Herbicides, pesticides, and other toxicants and chemicals shall only be applied within riparian management zones

PACFISH/INFISH	Land Management Plan
	when the activity does not retard attainment of aquatic and riparian desired conditions. FW-STD-RMZ-07. The Riparian Management Zone definitions in the introduction of section 2.2.2 (Riparian Management Zones) shall be used for all actions and projects. FW-GDL-RMZ-08. To maintain water quality, pumping directly from a stream channel should be avoided if chemical products are to be directly mixed with water being withdrawn. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian management zones.
RA-4. Prohibit storage of fuels and other toxicants within Riparian Habitat Conservation Areas. Prohibit refueling within Riparian Habitat Conservation Areas unless there are no other alternatives. Refueling sites within a Riparian Habitat Conservation Area must be approved by the Forest Service or Bureau of Land Management and have an approved spill containment plan.	FW-GDL-WTR-01. To maintain channel forming processes and aquatic habitat, large woody debris should not be cut or removed from stream channels or floodplains unless it threatens public safety or critical infrastructure, such as mid-channel bridge piers. FW-GDL-WTR-04. To avoid adverse effects to spawning and staging fish, their eggs, and embryos, instream activities, and near-stream activities with the potential to disturb spawning fish and directly deliver sediment to spawning habitat, should be implemented in accordance with State of Idaho instream work window guidelines. FW-GDL-RMZ-10. To conserve Pacific lamprey and Western pearlshell mussel populations, individuals should be re-located to an alternative site with suitable habitat prior to de-watering channel work proposed in areas containing habitat for these species.

The riparian management zone (RMZ) minimum width for all intermittent streams would be 100 feet under the action alternatives, instead of varying from 50 to 100 feet, as they do for some sub watersheds under current direction. Landslides and landslide-prone areas remain a Category 4 RMZ, noted as unstable or potentially unstable areas, as shown in Table 133.

Table 133. Minimum width of Riparian Management Zones under the Action Alternatives.

RMZ Category	Minimum width on each side of stream, pond, wetland, or unstable slopes
Category 1 – Fish bearing streams	300 feet
Category 2 – Permanently flowing non-fish bearing streams	150 feet
Category 3 – Constructed reservoirs, ponds, lakes, and wetlands >1 acre	150 feet
Category 4 – Seasonally flowing or intermittent streams, pond, lakes, wetlands < 1 acre, unstable or potentially unstable areas	100 feet

Further clarification is provided for Category 1 RMZs. The area around any stream, whether perennial or not, is considered a Category 1 RMZ if it contains fish at any time of the year and is

300-feet on either side. From the definition, fish-bearing intermittent streams are distinguished from non-fish-bearing intermittent streams by the presence of fish for any duration. Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams or travel routes for fish emigrating from lakes. In these instances, the guidelines for fish-bearing streams would apply to those sections of the full-extent of intermittent stream used by the fish from the mouth to the upper-most point of fish use.

As described in the Riparian Management Zone section of the Aquatic Ecosystems plan components, there are qualifiers on the total widths of RMZs based on site-specific conditions but as mentioned, these minimum widths are used for analysis at the programmatic level in this Final Environmental Impact Statement.

Riparian management zone (RMZ) direction under all action alternatives was refined through plan components designed to guide appropriate management based upon best available science. Monitoring and research reports over the past 20 years have documented the efficacy of RMZs and their ability to protect the functional attributes needed for riparian and aquatic resources and water quality. Using stream temperature as a response variable, a study in Oregon found no differences in temperature before and after a project using a no-cut buffer as small as 25 feet (Groom et al. 2011). Similarly, a comprehensive study in Oregon and Washington that evaluated various buffer widths found no increases in stream temperature using a 50-foot buffer (Anderson and Poage 2014). The latter study did point out that the efficacy depended on the adjacent disturbance and contrast in forest canopy.

Many researchers suggest that a 100-foot area where trees are retained next to fish-bearing and perennial streams is generally likely sufficient to protect against temperature increase (Anderson and Poage 2014, Reeves, Pickard, and Johnson 2016, Sweeney and Newbold 2014, Witt et al. 2016). Even so, considerations of context and geography are also appropriate. In a discussion of fixed-width riparian buffers, Richardson et al. (2012) state that although these types of protections are administratively simple to implement at the stream reach scale, watershed considerations and location within the catchment provide additional important context.

Riparian management zones on the Nez Perce-Clearwater are classified as not suitable for timber production under these alternatives, based on the determination that a scheduled flow of commercial timber products using a rotation age could not be expected to occur on these lands due to management requirements and desired conditions for other resources. Vegetation management is allowable with restrictions as specified in the Aquatic Ecosystems plan components. Other vegetation management activities are also allowed and are expected to occur to maintain desired conditions for riparian areas or other resources, as described further below. Refer also to the discussion later in this section on effects to riparian areas from timber and vegetation management.

Vegetation management in the RMZ would occur only for the purposes of restoring or enhancing riparian, fish, and aquatic resources (FW-STD-RMZ-01).

FW-STD-RMZ-01 was designed in conjunction with FW-STD-RMZ-04, FW-STD-RMZ-07, FW-GDL-RMZ-01, FW-GDL-RMZ-02 to replace Standard TM-1 in PACFISH and provide clarification of this language in TM-1: “Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on listed anadromous and inland native fish.” It does this by including the phrase “vegetation management shall only occur in riparian management zones”, and then specifies where, under what conditions, and for what purposes vegetation management is permitted.

Additionally, any vegetation treatments in riparian management zones would be designed to reflect the composition, structure, and pattern of vegetation consistent with the natural range of variation (NRV), as described in the desired conditions.

Fire is a natural disturbance process that has historically influenced the Nez Perce-Clearwater within watersheds, including riparian areas and forests adjacent to water features. The natural role of fire and other natural disturbances in creating the diversity of successional stages, species compositions, and structures in riparian areas is incorporated into the design of the desired forest and vegetation conditions outlined in the plan (FW-DC-RMZ-01 and 02).

The Aquatic Ecosystems plan components also contain standards and guidelines that are intended to prevent degradation from any harvest that might occur in riparian management zones (RMZs). These components provide more specific direction and clarification beyond what is included in PACFISH and INFISH. They include FW-STD-RMZ-03, where herbicides, pesticides, and other toxicants and chemicals shall only be applied within RMZs when the activity does not retard attainment of aquatic and riparian desired conditions. FW-GDL-RMZ-01 applies to new landings, skidding, staging or decking, and machine burn piling that should be located outside RMZs to minimize effects to riparian and aquatic resources. Where new activities inherently must occur in RMZs, they should be located so that they do not degrade or retard aquatic and riparian desired conditions. FW-GDL-RMZ-02 will reduce the likelihood of sediment input to streams by avoiding new road, trail, and landing construction, including temporary roads, in RMZs. FW-GDL-RMZ-03 directs yarding activities to achieve full suspension over the active channel to prevent damage to stream channels.

Additional components addressing effects from other activities would not lead to different outcomes when compared to PACFISH and INFISH direction and provide enhanced direction and clarification over what is provided in these amendments. To limit impacts from fire suppression activities, RMZs would have limited exposure to fire retardant (FW-GDL-RMZ-04) and new fire facilities would rarely be allowed to be located within these zones (FW-GDL-RMZ-05). These protections carry forward existing protections under the No Action Alternative and provide additional clarification. Fireline construction would be avoided in RMZs, except at stream crossings (FW-GDL-RMZ-06).

For all activities, including and especially those within RMZs, FW-STD-WTR-04 applies. This standard specifically directs that “projects shall restore or not retard attainment of desired conditions.” This standard clarifies the following statement in PACFISH, “Actions that reduce habitat quality, whether existing conditions are better or worse than objective values, are inconsistent with the purpose of this interim direction.” In other words, FW-STD-WTR-04, as part of all action alternatives, carries forward the same expectation from PACFISH, using language consistent with the 2012 Planning Rule and eliminating the word “interim.” In that sense, the expectation that Nez Perce-Clearwater actions will not result in permanent, long-term degradation of aquatic habitat, including RMZs, is the same for all alternatives. Therefore, outcomes from Alternatives W, X, Y, and Z, and the Preferred Alternative would be expected to be indistinguishable from those in the No Action Alternative.

Establishment of the Conservation Watershed Network, along with additional desired conditions and standards, further builds on the restoration concept where habitats are currently degraded, as discussed in greater detail in Effects of Forestwide Direction on Aquatic Habitat.

Aquatic Habitat Environmental Consequences

Effects of Forestwide Direction on Aquatic Habitat

No Action Alternative

For riparian areas and riparian habitat conservation areas, PACFISH amended the 1987 Nez Perce and Clearwater Forest Plans and is unchanged from its original wording in the No Action Alternative. INFISH amended the Clearwater Forest Plan in areas not supporting anadromous fish, which broadly includes the Upper and Lower North Fork Clearwater subbasins above Dworshak Dam and the Palouse River. Both underwent programmatic consultations in 1995 for listed salmon and again in 1998 for listed steelhead and bull trout, and additional requirements in the resulting Biological Opinions legally became part of PACFISH and INFISH and were implemented on the Nez Perce and Clearwater National Forests. Both PACFISH and INFISH and their Biological Opinions reduced the risk to watersheds and riparian and aquatic resources by improving riparian zone protections. They also included over-arching direction for actions that resulted in a reduction in aquatic habitat quality and thus were not consistent with the Biological Opinions. They were intended to arrest additional aquatic habitat degradation until the Nez Perce-Clearwater revised forest plans and replaced PACFISH and INFISH with more site-specific direction.

Of note, the 1998 National Marine Fisheries Service Biological Opinion for steelhead incorporated nine recommendations into the ongoing actions proposed by the U.S. Forest Service and Bureau of Land Management and agreed upon by three regional foresters to avoid a jeopardy determination for continued implementation of land management plans. These recommendations included special management considerations for the Middle Fork Salmon, South Fork Salmon, and Selway Rivers. These river basins are considered to support three stronghold populations of wild steelhead, one of which is the Selway River located on the Nez Perce-Clearwater. These management considerations included enhanced direction for management of timber, roads, fire, and recreation and were intended to minimize risks to these populations beyond measures included in PACFISH. They also emphasized restoration of degraded habitat.

Prior to PACFISH and INFISH, both the Clearwater and Nez Perce Forest Plans contained direction regarding aquatic resources, streams, and fish, particularly regarding potential sediment effects. Direction in the previous Nez Perce Forest Plan for aquatic resources was predicated on the principles of meeting “fish/water quality objectives” at a scale generally smaller than HUC12. Fish and water quality objectives were established based on the beneficial uses in each watershed and species present and ranged from 70 to 100 percent. Additional guidelines related to sediment yield and entry frequency for timber harvest were established based on these objectives. Sediment yield guidelines, entry frequency guidelines, and fishery habitat potential were included. The information and direction related to fish and water quality objectives, sediment yield guidelines, and entry frequency guidelines are contained in Appendix A of the Nez Perce Forest Plan. This guidance is now several decades old and was based upon the best available information at the time, but much of it is now outdated. The plan components in the revised Land Management Plan are based on knowledge gained during those decades under the current plan, updated baseline information, updated scientific information, and policy considerations.

In many cases, the current fishery habitat potential, as it was described in the 1987 Plan, was lower than its water quality objective value. These watersheds were assigned additional direction stating that “timber management can occur in these watersheds, concurrent with improvement efforts, as long as a positive, upward trend in habitat carrying capacity is indicated.” This direction was crafted to address the following forestwide standard: “Meet established fish/water quality objectives for all prescription watersheds as shown in [the Nez Perce Forest Plan] Appendix A." The upward trend direction was intended to allow timber harvest in watersheds not currently meeting their fish and water quality objectives, as long as watershed or stream improvements were also implemented that moved stream conditions towards their objectives.

Some watersheds were assigned a fish and water quality objective that was less than their current fishery habitat potential, thus allowing for a measure of planned degradation in these watersheds. In all cases, sediment yield and entry frequency guidelines varied according to fish and water quality objectives and were intended to function as thresholds providing the maximum increase in sediment yield plus the number of times that increase could occur in a decade that would allow for these objectives to be met.

Thus, the upward trend direction in the 1987 Nez Perce Forest compelled action intended to restore degraded fish habitat if timber harvest was to be pursued in watersheds that did not meet forest plan objectives.

Direction in the Clearwater Forest Plan was in many respects similar to the Nez Perce Forest Plan, as both national forests shared the same issues related to anadromous fish, sediment, and aquatic resources. The Clearwater Forest Plan equivalent to Appendix A of the Nez Perce Forest Plan was Appendix K, in which criteria for management of water resources was defined and assigned to specific watersheds at a scale generally smaller than HUC12. Rather than numeric fish and water quality objectives, this plan assigned one of six categories of water quality objectives, which included Basic, No Effect, High Fishable, Moderate Fishable, Low Fishable, and Minimum Viable. Assignment of watersheds to one of these objectives was based on one of five indicator fish species. Sediment loadings were assigned to each objective.

The Clearwater Forest Plan did not include upward trend direction for any of its watersheds. The Plan and record of decision, however, were challenged in court shortly after signing, and an out-of-court settlement included the following language:

"The Forest Service will proceed only with projects that result in no measurable increase in sediment production in drainages currently not meeting Forest Plan standards. The Forest Service also agrees, as budgets permit, to repair or correct any known sediment sources… Project plans will include a clearly described watershed improvement objective and identify improvement opportunities and realistic expectations offered by the project proposal."

This language is the current management direction.

To assess the effects of the 1987 Forest Plan direction, as amended by PACFISH and INFISH, PACFISH and INFISH Biological Opinion (PIBO) data provides a description of the existing stream conditions compared to reference and an analysis of trend. The data is summarized in Table 122, Table 123, Table 124, Table 125. For existing condition, the data presented indicates that overall stream conditions in managed watersheds on the Nez Perce-Clearwater, when all indicators are considered collectively, are within the range of natural variability. The data suggests that all indicators are better than or not less than residual pool depth, pool percent, and large wood frequency are degraded and less favorable for salmonids when compared against reference subwatersheds. In addition, median substrate size, bank angle, and macroinvertebrate assemblage in managed subwatersheds are indistinguishable from reference, and pool fines are in a more favorable condition than in reference subwatersheds. It should be noted that the term "reference" should not be confused with "undisturbed."

For trend, PIBO data indicates an overall improving trend when data from all sites across the Nez Perce-Clearwater are combined for OE, D50, and large wood frequency. At the subbasin scale, the subbasin with an overall statistically significant improving trend is the Lower Selway for 2019; although in 2016, the Lochsa, Lower Selway, South Fork Clearwater River, and Lower Salmon showed improvement. A statistically significant downward trend is indicated by data from managed sites in the Clearwater and South Fork Clearwater, although current conditions as of 2016 were within the range of reference.

Forest plan monitoring data is available for both the Nez Perce and Clearwater National Forests. For the Nez Perce National Forest, cobble embeddedness was the primary metric monitored, and analysis of the available data suggests that 1987 Forest Plan direction related to upward trend, combined with the PACFISH amendment, did indeed result in improved sediment conditions at the sites where data is available. Most notable among these decreases were sites in Red River and Newsome Creek, which have moratoriums on additional sediment producing activities, such as timber sales, until they recover to desired conditions. PIBO data appears to corroborate these conclusions.

Effects common to all action alternatives

This effects section will focus on three subsections, including indirect consequences of the action alternatives, specific activities likely to occur in the future, and aquatic plan components that are common to all action alternatives.

Aquatic habitat environmental consequences focus on two categories of actions and activities. The first category includes indirect consequences of action alternatives because they would not cause direct effects on the ground. For example, management area designations, establishing riparian management strategies, and selecting plan components are all proposed actions but are programmatic in nature such that they would only have indirect effects later in time. The second category includes specific activities likely to occur in the future that would be guided by the forest plan but are not yet formally proposed. Examples include infrastructure use, vegetation management, mining, recreation, etc. The effects analysis for these activities would occur during future Section 7 consultation after specific project proposals have been developed. Instead of an effects analysis in this document, the appropriate programmatic method for addressing these potential future activities is explaining how future actions guided by the plan might affect listed fish and critical habitat, given the potential land uses, description of desired components, and constraints imposed by standards and guidelines.

The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) have identified nine physical or biological features (PBFs) that describe pathways needed to support critical habitat (originally called “primary constituent elements” but officially changed to “physical or biological features” effective March 14th, 2016; 81 FR 7413). PBFs include habitat elements such as spring, seeps, and groundwater; migratory habitats; abundant food base; complex habitats; water temperature; natural hydrograph; water quality and quantity; and low levels of nonnative predators and competition. For this analysis, PBFs for all critical habitats have been aligned via a crosswalk table because they are similarly worded and could be similarly affected by proposed actions (Table 134).

Table 134 Standardized physical or biological features for the designated critical habitat of Bull Trout, Chinook Salmon (both races), and Steelhead.

Number	Bull Trout	Chinook Salmon	Steelhead
1	Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows)	water quality, quantity, temperature	water quality, water quantity
2	Migration habitats	free of artificial obstructions	floodplain connectivity, free of obstructions
3	An abundant food base	food, natural cover,	forage
4	Complex environments/processes that maintain them	cover, shelter, riparian vegetation, natural cover, space	floodplain connectivity, free of obstructions, natural cover
5	Water temperatures ranging from 36 to 59 °F	water quality, quantity, temperature	water quality, water quantity
6	Substrate of sufficient amount, size, and composition	spawning gravel, substrate	water quantity and floodplain connectivity, physical habitat conditions
7	A natural hydrograph	water velocity	water quantity
8	Sufficient water quality and quantity	water quality and quantity	water quality and quantity
9	Sufficiently low levels of occurrence of nonnative fish	no equivalent	no equivalent

Indirect Effects of Action Alternatives

Management area allocations can provide beneficial or adverse effects to listed species' critical habitat and essential fish habitat, depending on whether they increase or decrease recommended wilderness. This affects the number of acres that would be unsuitable for several activity types that otherwise could adversely affect physical or biological features (PBF)(for example, permanent road building) and greatly constrain others (for example, timber production). Refer to MA2-SUIT-RWILD plan components for complete suitability direction for recommended wilderness. The number of proposed wild and scenic rivers varies as well, however, stream and riparian protections would not be compromised because the quarter-mile protection corridor afforded by the National Wild and Scenic Rivers System Act is larger than necessary to protect stream functions such that the proposed riparian management zone (RMZ) distances would offer sufficient protection as determined by PACFISH/INFISH. Furthermore, RMZ plan components provide guidance for management activities to re-establish disturbance patterns in areas where it is lacking to restore riparian processes according to proposed RMZ desired conditions (FW-DC-RMZ-01, 02). PBF 4 would indirectly benefit from alternatives that increase recommended wilderness, and RMZ guidelines that are equally as protective as PACFISH/INFISH protections would contribute to the types of natural processes that provide complex habitat, natural cover, and refugia.

Suitability of motorized and non-motorized access proposals have the potential to adversely affect PBF 6 and the water quality components of PBFs 1 and 8 if lands suitable for motorized use are proposed to increase for both summer and winter. Roads and trails that support motorized use can cause sedimentation and large woody debris issues if not hydrologically disconnected. However, proposed standards and guidelines are expected to mitigate these effects. For example, FW-STD-ARINF-01 says, "Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat," and FW-GDL-ARREC-02 says, "To reduce potential adverse effects to water quality and aquatic resources, construction of new facilities or infrastructure within floodplains should be avoided. Where new activities inherently must occur in riparian management zones (for example, at road and trail stream crossings, boat ramps, or docks), they should be located and designed to minimize adverse effects to floodplains and other riparian-dependent resource conditions (for example, within geologically stable areas and avoiding major spawning areas)." These standards and guidelines would be expected to ensure that if adverse effects to PBFs were to occur in the future as the result of these motorized access suitability proposals, they would be minor and not lead to adverse modification or hinder recovery to conditions described by desired conditions.

Aquatic and riparian management strategies in the proposed forest plan would be beneficial for critical or essential habitat as several riparian management zone (RMZ) and Conservation Watershed Network (CWN) plan components were specifically designed to maintain the intent of PACFISH/INFISH direction (for example, FW-RMZ-STD-07; Appendix E), the same direction that was largely responsible for passive restoration and upward trend in habitat conditions documented by the PACFISH and INFISH Biological Opinion (PIBO) program (Roper 2020). Unlike the focus on passive restoration under the 1987 Forest Plan, the revised forest plan includes components that also emphasize active restoration. For example, FW-OBJ-RMZ-01 says: "Improve 300 to 700 acres of riparian habitat every 5 years, through improvements that are intended to meet desired conditions for riparian management zones, such as road obliteration, riparian planting, hardwood restoration, post assisted log structures, beaver dam analogs, and reconnecting floodplains by removing road prisms or berms." This increased capacity for active restoration has the potential to have long-term beneficial effects to all physical or biological features (PBFs). Identifying inner and outer zones of RMZs that clearly allow for active restoration to occur where desired conditions are not currently being met as opposed to PACFISH and INFISH that was often interpreted as "exclusion zones" or areas that were not readily available for active management.

Indirect effects of alternatives such as the monitoring program, potential management approaches, and other plan content would also be beneficial for critical or essential habitat as these elements are designed to facilitate implementation of the new forest plan. Because the net effect of most other proposed actions as described above are beneficial, proposals to evaluate progress towards meeting desired conditions and engage in partnerships, establish priority watersheds, etc. would likewise have a variety of effects on all PBFs. There are several relevant roles of plan components, which include limiting adverse effects of forest management, and promoting effective restoration and mitigation. When considering the plan as a whole, some plan components have negative effects on aquatics, that are at least partly reduced by potential management approaches, and some components such as those promoting restoration will have beneficial effects.

One of the assumptions of the PIBO monitoring is that the selected stream reaches withing an ecoregion are representative of conditions within that ecoregion. The large-scale sampling design has been shown to be statistically robust and is intended to provide accurate monitoring of trends without having to sample every single stream or stream reach. In addition, some of the bull trout core areas are primarily in Management Area 1 and would not be likely to exhibit downward trends due to active forest management, as none occurs there. Where management does occur, it is guided by plan components that require the Forest Service's best management practices (BMPs) to be used. The BMPs are built upon decades of monitoring to ensure that management does not have deleterious effects on critical habitat.

The net effect of proposed plan components is expected to be primarily beneficial in the long term for critical or essential habitat for the reasons stated above. The primary reason for this is the inclusion of desired conditions that identify what future projects would be designed to achieve. For example, projects in watersheds that contain designated critical habitat would have to "contribute to and enhance the conservation of aquatic species of conservation concern and recovery of threatened or endangered fish species" (FW-DC-CWN-01); "provide habitat that supports robust native fish populations, which are able to expand to and recolonize adjacent unoccupied habitats" (FW-DC-CWN-02); and ensure "critical habitat components (primary biological features) provide the ecological conditions necessary to achieve species recovery. Spawning, rearing, and migratory habitat are widely available and inhabited. Listed aquatic species have access to historic habitat and appropriate life history strategies (for example, bull trout resident, fluvial, adfluvial; and salmonid anadromy) are supported" (FW-DC-WTR-10). It is important to note that while some plan components could temporarily have adverse effects to critical habitat (for example, FW-OBJ-TBR-01: Offer 190-210 million board feet timber per year), those components would have to be implemented in a way that does not compromise the above-mentioned desired conditions for critical habitat. The following section provides additional information on how proposed plan components would guide the management of future activities.

Management of Activities Likely to Occur

This section describes activities likely to occur that would be guided by proposed forest plan components.

Infrastructure

The revised plan carries forward components and the intent of PACFISH and INFISH with some modification. For example, under the 2012 Planning Rule, Standards and Guides are not allowed to compel action, therefore the verbiage is changed for some components in the revised plan. In the place of those components, the Revised Plan has a far-reaching desired condition FW-DC-ARINF-01. It states, "The transportation system has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity of roads to streams, lower sediment delivery to streams, reduced road impact to floodplains, and improved aquatic organism passage, where transportation infrastructure affects these features." Under the revised plan, all road planning and activities must be designed to move the road system towards this desired condition. With addition of this desired condition, specific standards and guidelines that compel action under PACFISH and INFISH are not carried forward. An example would be PACFISH RF-2 c.2. which required developing a Road Management Objective for every road segment.

In addition to desired conditions, standards, guides, and goals, the revised plan has objectives. In the Forest Service Directives, objectives under the 2012 Planning Rule are described as, "A concise, measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives should be based on reasonably foreseeable budgets." The Conservation Watershed section of the revised plan has objectives for assessment of roads, regardless of maintenance level, that are most likely to be negatively impairing aquatic conditions and road storm-proofing (discussed below).

The revised plan carries components forward that restrict actions associated with existing road management that could otherwise retard attainment of aquatic restoration. The revised plan also contains components that restrict placement and construction of new roads such that the road network "has minimal impacts on aquatic and riparian conditions" (FW-DC-ARINF-01), and "road maintenance and new road construction shall be designed to minimize adverse effects" to listed species and their habitat (FW-STD-ARINF-01). Under the existing plans, the national forests have decommissioned 19 percent of the specified road system since PACFISH and INFISH in 1995.

Desired Conditions in the Revised Plan state that the road system is needed to "serve land management and public needs and purposes" (FW-DC-INF-01). The component FW-DC-INF-02 states, "Roads not needed to serve management and public needs and purposes are absent." When considered together, these two desired conditions acknowledge the desire of the public retain access to National Forest System lands while at the same time, roads that are not needed for access or management will be reduced during future projects.

To balance social, economic, and ecologic sustainability, and to support rural communities, guideline FW-GDL-ES-01 requires the Nez Perce-Clearwater to retain public access to areas that currently have open motorized access, in the summer or winter. When a route is identified as adversely affecting aquatic resources, the component guides maintenance or rerouting to be considered as alternatives to closing the route. If the route must be closed, the guideline states an alternative route should be provided. This guideline does not prohibit road closures per se, but it does provide a framework of alternatives that should be followed before implementing a closure, and it recognizes the importance of ecosystem services to the public. While this guideline does require the Forest Service to continue to provide ecosystem services that national forest visitors and rural communities expect, it does not absolve the national forest from the entirety of the rest of the plan nor does this plan component supersede any other. Instead, this guideline works in concert with other plan components to describe potential adverse impacts to aquatic resources and describe conditions that this ecosystem services plan component must work within. The scenario of multiple plan components working together to address problems in ways that promote the landscape toward desired conditions precludes any one plan component being a limiting factor for a resource. For example, specifically, FW-OBJ-WTR-02 aims to "enhance or restore" 50 – 100 miles of stream in unconfined channels every five years through means including streamside road decommissioning and floodplain restoration and FW-OBJ-INF-01 aims to "Complete 600 miles of road work, such as reconstruction; re-routing; road improvements; decommissioning; or placing roads in intermittent stored service, every 5 years. Priorities shall include reducing effects on desired aquatic and riparian conditions from chronic sediment delivery or potential future road prism failures, including previously decommissioned roads where drainage features have failed." Additional plan components, such as FW-DC-INF-02 that states "Roads not needed to serve management and public needs and purposes are absent" provide the pretext for removing system roads that are not needed for management or public purposes during travel planning. Additionally, FW-DC-INF-02 applies to non-system roads and routes that are on the landscape but not part of the transportation system. Removal of these unneeded roads from the landscape, particularly those near streams, can significantly reduce sediment production (Madej 2001).

Some roads are deemed important for future, but not current, use and are placed in storage. Forest Service roads that are not in use for periods of one year or more are Operational Maintenance Level 1 roads per the Forest Service Handbook (FSH 7709.59 62.32). Treatment for storing roads ranges from no ground disturbance activities to removing drainage structures. Site specific analysis is used to determine what treatment, or combination of treatments, would be appropriate for specific locations. Stored roads with a high potential to impact natural resources may warrant more intensive treatments, such as removal of culverts or prism modification. It may be appropriate to store roads that have minimal potential to impact natural resources with less intensive treatments, such as blocking the road entrance, installing waterbars, and seeding disturbed areas. Selecting appropriate treatments for road storage requires consideration of existing and future use, potential resource impacts, length of time the road is in storage, cost to implement treatments, and available funding. A more detailed description of the road storage and decommissioning decision making, and procedures used by the Forest Service can be found in the publication Guidelines for Storing and

Decommissioning Roads (USDA 2018). A more detailed description of the conditions associated with storage roads on the Nez Perce-Clearwater National Forest (including photographic examples), is provided under the Travel Management heading under Activities Likely to Occur Under the Land Management Plan heading in this document. The ground disturbance associated with decommissioning a road that is already in a hydrologically stable condition can sometimes create more initial sediment input to streams than leaving the same road in storage, and although both types of treatments can lead to similar aboveground properties, belowground properties and ecosystem processes can be altered (Lloyd et al. 2013). Effects of road treatments and road status are highly dependent upon many factors such as slope, soil type, and road location. Thus, decisions concerning appropriate road treatments are best evaluated at a site-specific project level. In the process of doing those evaluations, the revised forest plan will guide efforts through plan components that are intended to keep the focus of all management activities on the attainment of desired conditions.

Aquatic components in the proposed Revised Plan support a naturally functioning sediment regime that supplies of the "types, quantities, and rates" of sediment that "support the natural…substrate composition" for the benefit of listed species and their habitat (FW-DC-WTR-06, FW-STD-ARINF-01). Within the Conservation Watershed Network (CWN), road projects or projects with road-related components will be designed to support and "not retard" processes of natural habitat creation, maintenance, and recovery (FW-STD-CWN-01), in part by reducing the hydrologic connectivity of the road network (FW-STD-ARINF-07). Storm proofing, which is a non-recuring treatment to existing roads to reduce the potential for resource impacts from road feature failure, will target 15 percent of the road mileage every five years in the CWN (FW-OBJ-CWN-02). As indicated in Appendix 4 of the Revised Plan, section 1.11.3 Road Storm Proofing, potential management approaches include using road storm proofing techniques following Keller and Ketcheson (2015) or similar, and the U.S. Forest Service Transportation Resiliency Guidebook - Addressing Climate Change Impacts on U.S. Forest Service Transportation Assets (U.S. Department of Transportation 2018). As culverts are replaced either for road maintenance purposes or as a restoration component of larger projects, or in the event a new road is constructed across a stream, new stream crossing structures will allow for aquatic organism passage where desirable and feasible (FW-GDL-ARINF-11; PBF 2).

Site specific improvements can be made to reduce effects, particularly those associated with streamside roads and stream crossings. While adverse effects to stream habitats are likely to occur due to the road network, guidelines in the plan aim to reduce those risks to the extent feasible and utilize a proactive approach to road design, construction, and maintenance (GDL-ARINF-01-07, 09-11). Additionally, project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet water quality desired conditions, and to protect beneficial uses (FW-STD-WTR-02). Best management practices for road-related operations can be found in the Soil and Water Conservation Practices handbook (U.S. Department of Agriculture 1988a), the Idaho Forestry Best Management Practices Field Guide: Using BMPs to Protect Water Quality (University of Idaho Extension Office 2015), and the National Best Management Practices for Water Quality Management on National Forest System Lands Technical Guide (U.S. Department of Agriculture 2012b). Shaping road surfaces to drain as designed, constructing or reconstructing drainage control structures as needed, ensuring ditches and culverts are clean and functioning, not permitting side casting of maintenance-generated debris within the riparian management zones (RMZs), and designing stream crossing structures to have sufficient capacity to convey the design flow without appreciably altering streamflow characteristics are a few examples of BMPs. The U.S. Forest Service's San Dimas Technology and Development Center completed a literature synthesis describing the effectiveness of

BMPs that have application to forest roads (Edwards et al. 2016). The report concluded that based on the results of most of the studies, the case could be made that most BMPs result in some level of effectiveness in terms of reduced sediment generation or transport, although wide ranges of BMP effectiveness were reported in many of the studies. Forest roads designed to minimize erosion, as proposed, can result in considerably less sediment mobilization (Ketcheson and Megahan 1996). The plan thus aims to reduce baseline, non-project specific, and project-specific impacts to streams related to roads and therefore "not retard" natural rates of recovery. This would likely be accomplished through a combination of mechanisms to include (1) forest road maintenance, (2) integrated projects with road mitigation or improvement elements, and (3) as direct mitigation for timber sales. This is in the context of the potential for increased timber harvest in the future as the infrastructure section of the Final Environmental Impact Statement estimated that the number of log truck trips on forest roads could increase. Currently, about 1,200 miles of Nez Perce-Clearwater roads are maintained each year. Objectives in the revised plan identify a goal of 1,400 miles of road maintenance per year (FW-OBJ-INF-02). Gravel surface replacement is currently accomplished on the Nez Perce-Clearwater using timber harvest receipts and approximately 25 percent of forest road maintenance is performed by timber purchasers; it is expected that the amount of road maintenance performed by timber purchases would remain commensurate under the new plan (that is, if timber sales increase, the amount of road maintenance they perform would also increase). Revised plan components designed to guide management of infrastructure near streams are coded as ARINF (Aquatics and Riparian Infrastructure).

Vegetation Management

The revised plan authorizes and guides vegetation management, including commercial timber sales and non-commercial vegetation management activities. In the revised plan, proposed riparian management zones (RMZs) remain the same as riparian habitat conservation areas (RHCAs) in PACFISH and INFISH, or are slightly wider, as non-priority watershed intermittent streams have an increase of 50 feet. Distinctions have been made in the revised plan to clearly identify what kinds of actions are appropriate and inappropriate within the RMZ (FW-STD-RMZ-07).

Along Category 1 fish-bearing streams, the RMZ consists of, "the stream and the area on each side of the stream extending from the edges of the active stream channel to the top of the inner gorge; or to the outer edges of the 100-year floodplain; or to the outer edges of riparian vegetation; or to a distance equal to the height of two site-potential trees; or 300 feet slope distance equaling 600 feet total, including both sides of the stream channel, whichever is greatest." Riparian management zones begin at 150 feet on non-fish-bearing perennial streams and 100 feet on seasonally intermittent streams. See riparian management zone definitions in the plan for more specifics including lakes and ponds. Seasonally intermittent streams used by fish would be treated as fish-bearing streams. Desired conditions of the revised plan include RMZs that reflect native plant communities and support the landscape processes that create and maintain cool, clean, complex, and connected instream habitat (FW-DC-RMZ-01/02, FW-DC-TE-05). Timber harvest would not occur on particularly vulnerable ground (FW-STD-TBR-02) or using means or in locations where impacts might outweigh economic returns (FW-STD-TBR-04). Guidelines aim to prevent adverse impacts to streams by avoiding logging-related activities in RMZs and yarding timber over streams rather than through them (FW-GDL-RMZ-02/03). Objectives target activities to steer RMZs closer to reference conditions (FW-OBJ-TE-01, FW-OBJ-RMZ-01).

Per FW-STD-RMZ-01, limited timber harvest could occur within the first site potential tree height distance from streams if needed to restore or enhance aquatic and riparian resources. Trees harvested must be left on site or used for aquatic restoration (FW-STD-RMZ-01). While trees cut could potentially interact with other processes, especially stream temperature, desired condition FW-DC-WTR-05 guides projects to meet state beneficial needs, which would limit harvest if tree cutting increased thermal input to the point where beneficial uses could not be met. Other typical examples of allowable treatment in the inner RMZ include hand thinning to underplant native hardwoods species which would move an RMZ closer to reference conditions if hardwoods were under-represented in that sub-watershed. Vegetation management could occur within the second site potential tree height distance provided that the "functions" relative to stream habitat of the outer RMZ were retained (FW-STD-RMZ-01). At least 10 percent of the trees harvested from the second site potential tree height area would be used for aquatic restoration on the Nez Perce-Clearwater (FW-OBJ-RMZ-02).

Vegetation management within riparian areas would largely be addressed by riparian management zone (RMZ) plan components designed to support two desired conditions: "RMZs reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions as compared to reference conditions. The species composition and structural diversity of native plant communities in riparian management zones provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration. Nutrients, large woody debris, and fine particulate organic matter are supplied in amounts and distributions sufficient to sustain physical complexity and stability" (FW-DC-RMZ-01); and "RMZs feature key riparian processes and conditions that function consistent with local disturbance regimes, including slope stability and associated vegetative root strength, wood delivery to streams and within the RMZs, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality" (FW-DC-RMZ-02). The revised forest plan also contains two objectives, seven standards, and ten guidelines (Appendix B). Many of the aquatic protections established by PACFISH and INFISH are continued by RMZ plan components (Appendix E), most notably of which is FW-STD-RMZ-07 that translates riparian habitat conservation area (RHCA) stream buffers into inner and outer RMZ management zones.

Proposed vegetation management could occur on approximately varying acres annually, offering various levels of timber production (FW-OBJ-TBR-02). Minimization of the potential risk to water resources will rely on the effectiveness of RMZs that work well for most stream functions, while timber harvest openings outside RMZs may more closely resemble the effect of natural disturbances on hydrologic and sediment delivery regimes due to the desired condition described above and several other components that address hydrologic effects. Additionally, project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet water quality desired conditions, and to protect beneficial uses (FW-STD-WTR-02). Best management practices for vegetation management related operations can be found in the Soil and Water Conservation Practices handbook (U.S. Department of Agriculture 1988a), the Idaho Forestry Best Management Practices Field Guide: Using BMPs to Protect Water Quality (University of Idaho Extension Office 2015), and the National Best Management Practices for Water Quality Management on National Forest System Lands Technical Guide (U.S. Department of Agriculture 2012b). Designing mechanical vegetation treatment prescriptions to limit site disturbance, soil exposure, and displacement; locating landings, skid trails, and slash piles in suitable sites to avoid, minimize, or mitigate potential for erosion and sediment delivery to nearby waterbodies; and applying soil protective cover on disturbed areas to prevent accelerated erosion are a few examples of BMPs.

Regarding sediment delivery related to peak flow, a recent study has been published to help disentangle increasing peak flows from increasing sediment delivery. Safeeq et al. (2020) found that increased amounts of sediment had more to do with disturbance related to vegetation management that did not leave buffer strips. Restricting activities that bare soils next to streams may be more important than increases in peak flow when considering sediment delivery.

Landscape analysis for the revised plan found a forestwide average disturbance patch size of 350 acres. Plan components focus forest management at the broad potential vegetation type scale. Average patch size varies by broad potential vegetation type with mean averages between 61 to 122 acres. Across broad potential vegetation types, patch sizes range between 25 and 2,680 acres in size. Desired conditions for target average patch size vary by broad potential vegetation type as detailed in Appendix 4 of the revised plan – potential management approaches with the smallest patches associated with the warm dry potential vegetation type (PVT) and the largest patches associated with the cool moist PVT. The revised plan details standards for exceptions which allow the maximum forest opening size to increase from 40 to 207 acres (FW-STD-TBR-06) as described in 36 CFR 219.11 (d)(4)(i). The rationale for using these exceptions at a project level must include restoring ecological conditions or resiliency—for example, restoring a fire regime when currently departed, or moving towards a condition within the natural range of variation (NRV). This standard applies to forest openings created through mechanical harvest operations only and does not apply to openings created through prescribed fire. It is expected that very few proposed openings created by regeneration harvest would reach 207 acres in size due to both target patch sizes for broad PVT groups and limitations of landscape topology which typically constrain opening size. Currently, the average patch size created by even age regeneration harvest on the national forest is 22 acres, and 90 percent of all openings that exceed 40 acres are less than 125 acres. That is because factors such as slope, elevation, aspect, location of riparian areas, etc. generally preclude the existence of large heterogenous timber stands that would all require a uniform silvicultural prescription (that is, given the patchy nature of landscapes in the action area, it is fairly rare to find a treatment area at the scale of 207 acres that would represent a consistent stand for which a single silviculture prescription could be applied). Increasing the average patch size above 22 acres is important ecologically to reduce the amount of edge effects, to allow larger stands of mature forest in the future and to give larger patches for wildlife that require them. Openings larger than 125 acres are unlikely to become more common than they currently are due to the topological constraints that currently limit opening size. Larger openings to be more consistent with the NRV would necessarily be created by wildland fire rather than through timber harvest. This maximum patch size standard approximates the average patch size of disturbance events occurring within the NRV on the national forests such that hydrologic regimes would more closely resemble natural patterns by increasing the size of openings. Because there is a great deal of uncertainty regarding effects to streamflow in particular, a management approach related to plan component FW-DC-WTR-07 was developed that can guide development of an adequate and standardized assessment of potential effects on water yield and peak flows associated with project activities and natural disturbances to provide a consistent approach to determine water yield associated with amount of area harvested. This management approach provides project level planning guidance focused on mitigating potential effects of forest openings.

Managed Wildfire and Prescribed Fire

As fire is the key natural disturbance on the Nez Perce-Clearwater, prescribed fire may be authorized in riparian management zones (RMZs), provided “aquatic and riparian-associated resources are maintained” (FW-STD-RMZ-01). Proposed guidelines seek to minimize adverse impacts to streams during management activities related to fire. FW-GDL-WTR-07 protects RMZs by limiting where and how fireline can be constructed in RMZs so that sediment delivery to waterbodies is minimized and capture of overland flow is limited. Regarding direct ignition of low intensity prescribed fire in RMZs, FW-STD-RMZ-06 states the activity will only be allowed when, “direct ignition within the riparian management zone will not retard attaining water, aquatic, and riparian desired conditions;" and "direct ignition within the riparian management zone maintains or enhances existing stream conditions and effects to threatened or endangered species and their designated critical habitat are considered."

Salvage is unlikely to occur anywhere in RMZs unless it can be shown that aquatic and riparian resources can be maintained and not retarded (FW-STD-RMZ-01). Numerous other guidelines pulled forward from PACFISH and INFISH protect the riparian area from the actions pursued to manage wildfires. FW-GDL-RMZ-04 guides aerial retardant use to avoid application in mapped aerial retardant avoidance areas for the protection of RMZs; FW-GDL-RMZ-05 guides incident bases, staging areas, etc. to be placed outside of RMZs or take mitigation actions if no alternative exists; FW-GDL-RMZ-06 guides machine line to be constructed outside RMZs, and if it must occur through RMZs, it should cross perpendicularly; FW-GDL-RMZ-07 guides restoration of any fire suppression activity that could deliver sediment to streams; and FW-GDL-RMZ-08 guides suppression activities to avoid pumping water directly from a stream.

Allowing naturally ignited fires to play their ecological role, particularly in wilderness areas and designated roadless areas, will produce long-term beneficial effects to aquatic habitat and aquatic species (FW-DC-FIRE-01, FW-OBJ-FIRE-03). Jakober (2002), Rieman et al. (1997) documented increased abundance of fish after fires, even in reaches where the fire had resulted in the local extirpation of fish. (Sestrich et al. 2011) documented a decline in non-native brook trout over time and rapid recovery of native westslope cutthroat trout in severely burned areas in the Bitterroot River, indicating fire may have shifted the competitive advantage in the favor of the native species. At a landscape scale, suppressing fire and reducing its natural effects poses a greater risk to long-term aquatic process and function than the effects of wildfire. Prescribed fire and ecologically beneficial wildfire will promote physical or biological features (PBFs) 3, 4, 6, and 5 by allowing the natural disturbance regime to fuel the stream habitat process that evolved within it.

Wildland fire in riparian areas can help stands move towards reference conditions when it removes excessive fuel loads that otherwise would not have accumulated without fire suppression. Wildland fire, be it prescribed or naturally ignited, can adversely affect stream habitats in its immediate aftermath. It is the natural driver of disturbance on the Nez Perce-Clearwater and thus is integral to the landscape processes that create and maintain instream habitat. Proposed riparian management zones (RMZs), nearly identical to riparian habitat conservation areas (RHCAs), would continue to help create and maintain complex habitat (PBFs 3, 4, 6). It is likely that the proposed RMZs would help keep streams cool (PBFs 2, 5, 8). RMZs provide for clean habitat by filtering overland sediment transport and protecting streambank integrity, two processes that maintain natural sediment routing (PBFs 3, 4, 6, 8). Higher water yields or other changes in the hydrograph could adversely affect PBF 7, but this does not necessarily correlate to increased sediment yield (PBF 6).

Mining

According to the Designated Wild and Scenic Rivers section of the Final Environmental Impact Statement, while "potential for locatable minerals does exist" in the designated portions of the Middle Fork Clearwater River (including the Lochsa and Selway rivers), "there are no valid existing rights, therefore no potential for mining operations" within those corridors. Many of the rest of the streams on the national forests are, however, eligible for mining, provided the noted requirements are met.

To protect riparian and instream habitat, the Nez Perce-Clearwater proposes standards and guidelines that include the requirement of a reclamation plan and a reclamation bond for mining activities in

RMZs (FW-STD-AREM-01); limiting mine waste in RMZs (FW-STD-AREM-02); limiting mineral operation in RMZs unless strict adherence to guidance is followed (FW-GDL-AREM-01/02); controlling water flow paths to maintain water quality and to prevent biological, chemical, or industrial pollutants from being delivered to water bodies (FW-GDL-AREM-03); and requiring the inclusion of best management practices into plans of operations (FW-GDL-AREM-04). Best management practices for mining operations can be found in the Idaho Administrative Code IDAPA 20.03.01, the Manual of Best Management Practices for the Mining Industry in Idaho (Idaho Department of Lands 1992), Forest Service Soil and Water Conservation Practices (U.S. Department of Agriculture 1988a), and the National Best Management Practices for Water Quality Management on National Forest System Lands Technical Guide (U.S. Department of Agriculture 2012b) such as adhering to instream work windows, not discharging wastewater to streams, keeping disturbed areas to a minimum at any given time through concurrent reclamation; and seeding disturbed soil after completion. Lands impacted by mining shall be returned to a pre-disturbance topographical state (FW-STD-EM-01). Some proposed potential management approaches related to general recreation may apply to mining operations in riparian management zones (RMZs), including those related to camps and sanitation in RMZs, for example, see Appendix 4 of the Revised Plan, section 1.16.2 Developed and Dispersed Sites.

Mining will likely adversely affect listed fish and critical habitat, as the techniques used, including suction dredging or placer mining, interrupt natural stream maintaining processes. Physical or biological features (PBFs) sensitive to sediment deposition (2, 4, 6, and 8) could continue to be affected by mining, though monitoring suggested the magnitude of this means of disturbance has been minor in the recent era. The Forest Service has only limited authority to regulate mining, particularly for locatable minerals, and therefore some, even foreseeable impacts would be beyond the purview of the Nez Perce-Clearwater. Minerals activities that are ground disturbing and that use equipment require a plan of operation be submitted for approval. Section 7 consultation would occur on each of these actions that are likely to occur over the life of the plan. It is not possible to predict when and where plans of operation would be submitted, or the potential environmental impacts of these operations at the national forest scale. Thus, the plan components listed above are put in place to ensure minimum requirements are met while relying on project level site specific analysis and consultation to determine potential adverse effects from specific proposed actions.

Currently there are no leasable minerals activities on the Nez Perce-Clearwater. Saleable mineral materials are made available by the national forest. Permitting removal of these materials, unlike locatable minerals, is a discretionary action. Plan components FW-STD-AREM-01, FW-STD-AREM-03, FW-GDL-AREM-01 and FW-GDL-AREM-04 would apply. The limited discretion provision in FW-GDL-AREM-01 would not apply to leasable or saleable materials, thus, should project level site specific analysis find that an action would retard attainment of aquatic and riparian desired conditions, that action would not be allowable under the plan and the project could not go forward.

According to the Designated Wild and Scenic Rivers section, while “potential for locatable minerals does exist” in the designated portions of the Middle Fork Clearwater River (including the Lochsa and Selway rivers), “there are no valid existing rights, therefore no potential for mining operations” within those corridors. Much of the rest of the streams on the Nez Perce-Clearwater are eligible for mining, provided the noted requirements are met.

Livestock Grazing

About 15 percent of the land area of the Nez Perce-Clearwater is within active livestock grazing allotments. All permitted livestock grazing is for cattle, as the one sheep allotment was vacated in 2007. In fiscal year 2020, 4,590 cow and calf pairs were permitted to graze the national forests at various times of the year, but largely from June 1st until September 30th, for a total of 29,861 animal unit months. Table 136 summarizes active allotment acres, livestock numbers, and animal unit months by grazing allotment by subbasin. Beginning May 2024, the Cedar Allotment will become vacant, and the Musselshell Allotment will be administratively closed. Federally listed fish occupy streams within or adjacent to 24 out of 36 active allotments, approximately 67 percent of the allotments (Table 135).

Table 135. Livestock grazing statistics for Nez Perce-Clearwater lands

Grazing Information	Number
Permitted Cattle Numbers[1]	4,590
Permitted Cattle Animal Unit Months Term (Active Allotments)	29,861
Grazing Permittees (Permit Entities)	34
Active Allotments	36
Active Allotment Acres	612,766
Vacant Allotments	9

[1] One cattle number is equal to 1 cow/calf pair or 1 steer or 1 bull; calves greater than 6 months old are counted as cattle
Data Source: Forest Service INFRA database, 2020; Nez Perce-Clearwater geographical information system data

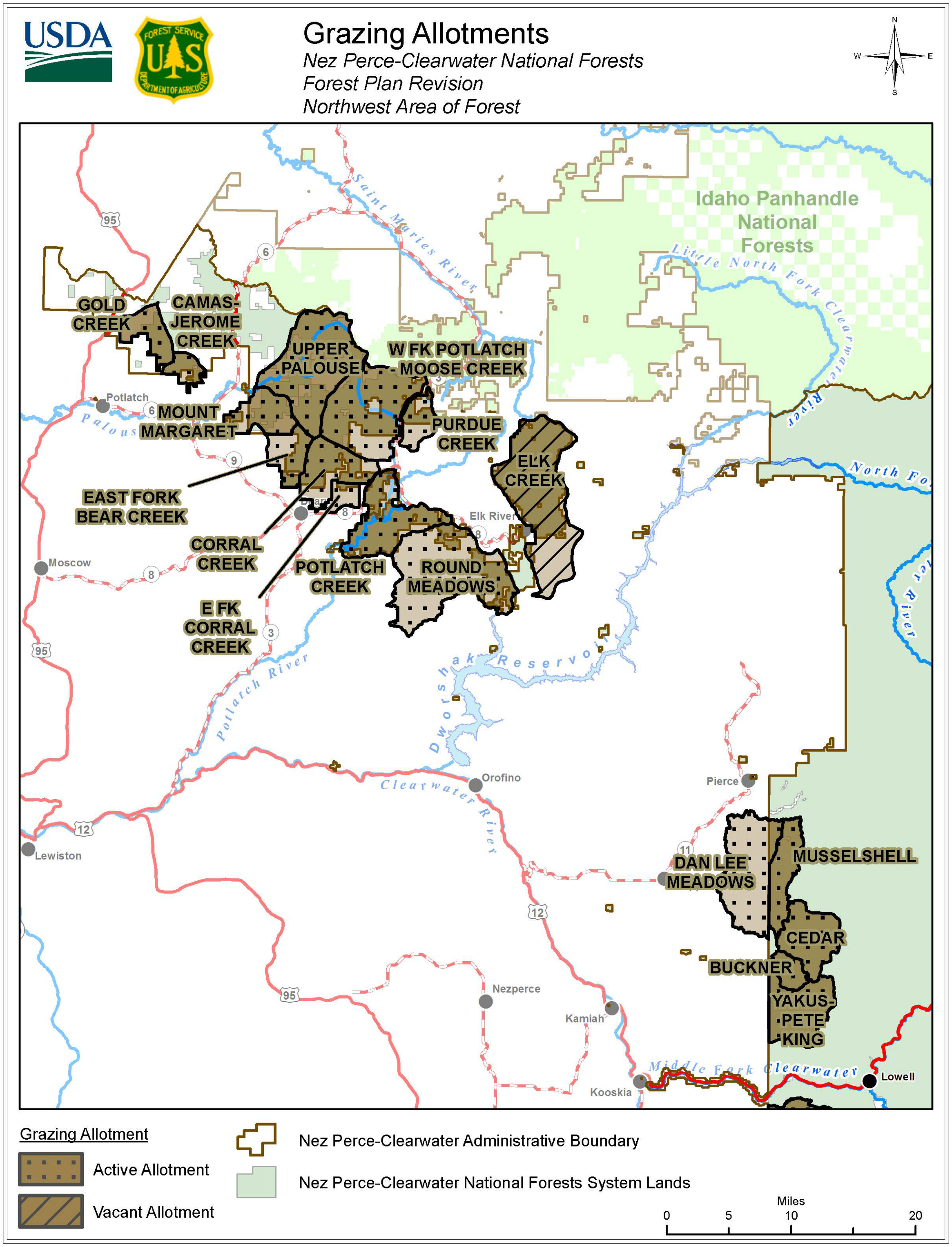


Figure 53 Grazing allotments in the northwest part of the plan area

*Beginning May 2024, the Cedar Allotment will become vacant and the Musselshell Allotment will be administratively closed.

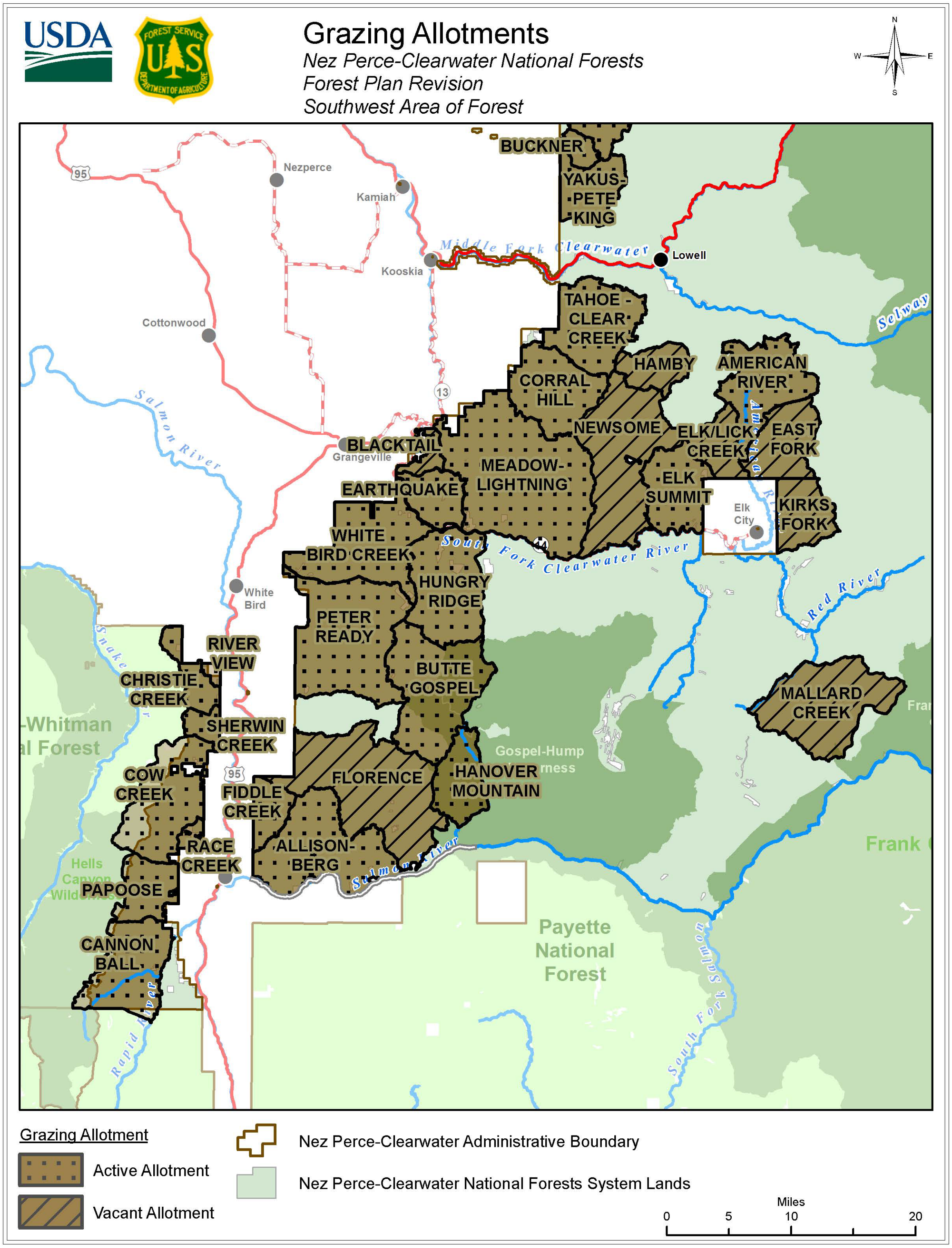


Figure 54. Grazing allotments in the southwest portion of the planning area

Table 136. Summary of active allotment acres, livestock numbers, and animal unit months by grazing allotment by subbasin.

Allotment Name	Subbasin(s)	Total Allotment Acres	Allotment Acres on Nez Perce-Clearwater Lands	Livestock Numbers	Permitted Animal Unit Months
Buckner	Clearwater	4,054	4,054	25	132
Cedar[2]	Clearwater	12,834	12,834	48	254
Dan Lee Meadows	Clearwater	22,029	1,531	23	152
Musselshell[3]	Clearwater	9,708	9,703	90	475
Yakus-Pete King	Clearwater, Middle Fork Clearwater, Lochsa	14,594	14,594	65	343
Corral Hill	Middle Fork Clearwater, South Fork Clearwater	24,929	24,929	125	851
Tahoe-Clear Creek	Middle Fork Clearwater, South Fork Clearwater, Lower Selway	26,975	26,975	70	591
Camas-Jerome Creek[1]	Palouse	3,519	2,716	20	120
Corral Creek[1]	Clearwater	13,185	8,747	246	1633
East Fork Bear Creek[1]	Clearwater, Palouse	7,529	3,798	35	210
East Fork Corral Creek[1]	Clearwater	2,653	444	25	166
Gold Creek[1]	Hangman, Palouse	6,951	6,951	25	166
Mount Margaret[1]	Clearwater, Palouse	9,753	7,859	17	114
Potlatch Creek	Clearwater, Lower North Fork Clearwater	17,763	14,026	161	1,069
Purdue Creek	Clearwater	3,235	2,335	12	73
Round Meadows	Clearwater, Lower North Fork Clearwater	34,486	7,404	75	433
Upper Palouse[1]	Clearwater, Palouse	36,362	35,530	11	66
West Fork Potlatch - Moose Creek	Clearwater, Palouse	26,404	21,045	188	1,249
American River	South Fork Clearwater, Lower Selway	24,977	24,977	115	546
Elk Summit	South Fork Clearwater	19,306	19,306	100	806
Allison-Berg	Lower Salmon	37,359	37,359	60	479
Butte Gospel	South Fork Clearwater, Lower Salmon, Middle Salmon-Chamberlain	38,895	38,895	215	766
Cannon Ball	Little Salmon	25,583	21,796	170	1,145
Christie Creek[1]	Lower Salmon	8,232	8,112	173	1,156
Cow Creek	Lower Salmon	29524	18,556	599	4,847
Earthquake	South Fork Clearwater	11,928	11,928	185	1,148
Fiddle Creek[1]	Lower Salmon	8,477	8,477	100	405
Hanover Mountain	Lower Salmon, Middle Salmon-Chamberlain	15,473	15,473	145	293

Allotment Name	Subbasin(s)	Total Allotment Acres	Allotment Acres on Nez Perce-Clearwater Lands	Livestock Numbers	Permitted Animal Unit Months
Hungry Ridge	South Fork Clearwater, Lower Salmon	31,505	31,505	210	1,386
Meadow-Lightning	South Fork Clearwater, Middle Fork Clearwater	70,340	70,340	234	1,720
Papoose	Little Salmon, Lower Salmon	13,156	12,189	160	1,233
Peter Ready	South Fork Clearwater, Lower Salmon	47,552	47,363	368	2,627
Race Creek[1]	Lower Salmon	2,350	2,350	35	234
Riverview[1]	Lower Salmon	1,274	628	11	22
Sherwin Creek[1]	Lower Salmon	4,512	4,498	49	393
White Bird Creek	South Fork Clearwater, Lower Salmon	33,539	33,539	400	2,558
Total	**Empty cell**	**700,945**	**612,766**	**4,590**	**29,861**

[1]Allotments do not contain streams with Endangered Species Act listed fish
[2]Cedar Allotment will become vacant in May 2024
[3]Musselshell Allotment will be administratively closed in May 2024
Data Source: Forest Service INFRA database, 2020; Nez Perce-Clearwater geographical information system data

Direction in the current Forest Plan as modified by PACFISH and INFISH has standards and guidelines that protect or minimize effects to listed fish from livestock grazing include modifying grazing practices, locating new facilities outside of riparian habitat conservation areas (RHCAs), relocating or closing facilities, and limiting livestock handling efforts (PACFISH/INFISH GM-1, 2, and 3). Components, such as FW-STD-ARGRZ-01, FW-STD-ARGRZ-02, FW-GDL-ARGRZ-02, FW-GDL-ARGRZ-03 in the proposed action mostly carry forward and expand upon current standards and guidelines.

Streams with lower gradients (primarily less than 3 percent) are the most sensitive to grazing impacts (Rosgen 1996). Proposed guideline FW-GDL-ARGRZ-01 establishes minimum end of season stubble heights of 4 to 6 inches along the greenline for low gradient streams. Alternative use and disturbance indicators and values may be used if they are based on site capability, relevant science, monitoring data, and meet the purpose of this guideline. Stubble height is a meaningful and relatively easily determined metric related to riparian vegetation and has been found to correlate with instream habitat quality (Roper 2020), and has been widely utilized as an end-of-season monitoring indicator (USDA Forest Service, 2022). End of season stubble height (greenline vegetation height) has been shown to be a good indicator of two primary factors: 1) the effect of grazing on the physiological health of herbaceous, hydrophytic plants, and 2) the ability of the vegetation to provide streambank protection and bank building function. Stubble height criteria should be used where streambank stability is dependent upon herbaceous plants. Clary and Webster (1990) recommended that in the Intermountain West, a minimum stubble height of approximately 4 to 6 inches should remain at the end of the grazing season to maintain plant vigor and provide for bank protection and for sediments to be deposited. However, 7.5 to 8 inch stubble height was the optimal length to retain sediment deposits (Thornton et al. 1997, Abt et al. 1994). Similarly, Clary and Leininger (2000) indicated that 6 to 8 inch stubble height would be necessary to protect willow and vulnerable streambanks. Clary (1999) found that 4 inches protected most of the stream attributes while 5.6 inches was needed to protect all stream attributes. Higher average stubble height at the end of season is more likely to provide plants with enough growth during the season to retain vigor in the following season (Clary 1995, Boyd and Svejcar 2012). While height at the end of the growing season still needs more study, some have found positive relationships between higher stubble height at the end of the season and stream habitat conditions (Goss 2013).

Table 383 displays the current stubble height objectives directed in annual operating instructions by allotment as established by specific allotment National Environmental Policy Act (NEPA) or allotment management plans. Of the 36 active allotments, 33 allotments have stubble height objectives between 4 and 6 inches. Three allotments have a stubble height objective of 65 percent utilization. These allotment specific stubble height objectives would be retained until new objectives are established through site specific NEPA, as guided by FW-GDL-ARGRZ-01.

As shown in Table 137 there are approximately 416 miles of streams of low gradient streams (based on average of 3 percent gradient) that occur within active allotments, about 15 percent of the total stream miles within active livestock grazing allotments.

Table 137. Number of stream miles less than and greater than three percent gradient by allotment

Allotment Name	Stream Miles with Gradient Less Than 3 Percent	Stream Miles with Gradient Greater Than 3 Percent
Buckner	5.5	14.1
Cedar[2]	19.2	27.7
Dan Lee Meadows	46.6	26.4
Musselshell[3]	17.9	12.6
Yakus-Pete King	3.4	46.4
Corral Hill	2.9	94.8
Tahoe-Clear Creek	0.7	77.8
Camas-Jerome Creek[1]	1.1	15.7
Corral Creek[1]	36.3	83.6
East Fork Bear Creek[1]	7.5	53.7
East Fork Corral Creek[1]	6.1	7.5
Gold Creek[1]	2.7	25.8
Mount Margaret[1]	3.1	39.6
Potlatch Creek	31.9	77.6
Purdue Creek	2.3	20.6
Round Meadows	35.2	113.8
Upper Palouse[1]	25.3	121.6
West Fork Potlatch - Moose Creek	51.1	111.4
American River	10.0	77.8
Elk Summit	14.3	82.3
Allison-Berg	12.4	143.7
Butte Gospel	8.8	76.0
Cannon Ball	6.7	83.9
Christie Creek[1]	0.0	26.4
Cow Creek	0.2	171.1
Earthquake	10.5	35.9
Fiddle Creek[1]	0.0	22.9

Allotment Name	Stream Miles with Gradient Less Than 3 Percent	Stream Miles with Gradient Greater Than 3 Percent
Hanover Mountain	1.7	52.5
Hungry Ridge	15.9	94.6
Meadow-Lightning	18.0	275.5
Papoose	0.1	43.3
Peter Ready	10.5	156.3
Race Creek[1]	0.0	9.1
Riverview[1]	0.0	6.0
Sherwin Creek[1]	0.1	19.9
White Bird Creek	7.7	88.4
Total	**415.8**	**2,436.3**

[1]Allotments do not contain streams with Endangered Species Act listed fish
[2]Cedar Allotment will become vacant in May 2024
[3]Musselshell Allotment will be administratively closed in May 2024

Twenty of 36 active livestock grazing allotments are located within watersheds included in the Conservation Watershed Network (CWN) Table 136table 138. In addition to standards and guidelines limiting activities that could cause damage to the riparian area, the "do not retard" clause in FW-STD-CWN-01 also applies. This standard is very similar to existing PACFISH standard GM1, both of which require modification of grazing practices which retards or adversely affect listed anadromous fish.

Proposed standard FW-STD-ARGR-03 states during livestock grazing authorizations, re-authorizations, or updates to annual operating instructions, measures should be included to prevent livestock trampling of fish redds of federally listed fish and species of conservation concern. This standard is a partial refinement of grazing standards in PACFISH and INFISH. As shown in Table 138, federally listed fish occur in 24 out of 36 allotments, approximately 67 percent of allotments. This standard has been implemented on the Nez Perce-Clearwater for federally listed fish species since consultation with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration (NOAA) Fisheries Service in 1999 and 2000. Mitigation measures have been identified and implemented to protect salmon and steelhead redds from livestock trampling according to the agreements in the Forest Service Biological Assessments and concurrence documents from NOAA Fisheries Service. Annual operating instructions for those allotments containing streams with federally listed species provide specific direction and mitigation measures for protection of redds. These measures include identifying redd locations through redd surveys by Forest Service fisheries biologists. If fish redds are identified, mitigation measures, such as changing the date for livestock entry into a pasture containing active spawning, installing temporary or permanent fencing of identified redds or areas of redd concentrations, or use of herding by the grazing permittee to keep cattle away from spawning areas would be implemented. This standard would be applied throughout the life of the plan to the same degree as was applied at the time of consultation with NOAA Fisheries Service. Implementation of proposed plan direction would continue to move resource conditions within allotments toward desired conditions.

Table 138. Presence of Endangered Species Act Fish within streams located within livestock grazing allotments

Allotment Name	Bull trout	Steelhead	Spring/Summer Chinook (Salmon River)	Fall Chinook	Sockeye
Buckner	present	present	not present	not present	not present
Cedar[1, 2]	present	present	not present	not present	not present
Dan Lee Meadows	not present	present	not present	not present	not present
Musselshell[1, 3]	present	present	not present	not present	not present
Yakus-Pete King	not present	present	not present	not present	not present
Corral Hill	present	present	not present	not present	not present
Tahoe-Clear Creek[1]	present	present	not present	not present	not present
Camas-Jerome Creek	not present	not present	not present	not present	not present
Corral Creek[1]	not present	not present	not present	not present	not present
East Fork Bear Creek	not present	not present	not present	not present	not present
East Fork Corral Creek[1]	not present	not present	not present	not present	not present
Gold Creek	not present	not present	not present	not present	not present
Mount Margaret	not present	not present	not present	not present	not present
Potlatch Creek[1]	not present	present	not present	not present	not present
Purdue Creek	not present	present	not present	not present	not present
Round Meadows	present	not present	not present	not present	not present
Upper Palouse	not present	not present	not present	not present	not present
WF Potlatch-Moose Creek[1]	not present	present	not present	not present	not present
American River[1]	present	present	not present	not present	not present
Elk Summit[1]	present	present	not present	not present	not present
Allison-Berg[1]	present	present	present	present	present
Butte Gospel[1]	present	present	present	not present	not present
Cannon Ball[1]	present	present	not present	not present	not present
Christie Creek	not present	not present	not present	not present	not present
Cow Creek	present	present	not present	not present	not present
Earthquake[1]	present	present	not present	not present	not present
Fiddle Creek	not present	not present	not present	not present	not present
Hanover Mountain[1]	present	present	present	not present	not present
Hungry Ridge[1]	present	present	not present	not present	not present
Meadow-Lightning[1]	present	present	not present	not present	not present
Papoose[1]	not present	present	not present	not present	not present
Peter Ready[1]	present	present	present	not present	not present
Race Creek	not present	not present	not present	not present	not present
Riverview	not present	not present	not present	not present	not present
Sherwin Creek	not present	not present	not present	not present	not present
White Bird Creek[1]	not present	present	present	not present	not present

[1]Allotment located within a Conservation Watershed Network (CWN)

[2]Cedar Allotment will become vacant in May 2024

[3]Musselshell Allotment will be administratively closed in May 2024

Data Source: Fish distribution spatial data was obtained from Pacific States Marine Fisheries Commission (PSMFC) Stream Net website, http://www.streamnet.org, version 01/31/2019.

The revised plan updates PACFISH and INFISH components and adds additional components to address site-specific adverse effects that could occur. Additionally, project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet water quality desired conditions, and to protect beneficial uses (FW-STD-WTR-02). Best management practices for livestock grazing management can be found in the Soil and Water Conservation Practices handbook (U.S. Department of Agriculture 1988a) and the National Best Management Practices for Water Quality Management on National Forest System Lands Technical Guide (U.S. Department of Agriculture 2012b). Controlling livestock distribution within a pasture or allotment, adjusting season of use to maintain and protect soil and water resources, and moving livestock when prescribed utilization levels are reached are a few examples of BMPs.

Overall, riparian management zone (RMZ) conditions in grazing allotments are expected to be maintained where they currently meet desired conditions and improve where they do not. When degraded conditions are documented at specific sites (for example, Clearwater bank stability), particularly those related to physical or biological features (PBFs) 1, 4, 5, 6 and 8, changes to annual operating instructions would be given to guide attainment of desired conditions. Steadily improving riparian conditions in grazing allotments would be expected to contribute to improvements in instream habitat to the benefit of the species addressed in this Final Environmental Impact Statement.

Recreation

Desired conditions include a minimal recreation footprint on aquatic habitat including the species and critical habitat addressed in this Final Environmental Impact Statement (FW-DC-ARREC-01). Two streamside dispersed recreation sites would be targeted for improvements or relocations every five years (FW-OBJ-ARREC-01). Newly developed recreation facilities would be kept out of floodplains or within 100 feet of water where feasible (FW-GDL-ARREC-01) to help protect riparian and instream conditions. Guidelines related to trail design, construction, and maintenance aim to prevent or minimize aquatic impacts (FW-GDL-ARREC-02-06).

Revised plan components aim to minimize and prevent background levels of riparian disturbance and streambank impacts caused by the recreation program. Over time, impacts to critical habitat from existing recreation sites would be mitigated, through project specific measures to reduce impacts or relocation or closure of the site altogether. Additionally, new recreation sites would not be approved if they caused adverse effects to water quality or aquatic resources (FW-GDL-ARREC-02). Localized effects to riparian vegetation, streambanks, woody debris, and water quality could still occur where heavy recreational use occurs and at some popular established recreation sites. FW-OBJ-ARREC-01 is aimed at reducing the impacts of these popular sites by mitigating, removing, or relocating two sites every five years, though impacts would still continue to occur until a project is proposed to address them. Adverse effects could therefore occur to physical and biological feature (PBF) 4 and PBF 8.

Lands and Special Uses

Effects under the revised plan would be expected to be the same as under the current plan. Effects to critical habitat from special uses would generally arise from occupation and use of riparian management zones (RMZs), and the general effects of soil compaction, stream bank disturbance, and effects to riparian vegetation (PBF 4). Existing special use permits were consulted on when salmon, steelhead, and bull trout were listed under the Endangered Species Act (ESA), or had site or permit-specific consultation, if appropriate. The primary revised standard for protecting federally listed aquatic resources, FW-STD-ARLND-01, states that: "When authorizing new lands special uses, or reauthorizing existing uses, include conditions to avoid or minimize adverse effects to fish, water, and riparian resources. If adverse effects are unavoidable to ESA listed fish, species of conservation concern, impaired water bodies, or stream habitat conditions, authorizations shall require actions that result in the re-establishment, restoration, mitigation, or improvement of conditions and ecological processes to ensure that projects that degrade conditions also include measures to improve conditions to the extent practicable. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat." A standard and guideline would also apply to new and existing hydropower facilities (FW-STD-ARLND-02, FW-GDL-ARLND-01). The potential and degree of risk to listed fish and critical habitat by lands and special uses are generally low and any specific actions would be subsequently reviewed on an individual basis with the revised standard (FW-STD-ARLND-01) as the basis for evaluation.

Watershed Restoration

The revised forest plan must incorporate watershed restoration direction from multiple sources which can give the appearance of conflicting restoration priorities. It can therefore be helpful to consider where and when each of the three primary sets of watershed restoration direction applies. The first set of watershed restoration direction are the water (WTR) plan components. These include twelve desired conditions and five objectives that are all forestwide (FW) components such that they would apply to all future management actions regardless of which watershed or what other type of status may also be applicable (priority watershed, conservation watershed network, etc.). These WTR plan components are grounded in the 2012 Planning Rule that requires "the plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area…" (U.S. Department of Agriculture 2012c).

The second set of watershed restoration direction is the requirement for forest plans to identify priority watersheds as part of the watershed condition framework (WCF). The WCF was designed in 2011 to establish a nationally consistent method for evaluating watersheds and provide a comprehensive approach for proactively implementing integrated restoration on priority watersheds on national forests and grasslands (U.S. Department of Agriculture 2011d); use of this national strategy in all forest plan revisions is also a requirement of the 2012 Planning Rule. A watershed restoration action plan (WRAP) must be completed for every watershed identified as a priority watershed under the WCF program that specifically identifies restoration actions needed to improve the overall watershed rating. The scope of the WCF program is broad and encompasses all Forest Service activities that contribute to improved watershed condition, including soil and water improvements, vegetation management, invasive species treatment, range management, wildlife and fisheries habitat restoration, road improvements, road decommissioning, and other activities. The intent is to utilize a holistic approach to treat whole subwatersheds from "ridge-top to ridge-top" to improve overall watershed condition.

The Nez Perce-Clearwater has completed three WRAPs to date (Fishing Creek, Upper Newsome Creek, and Meadow Creek) and is currently working on implementing WRAPs in three additional watersheds (Upper Elk Creek, Upper Clear Creek, and Upper Little Slate Creek). The Agricultural Improvement Act of 2018 authorized national forests to have up to five priority watersheds identified at any given time (U.S. Department of Agriculture 2018g). Under the revised plan, the national forest would evaluate and identify priority watersheds based on the need for restoration to improve overall watershed condition; alignment with other strategic objectives or priorities at the national, regional, or local level; alignment with priorities of other agencies and potential partners, and in consideration of available funding sources for potential WRAP actions. These watersheds would generally be the highest priority watersheds for focusing active restoration efforts as resources become available to meet the desired outcome of FW-OBJ-WTR-01: "Complete the actions identified in watershed restoration action plans for 15 priority watersheds as identified under the Watershed Condition Framework process every 15 years." Priority watersheds may or may not overlap geographically with the conservation watershed network (CWN).

The third set of watershed restoration direction is the CWN. PACFISH and INFISH originally called watersheds meant to focus on restoring native fish habitat "priority watersheds," but since that term was adopted by the watershed condition framework (WCF), the watersheds identified for emphasis on native fish are now called CWN watersheds in the revised plan to continue to meet the intent of PACFISH and INFISH direction (see Conservation Watershed Network section above and Appendix C for additional CWN details). At a minimum, restoration in CWN watersheds would become a priority when they happen to be in the action area of future integrated projects, but they could become an overall priority if CWN watersheds are also designated as a WCF priority watershed.

WCF Priority Watersheds can best be thought of as tactical and near-term designations guiding the implementation of agency work priorities in the near-term (that is, 5-year program of work), whereas Conservation Watersheds are more strategic and long-term designations helping to provide conditions that maintain or restore habitat for aquatic species in highly dynamic environments over the duration of a land management plan.

Under the revised plan, watershed restoration projects will promote the long-term ecological integrity of aquatic ecosystems (FW-DC-WTR-12, FW-GL-WTR-04). Priority watersheds identified in the revised plan include Upper Elk Creek, Upper Clear Creek, and Upper Little Snake Creek. Additions to the priority list would occur over the life of the plan and would require the development of WRAPs with the object to "complete the actions identified in watershed restoration action plans for 15 priority watersheds as identified under the Watershed Condition Framework process every 15 years" (FW-OBJ-WTR-01). Beyond this specific "priority" list, watersheds in the CWN would have high priority for restoration (FW-OBJ-CWN-01).

Short-term effects of implementing instream project elements are generally harmful to physical or biological features (PBFs) and listed species because plumes of suspended sediment can be created, and individual fish can be injured or killed during construction; dewatering project sites can also strand young-of-the-year fish. Fuel or hydraulic fluid leaks from heavy equipment can contaminate soil and streams. Equipment access points and work in riparian areas (for example, annual operating plan [AOP] installation) can locally disturb stream beds, banks, and surrounding vegetation.

However, long-term effects of implementing instream project elements are generally beneficial to PBFs and listed species because instream habitat and habitat forming processes are restored though these types of projects. Properly mitigated temporary negative effects are therefore dramatically outweighed by permanent long-term beneficial effects. For example, imposing new patterns of scour and deposition by installing instream habitat structures can redistribute existing spawning gravels. Installing instream wood can supplement local wood and gravel supplies, create or improve spawning and rearing habitat, and buy time for riparian treatments to have the desired effect of restoring natural channel forming processes. AOPs restore connectivity within watersheds, making more spawning and rearing habitat and temperature refugia available to listed fish as well as allowing hydrologic connectivity by conveying bed materials down the stream network (FW-DC-WTR-02). Much of this work would be accomplished through partnerships (FW-GL-WTR-02).

The revised plan aims to support functionally intact watersheds and critical habitat and thereby support native aquatic communities including listed fish (FW-DC-WTR-01/03/10). The plan includes specific targets of restoring 50 to 100 miles of unconfined stream channels (FW-OBJ-WTR-02) and 5 miles of confined channels (FW-OBJ-WTR-03) every five years. The riparian management zone (RMZ) definition (FW-STD-RMZ-01) and the associated objective FW-OBJ-RMZ-02 to improve riparian habitat aim to facilitate instream habitat improvement projects on the national forests. FW-STD-RMZ-01 was written in such a way as to specifically allow projects whose sole objective is to improve aquatic and riparian associated resources within the nearest 100 feet to the active stream channel. Outside the nearest 100 feet (an additional 200 feet in fish bearing streams), allow projects to benefit aquatic and riparian resources as well as to address fuel loading and silvicultural desired conditions provided it can be demonstrated (through multiscale analysis) that the project would not negatively impact the important functions of the outer area which include sediment filtering and large woody debris requirement. No commercial timber harvest may occur within the RMZ. While connectivity has been restored in many parts of the Nez Perce-Clearwater, new AOPs would aim to reconnect 10 to 20 miles of habitat every 5 years (FW-OBJ-WTR-04). Each of these restoration actions allowed and encouraged by the plan may have short term adverse effects to critical habitat followed by long term beneficial effects.

Proposed RMZ guidance would create opportunities for vegetation management to underplant native tree species in riparian areas, for example, that would move RMZs towards desired conditions of reference-like habitat in terms of their species diversity and structural complexity. Ecoregion-appropriate riparian stands would benefit instream habitats and the listed fishes that utilize them as the riparian, instream, and biological processes of interest evolved coincidently and are therefore dependent on each other.

Proposed projects completed under the new plan would undergo reviews via National Environmental Policy Act, Endangered Species Act, Magnussen-Stevens, and by the Army Corps of Engineers. Short-term and local adverse impacts to critical habitat would occur as restoration projects are implemented. PBF 8, which is sensitive to stream- bank or bed disturbance, could be adversely affected during project implementation but would be expected to quickly recover, within hours to days. Ultimately, all PBFs would benefit from restoration work.

Aquatic Plan Components

Under the action alternatives, all 1987 Forest Plan direction, the settlement agreement on the Clearwater Forest Plan lawsuit, PACFISH, INFISH, and provisions in the 1995 and 1998 Biological Opinions are replaced with the Nez Perce-Clearwater Aquatic Ecosystems plan components. The discussion below provides a comparison of the key attributes of the existing direction of the 1987 Forest Plans under the No Action Alternative to those in the Land Management Plan action alternatives.

The Land Management Plan focuses on managing toward desired conditions, or outcomes, rather than focusing simply on outputs. The following desired conditions are contained within the Aquatic Ecosystem plan components of the Land Management Plan:

FW-DC-WTR-01. National Forest System lands provide the distribution, diversity, and complexity of watershed and landscape-scale features including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted.

Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.

FW-DC-WTR-02. Spatial connectivity exists within or between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact habitat refugia. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-associated, and many upland species of plants and animals.

FW-DC-WTR-03. Aquatic habitats contribute to ecological conditions capable of supporting self-sustaining populations of native species and diverse plant, invertebrate, and vertebrate aquatic and riparian-dependent species. Aquatic habitats are key contributors for the recovery of threatened and endangered fish species and provide important habitat components for all native aquatic species.

FW-DC-WTR-04. Instream habitat conditions for managed watersheds move in concert with or towards reference conditions. Aquatic habitats are diverse, with channel characteristics and water quality reflective of the climate, geology, and natural vegetation of the area. Instream habitat conditions across the Nez Perce-Clearwater, such as large woody material, percent pools, residual pool depth, median particle size, and percent fines are within reference ranges as defined by agency monitoring (for example, PIBO) and match the frequency distribution of comparable reference sites for a given channel type, channel size, climate, and geomorphic setting.

FW-DC-WTR-05. Water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, and is of sufficient quality to support surrounding communities, municipal water supplies, and natural resources. The Nez Perce-Clearwater has no documented lands or areas that are delivering water, sediment, nutrients, or chemical pollutants that would result in conditions that violate the State of Idaho’s water quality standards.

FW-DC-WTR-06. Sediment delivery to streams is of the types, quantities, and rates that support the natural instream sediment transport and storage rates and instream sediment substrate composition. The sediment regime in water bodies is not chronically affected by management activities to the extent that the availability of functioning spawning areas and interstitial spaces are reduced.

FW-DC-WTR-07. Instream flows are sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained. Stream flow regimes maintain riparian ecosystems and natural channel and floodplain dimensions. Stream channels transport sediment and woody material over time while maintaining reference dimensions (for example, bankfull width, depth, entrenchment ratio, slope, and sinuosity).

FW-DC-WTR-08. Groundwater dependent ecosystems, including peatlands, bogs, fens, wetlands, seeps, springs, riparian areas, groundwater-fed streams and lakes, and groundwater aquifers, persist in size and seasonal and annual timing and exhibit water table elevations within the natural range of variability. Surface and groundwater flows provide late-season stream flows, cold water temperatures, and sustain the function of surface and subsurface aquatic ecosystems.

FW-DC-WTR-09. Beavers are present in watersheds where their activities benefit ground water, surface water, and aquatic habitat complexity, and where their activities support conservation and recovery of imperiled aquatic species.

FW-DC-WTR-10. Critical habitat components (physical and biological features) provide the ecological conditions necessary to achieve species recovery. Spawning, rearing, and migratory habitats are widely available and inhabited. Listed aquatic species have access to historic habitat and appropriate life history strategies (for example, bull trout resident, fluvial, adfluvial; and anadromy for salmon and steelhead) are supported.

FW-DC-WTR-11. Water cooling mechanisms in unconfined channels that are dependent on the exchange of surface water and groundwater are functioning at full potential. Cooling mechanisms include dynamic scouring and bar formation, activation of side channels during high flow events, and inundation of the full floodplain extent during floods with an approximate 5- to 10-year return interval.

FW-DC-WTR-12. Watershed restoration projects promote the long-term ecological integrity of aquatic ecosystems and conserve the genetic integrity of native species.

FW-DC-RMZ-01. Riparian Management Zones reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions as compared to reference conditions. The species composition and structural diversity of native plant communities in riparian management zones provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration. Nutrients, large woody debris, and fine particulate organic matter are supplied in amounts and distributions sufficient to sustain physical complexity and stability.

FW-DC-RMZ-02. Riparian Management Zones feature key riparian processes and conditions that function consistent with local disturbance regimes, including slope stability and associated vegetative root strength, wood delivery to streams and within the riparian management zones, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality.

FW-DC-CWN-01. Conservation Watershed Networks have functionally intact ecosystems that provide high-quality water and contribute to and enhance the conservation of aquatic species of conservation concern and recovery of threatened or endangered fish species.

FW-DC-CWN-02. Streams within the Conservation Watershed Network provide habitat that supports robust native fish populations, which can expand to and recolonize adjacent unoccupied habitats. These areas conserve key demographic processes likely to influence the sustainability of aquatic species.

FW-DC-CWN-03. Roads in the Conservation Watershed Network present minimal risk to aquatic resources.

FW-DC-ARINF-01. The transportation system has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity of roads to streams, lower sediment delivery to streams, reduced road impact to floodplains, and improved aquatic organism passage, where transportation infrastructure affects these features.

FW-DC-ARREC-01. Recreation facilities and their use, including trails and dispersed sites, have minimal impacts on aquatic resources, including threatened and endangered species, designated critical habitat, and aquatic species of conservation concern.

Riparian management zone widths included within FW-STD-RMZ-07 are mostly the same as PACFISH and INFISH. Exceptions include expanding the width of all Category 4 riparian management zones to 100 feet, where previously it was either 50 feet or 100 feet, and including intermittent streams that support fish at any time of the year as a Category 1 instead of a Category 4. These changes are more explicit in terms of what can or cannot happen within the zones, are based on best available science information and public input, and expand upon and clarify existing direction in PACFISH and INFISH.

Appendix A of the 1987 Nez Perce Forest Plan contained fish and water quality objectives, sediment yield and entry frequency guidelines, upward trend requirements for watersheds not meeting objectives that should occur concurrent with timber harvest, and a moratorium on sediment producing activities in Red River and Newsome Creek. Appendix K of the 1987 Clearwater Forest Plan included water quality objectives based on species present, as well as a litigation settlement agreement that allowed no measurable sediment increases with watershed improvement objectives. These historical directives were very effective at arresting habitat degradation during a time when management values were different, and land was being managed very aggressively (that is, extending the road network and harvesting close to streams on unstable ground). Management has since become more holistic, and in many cases, the old direction attempts to prevent effects that no longer occur with the use of modern best management practices.

The revised land management plan includes several plan components designed to address fish and water quality objectives, sediment yield, and trending toward desired conditions. FW-STD-CWN-01 and FW-STD-WTR-04 are intended to provide for improving stream conditions where they are currently degraded and suggest use of tools, such as multiscale analysis, to support the conclusion aquatic desired conditions will be met. Watersheds included in the Conservation Watershed Network (CWN) are expected to be those most important for long term conservation and recovery of threatened or endangered fish species and aquatic Species of Conservation Concern. FW-STD-CWN-01 applies everywhere in the CWN, including areas not currently under the Nez Perce Forest Plan. FW-STD-WTR-04 applies to all streams on the Nez Perce-Clearwater National Forest. Management approaches within Appendix 4 suggest the use of the Stream Condition Indicator Assessment to determine whether streams are meeting aquatic and riparian desired conditions. For both FW-STD-CWN-01 and FW-STD-WTR-04, where desired conditions are not being met, implementation of stream or riparian restoration actions will move indicators toward or maintain desired conditions. These actions will contribute toward Aquatic Ecosystem Objectives in meeting, enhancing, or restoring stream habitat.

Appendix A of the 1987 Nez Perce Forest Plan required the use of the sediment model for the Northern Region and Intermountain Region (R1/R4) to assess compliance with sediment yield guidelines. It was the intent of the previous Clearwater Forest Plan to use it as well. Specific sediment models are not required to be used in the Land Management Plan aquatic ecosystems plan components. The Nez Perce-Clearwater is moving away from being required to use a specific model. Many of the models that were required under the old forest plans (such as R1/R4) are now seen as outdated and suffered from a one-size-fits-all approach. These models were not applicable across the entire forest, and being tied to a specific model precluded the use of constantly evolving best scientific information and improvements in modeling technology. Rather, in assessing compliance with components, such as FW-STD-WTR-04, FW-STD-ARINF-07, FW-GDL-RMZ-02, and FW-GDL-ARINF-01, it is assumed that best available science will be used. Potential Management Approaches within Appendix 4 suggests the use of models, such as GRAIP-Lite, WEPP, and R1/R4, to collectively provide an assessment of existing condition and project effects and determine whether actions associated with projects would move conditions towards meeting desired conditions where not currently met or maintain desired conditions where currently met. These models allow for both short- and long-term estimates of sediment delivery, and the combination should be modeled. These components are intended to provide the same or enhanced direction as the 1987 Nez Perce Forest Plan Appendix A and the litigation settlement on the Clearwater National Forest.

FW-STD-WTR-04, in combination with other plan components, is intended to prevent long-term habitat degradation and not retard attainment of aquatic and riparian desired conditions. PACFISH and INFISH Biological Opinion (PIBO) data suggests static or improving habitat conditions when summarized at a broad scale (HUC8 or larger), since the late 1990s, after PACFISH and INFISH were implemented.

The Stream Condition Indicator Assessment and standards that refer to its use (FW-STD-WTR-04, FW-STD-RMZ-01, FW-STD-RMZ-06, FW-STD-CWN-01) in conjunction with PIBO monitoring, offer the same or an enhanced yardstick as Riparian Management Objectives (RMOs) from PACFISH, to assess effectiveness of the components in achieving aquatic desired conditions. FW-DC-WTR-04 replaces a set of fixed habitat metrics as a desired condition (RMOs in PACFISH). This plan component describes desired stream conditions in terms of a range of conditions established from data from reference conditions, with the understanding that, even in reference streams, habitat is dynamic and changes in response to natural disturbances. The desired condition for streams states the range of conditions in managed streams moves in concert with conditions within the range of reference.

FW-DC-WTR-04 is a higher bar than the 1987 Nez Perce Forest Plan Appendix A fish or water quality objectives in the No Action Alternative, where fish or water quality objectives range from 100 percent in “pristine” watersheds to 70 percent. The 1987 Nez Perce Forest Plan also allows a measure of degradation in some watersheds, describing the existing condition as 100 percent but assigning a fish or water quality objective of 70 percent. The Aquatic Ecosystems plan components specify desired condition as functioning at 100 percent.

The Stream Condition Indicator Assessment included in Appendix 4, Potential Management Approaches, which describes desired condition and natural range for each stream and riparian function. The assessment determines whether stream and riparian processes are functioning at desired conditions. For those processes functioning at low or medium level, stream or riparian restoration actions should be implemented to move those processes toward desired conditions. For plan components FW-STD-CWN-01, FW-STD-RMZ-01 (timber harvest within RMZ), and FW-STD-RMZ-6 (prescribed fire in RMZ), multiscale analysis, in addition to completing the Stream Condition Indicator Assessment, shows where indicators are not functioning at high level.

Multiscale analysis replaces watershed analysis that was used in the 1987 Forest Plans. Watershed analyses were completed for projects that proposed harvest within the riparian habitat conservation area. Under the revised Land Management Plan, to show compliance with FW-STD-CWN-01, FW-STD-RMZ-01, and FW-STD-RMZ-06, multiscale analysis, as described in Appendix 4, Potential Management Approaches, determines consistency with these standards. Stream and riparian conditions not meeting desired conditions would include aquatic restoration to maintain or move toward desired conditions, including the use of wildland fire to move toward those desired conditions.

Conservation Watershed Network

Conservation Watershed Networks (CWNs) are an outgrowth of a suite of policy guidance including PACFISH, INFISH, and Interior Columbia Basin Ecosystem Management Project (ICBEMP). PACFISH and INFISH were intended provide temporary guidance and were expected to be replaced by ICBEMP in 2000. Because the incoming administration did not make a decision in 2000, further scientific guidance from ICBEMP was received in 2003 and amended in 2014 that provided guidance specific to the Columbia River basin. The concept of CWNs builds upon what has been learned from PACFISH, INFISH, and ICBEMP, including Key Watershed guidance found in PACFISH (U.S. Department of Agriculture and U.S. Department of the Interior 1995a) and priority watershed guidance found in INFISH (U.S. Department of Agriculture 1995d). Under both sets of guidance, key and priority watersheds were selected to protect population strongholds. Selected watersheds were expected to provide a pattern of protection across the landscape where the habitat of threatened and endangered fish and Species of Conservation Concern (SCC) received special attention and treatment. For the Aquatic Ecosystems plan components, major and minor spawning areas identified in the Snake River Recovery plans for steelhead and spring and summer Chinook, presence of a bull trout local population identified in the Columbia River bull trout recovery plan, designated critical habitat for one or more endangered fish species, spawning and rearing habitat for Pacific lamprey, and reaches where models predict to have occurrence of bull trout in 2040 (Isaak et al. 2015) were the criteria used to include watersheds in the CWN.

The CWN is a well distributed and connected set of watersheds that provide the principal production areas for maintaining and restoring the populations, including providing resiliency during and after disturbance events and as the effects of climate change occur. The CWN plan components emphasize maintenance or restoration of spawning, rearing, and migration habitat that supports Endangered Species Act (ESA) listed and SCC fish populations.

For those efforts to be effective for listed species within the network of watersheds represented by the CWN, it is vital that project planners are aware of and consider the types of aquatic restoration that help alleviate factors most limiting the production of ESA listed and SCC juvenile outmigrants from the Nez Perce-Clearwater watersheds.

Conservation Watershed Networks are the highest priority for restoration actions for the aquatic environment. Conservation Watershed Network components contain an emphasis on watershed restoration, in addition to standards and guidelines. Desired conditions within the CWN focus on functionally intact ecosystems that contribute to and enhance conservation of aquatic species of conservation concern, recovery of threatened or endangered fish species, providing habitat capable of supporting robust fish populations that can expand and recolonize adjacent unoccupied habitats, and forest roads that present minimal risk to aquatic resources. Objectives emphasize assessing roads (FW-OBJ-CWN-01) that negatively interact with streams and storm proofing roads prioritized for restoration (FW-OBJ-CWN-02). Restoration would be achieved through the collective objectives within Aquatic Ecosystem plan components. Aquatic restoration is also encouraged in HUC 12 sub-watersheds outside of the CWN that are important for meeting recovery of listed species.

Conservation Watershed Networks in the Land Management Plan replace Key and Priority Watersheds under PACFISH and INFISH. According to plan component FW-STD-CWN-01, use Stream Condition Indicator Assessment and multiscale analysis for all HUC12 watersheds that are considered CWN. The completion of the assessment and multiscale analysis guides stream and riparian restoration actions that contribute towards the recovery of federally listed species and the achievement of these desired conditions and does not retard them. Under FW-STD-ARINF-07, when projects are constructing or reconstructing roads within CWN or HUC12 sub-watersheds with critical habitat or listed aquatic species, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network. FW-STD-ARLND-03 and 04 provide protection for sub-watersheds when hydroelectric and water developments are to be authorized or developed.

The Biological Opinion entitled "Land and Resource Management Plans for National Forests and Bureau of Land Management Resource Areas in the Upper Columbia River Basin and Snake River Basin Evolutionarily Significant Units" (NMFS 1998) included special management considerations for the Selway River incorporated into the action to avoid a jeopardy determination for Snake River steelhead. These protections afforded in that biological opinion will be superseded by the biological opinion on the revised forest plan. However, in the revised forest plan, there will still be special consideration for much of the Selway, for example, 22 sub-watersheds are included in the CWN in the Selway basin, including these HUC12 sub-watersheds: Upper Running Creek, Lower Running Creek, Upper Bear Creek, Paradise Creek Middle Bear Creek Lower Cub Creek, Lower Bear Creek, Elk Creek-Selway River, Upper East Fork Moose Creek, Middle East Fork Moose Creek, Middle North Fork Moose Creek, Rhonda Creek, Lower North Fork Moose Creek Lower East Fork Moose Creek, Moose Creek, Marten Creek, Headwaters Meadow Creek, Upper Meadow Creek, Middle Meadow Creek, Buck Lake Creek, Lower Meadow Creek, and O'Hara Creek.

Based on the information presented above, it is expected that implementation of the action alternatives would result in the same or similar outcomes as the No Action Alternative for the following reasons:

1. direction in the Aquatic Ecosystems plan components is designed to build and strengthen on that in PACFISH and INFISH.
2. these plan components are designed to carry forward the principle of improved aquatic habitat from the 1987 plans as amended by PACFISH and INFISH.
3. the plan components are designed to provide clarification for direction that is ambiguous in the No Action Alternative.

It is possible that improving trends that are evident in some subbasins will be initiated in others where there is presently no improvement indicated, such as the Lower Clearwater. In any case, degradation of existing conditions is not expected and improving trends are expected to be supported and not retarded by the action alternatives.

Aquatic Ecosystem objectives emphasize restoration in priority watersheds identified under the CWN. Other objectives apply to all watersheds across the Nez Perce-Clearwater and focus on restoration within unconfined and confined channels, reconnecting habitats and improving soil and watershed conditions. Under FW-OBJ-WTR-02, restoration of stream habitat within unconfined channels would occur to maintain or restore connectivity, structure, composition, and function of habitat for fisheries and other aquatic species in streams with legacy effects that caused channels to become straightened or incised, impaired beaver habitat, or diminished floodplain capacity. Types of activities that would be likely to contribute to this objective include berm removal, large woody debris placement, streamside road decommissioning, riparian planting, beaver dam analogs, and process-based restoration or floodplain restoration. For FW-OBJ-WTR-03, restoration within confined channels would improve step pool structure, composition, and function of habitat for aquatic species. Types of activities that would be likely to contribute to this objective include improving stream complexity, large wood debris or boulder placement, and riparian planting. FW-OBJ-RMZ-01 would improve riparian habitat through improvements that are intended to meet desired conditions for riparian management zones (RMZs), such as road obliteration, riparian planting, hardwood restoration, post assisted log structures, beaver dam analogs, and reconnecting floodplains by removing road prisms or berms. Under FW-OBJ-02, when harvest occurs within the RMZ, a minimum of 10 percent of trees beyond 150 feet (RMZ Category 1) and beyond 100 feet (RMZ Categories 2 and 3) from the edge of the active stream channel would be used for aquatic stream restoration either on-site or offsite to contribute large wood to stream channels.

The rate of watershed and aquatic restoration would increase under all the action alternatives when compared to the No Action Alternative. The following objectives include aquatic restoration activities that are set to occur every five years.

FW-OBJ-WTR-01. Complete the actions identified in watershed restoration action plans for 15 priority watersheds as identified under the Watershed Condition Framework process every 15 years.

FW-OBJ-WTR-02. Enhance or restore 50 to 100 miles of stream habitat within naturally unconfined channels every 5 years to maintain or restore connectivity, structure, composition, and function of habitat for fisheries and other aquatic species in streams with legacy effects that caused channels to become straightened or incised, impaired beaver habitat, or diminished floodplain capacity. Activities include, but are not limited to, berm removal, large woody debris placement, streamside road decommissioning, riparian planting, beaver dam analogs, and process-based restoration/floodplain restoration.

FW-OBJ-WTR-03. Enhance or restore stream habitat on 5 miles, every 5 years, in naturally confined channels to maintain or restore step pool structure, composition, and function of habitat for fisheries and other aquatic species. Activities include, but are not limited to, improving stream complexity, large wood debris or boulder placement, and riparian planting.

FW-OBJ-WTR-04. Reconnect 10 to 20 miles of habitat in streams every 5 years where passage barriers created by roads or culverts are limiting the distribution of fish or other aquatic species of concern.

FW-OBJ-WTR-05. Improve soil and watershed conditions on 3,000 to 4,000 acres every 5 years, emphasizing actions in priority watersheds and Conservation Watershed Network watersheds. This includes non-system road decommissioning.

FW-OBJ-CWN-01. Conservation Watershed Networks are the highest priority for restoration actions for native fish and other aquatic species. Assess 500 miles of maintenance level 1 (for example, intermittent stored) roads every 5 years to identify those roads that may negatively impact streams, such as contributing excessive sediment or altering riparian areas or floodplains.

FW-OBJ-CWN-02. Stormproof roads in Conservation Watershed Network prioritized for restoration every 5 years as funding allows to benefit threatened and endangered aquatic species and municipal watersheds. Emphasize roads with greatest risk of erosion and road prism failure, including maintenance level 1 & 2 roads.

FW-OBJ-CWN-02P. Stormproof 15 percent of roads in Conservation Watershed Network prioritized for restoration.

FW-OBJ-RMZ-01. Improve 300 to 700 acres of riparian habitat every 5 years, through improvements that are intended to meet desired conditions for riparian management zones, such as road obliteration, riparian planting, hardwood restoration, post assisted log structures, beaver dam analogs, and reconnecting floodplains by removing road prisms or berms.

FW-OBJ-RMZ-02. On an annual basis, a minimum of 10 percent of trees harvested in the portions of the Riparian Management Zone beyond 150 feet (Riparian Management Zone Category 1) and beyond 100 feet (Riparian Management Zone Categories 2 and 3) from the edge of the active stream channel are used for aquatic stream restoration either on-site or off-site to contribute large wood to stream channels.

FW-OBJ-ARREC-01. Mitigate, remove, or relocate two existing dispersed recreation sites from within riparian management zones to outside of riparian management zones every 5 years.

Management within the Riparian Management Zones

FW-STD-RMZ-01 (standard TM-1 in PACFISH) is intended to provide clarification of direction in the No Action Alternative related to silvicultural treatments in riparian management zones (RMZs) by describing the conditions under which these activities, including timber harvest, might be appropriate in RMZs. It is expected that some level of harvest in RMZs would occur under the action alternatives, which would exceed levels harvested since 1995 under direction in the No Action Alternative. Harvest in RMZs conducted according to the constraints outlined in FW-STD-RMZ-01 is not expected to result in additional effects for the following reasons:

The main premise in this standard is the same as TM-1 in PACFISH because it sets the expectation that timber harvest will be conducted in RMZs where needed to achieve aquatic desired conditions. The language further clarifies the direction found in TM-1 regarding conditions under which timber harvest is permitted in riparian areas by adding the word "only" [emphasis added] in FW-STD-RMZ-01 as shown in the following quote:

"Vegetation management shall ***only*** occur in riparian management zones from the edges of the active stream channel to … (*various distances depending on the RMZ category*)… to restore or enhance aquatic and riparian-associated resources".

Contemporary science supports the conclusion that this level of activity in riparian management zones is sufficient to maintain stream conditions. Initial studies completed by Chen et al. (1993) and the Forest Ecosystem Management Assessment Team (1993) suggested that streamside buffers of over 400 feet were needed to protect ecological processes such as wind speed and humidity near streams, which at the time were thought to potentially increase stream temperature. This finding was partially responsible for the second tree height, which added another 150 feet on each side of the creek to riparian habitat conservation areas, applied to riparian reserve and riparian habitat conservation area widths in PACFISH and INFISH (Everest and Reeves 2007, Reeves, Pickard, and Johnson 2016). More recently, many researchers have suggested that a 100 foot buffer next to fish-bearing and perennial streams is generally likely to be sufficient to protect against stream temperature increase (Anderson and Poage 2014, Reeves, Pickard, and Johnson 2016, Sweeney and Newbold 2014, Witt et al. 2016). Even so, consideration of context and geography is also appropriate. In a discussion of fixed-width riparian buffers, Richardson et al. (2012) stated that although these types of protections are administratively simple to implement at a reach scale, watershed considerations and location within the catchment provide additional important context. Reeves et al. (2016) stated that, with the tools currently available, widths can be more easily adjusted and justified for both wider and narrower buffers.

Regarding the riparian width needed to ensure streamside wood delivery to streams, debate and scientific inquiry have continued since PACFISH and INFISH were adopted. Studies have been completed to help identify where wood in streams comes from (Reeves et al. 2003, Benda and Miller 2003) and the fate of wood once it is delivered above or to the stream (Beechie et al. 2000). In addition to streamside delivery, disturbance combined with topography can deliver a significant percentage from outside riparian management zones, especially steeper watersheds that are more dissected. Models have also been developed to help identify the likelihood of riparian trees being delivered to the stream channel (Benda et al. 2003, Meleason et al. 2003, Pollock et al. 2012, Spies et al. 2013, Welty et al. 2002). Models focused on wood delivery from the riparian areas consider distance from the stream, median tree height, and the direction that trees fall. Modeling completed by Meleason et al. (2003) found that greater than 90 percent of wood was contributed from within 100 feet of the stream edge for modeled conifer riparian stands in western Oregon and Washington. In a literature review, Spies et al. (2013) found that 95 percent of wood delivered to streams from hardwood stands came from within 82 feet, and from conifer stands from within 148 feet, in forests in the western cascades of Oregon and Washington.

Third, additional components intended to address potential effects from harvest activities in riparian management zones (RMZs), particularly increases in sediment delivery from soil disturbance, are included. Guidelines FW-GDL-RMZ-01, 02, and 03 would restrict timber harvest activities that could result in ground disturbance that might lead to sediment input to streams or wetlands. FW-STD-ARINF-03 and FW-GDL-ARINF-01 address sediment from road construction and reconstruction, including temporary roads.

And fourth, use of the Stream Condition Indicator Assessment and completion of a multiscale analysis are management approaches that can be used to demonstrate the ecological need for the proposed activity and to document that it maintains or improves existing stream habitat and avoids adverse effects to threatened and endangered species and their designated critical habitat. A favorable assessment of the compilation of information obtained from using these tools would support the conclusion that FW-STD-RMZ-01 is met. FW-STD-WTR-04 also provides direction that activities shall maintain existing aquatic conditions where Aquatic Ecosystems plan components desired conditions are met and restore or not retard their attainment where not met. The Stream Condition Indicator Assessment or a similar tool, can be used in conjunction with, or as a part of, multiscale analysis or other equivalent analysis tools to determine if these standards are being met when harvest is proposed in riparian management zones.

Aquatic Species Environmental Consequences

Effects of Forestwide Management on Aquatic Species

Watersheds throughout the Nez Perce-Clearwater support populations of five listed fish species, one species of conservation concern, and five regional forester aquatic sensitive species. Several areas are protected through congressionally designated wilderness areas, inventoried roadless, and eligible wild and scenic rivers. These areas have significant overlap with Conservation Watershed Network sub-watersheds.

No Action Alternative

Past management has resulted in degraded conditions across many watersheds within the Nez Perce-Clearwater. Habitat for aquatic species is impaired from the effects of human influence over the past 150 years. Watershed restoration efforts to restore aquatic, riparian, and terrestrial habitat have been underway since the 1980s. Continuing with the existing management and current levels of aquatic restoration would produce a slow improving trend for some watersheds, while others would remain in their current condition. Under the existing forest plans, both national forests have consistently implemented restoration work, along with partners, to meet forest plan fish and water quality objectives. Restoration actions have primarily focused on road decommissioning and roaded stream crossing upgrades to pass 100-year flows and allow for aquatic organism passage. Other activities have focused on riparian and meadow restoration and have included rehabilitating abandoned mines, planting native vegetation, stabilizing stream banks, fencing riparian and wetland areas, removing streamside mine tailings, improving stream habitat, and large woody debris placement. These activities have resulted in decreased sediment delivery and have improved riparian function and stream processes. These activities would continue under the No Action Alternative if the Nez Perce-Clearwater continues to prioritize watershed restoration and emphasize partnership opportunities, especially with the Nez Perce Tribe. Stewardship funding and retained receipts are current budget sources used for restoration projects and would likely continue under the No Action Alternative.

There would continue to be localized improvements to watershed, soil, riparian, and aquatic habitat conditions as projects are implemented, but watershed-scale improvements may occur slowly given current and anticipated funding levels. With the direction and emphasis in the Land Management Plan, watershed restoration may tend to be prioritized and directed by more commodity-based resource decisions, such as restoration associated with timber harvest activities and integrated vegetation restoration projects.

Effects common to all action alternatives

Endangered Species Act Listed Fishes

There are several factors to consider in assessment of how forest management is expected to affect Endangered Species Act listed salmonids at a population level including salmonid life history, the magnitude of various current threats, outcomes of aquatic restoration, advancements in forestry practices, as well as current conditions and protections on the Nez Perce-Clearwater. Although forest management in the past has been a threat to aquatic species, progress in environmentally responsible forest practices provides tools to mitigate for many of the previously detrimental effects of management. In addition, many of the most salient current threats to anadromous salmonids in the Columbia and Snake rivers occur off of the national forest and are not related to national forest management, which limits the national forest's potential to mitigate for these threats. It is important to note that the Forest Service is not solely responsible for recovery of endangered species, but as part of its stewardship, is responsible for providing ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern. The responsibility for administering recovery of endangered species lies with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration Fisheries.

There have been recent ecological (Welch et al. 2020)and economic (Jeager and Scheurell, 2023) analyses that question the contribution of freshwater aquatic restoration to basin-wide Endangered Species Act listed salmon recovery. The observed lack of a strong response at the basin level that these authors reported is not surprising given the life history of these fish, considering the physical location and salmon life stage where many current threats occur. Pacific salmon exhibit a type-3 survivorship curve (Demetrius 1978), with high fecundity and most mortality occurring early in life. Although a great deal of research concerning threats to salmonid recovery has focused on smolt mortality during the early freshwater rearing and migration period, because of the inherent life history, it is difficult to show that any early mortality is not compensatory, and mortality that is not additive is not capable of strong population level effects. For example, see the discussion of avian predation in Haeseker et al. (2020) and Payton et al. (2020), who arrived at different conclusions from similar data. Conversely, adult mortality in an organism with a type-3 survivorship curve is paramount and exerts a much stronger population level influence. Accounting for smolt-to-adult return rates, juvenile mortality often has to be several thousand times greater to equal adult mortality's effect on a population. Some recent studies have attempted to incorporate this principle by interpreting smolt mortality via the concept of adult equivalence (Tiffan et al. 2020, Chasco et al 2017b), but more research is needed to provide a comparative accounting of mortality threats to Pacific salmon over their life cycle.

There are many factors affecting anadromous salmonid recovery that have been reported. These continue to be analyzed and debated in the literature, including but not limited to, effects of hydropower facilities (Budy et al. 2002, Schaller and Petrosky 2007, Muir et al. 2006, Keefer et al. 2004, Rechisky et al. 2009, 2013, 2014, Welch et al. 2008, Hilborn 2013); atmospheric circulation, primarily the Pacific Decadal Oscillation (PDO), North Pacific Gyre Oscillation (NPGO), El Nino Southern Oscillation (ELSO) effects on ocean conditions (Johnstone and Mantua 2014, McFadden and Zhang 2002, Schollaert Uz et al, 2017, Kilduff et al. 2015 Gosselin et al 2021); avian predation during both estuary migration (Schreck et al. 2006, Ryan, et al. 2003, Evans et al. 2019) and ocean residence (Philips et al 2021); increased ocean mortality from sharks and orcas (Manashin et al 2021, Adams et al 2016, Seitz et al. 2019, Ohlberger et al 2019); competition from pink salmon (Ruggerone and Nielson 2004, Batten et al. 2018); sport and commercial fisheries (Lindsay et al. 2004); commercial bycatch (Ricker 1976, Wertheimer 1988); and pinniped predation on late-stage juveniles and adults in the estuary and ocean (Chasco et al. 2017a, Chasco et al. 2017b, Wright et al. 2007, WSAS 2022) that likely have greater population-level effects than forest management, simply because they occur at later life stages, when mortality is more likely to be additive.

Because there are so many threats, the varying effect of mortality by age, and the prevalence of strong population level effects outside the window of forest stream habitation, it is not surprising that regional assessments would fail to find direct relationships between funding and freshwater activity levels on population recovery. By design, habitat restoration projects achieve progress at incremental scales, generally one stream reach at a time. These incremental improvements in habitat may not have large enough effects to compensate for larger factors that occur throughout a species' range until they reach a critical threshold (Roni et al. 2010). However over time, as aquatic habitat improvements accumulate in an area of interest, they can provide beneficial effects at local scales, especially in terms of resilience of local populations. For example, large-scale stream restoration in the Lemhi basin did result in local benefits that were hypothesized to increase population resilience but did not result in population increases (Copeland et al. 2020). For fish and aquatic organisms that are likely to face climate change effects over the life of the plan, it is increasingly important to prioritize mitigation and restoration actions on those that are likely to increase population resilience (Beechie et al. 2023). Increasing population resilience is especially important for populations that appear to exhibit density dependence in freshwater like spring Chinook and steelhead (Walters et al. 2013), highlighting the importance of expanding and maintaining connectivity and expanding suitable habitat through restoration.

Regardless of the outcome of the continuing academic discussions concerning the intensity of various threats to salmon recovery, or the merits of aquatic restoration to Endangered Species Act (ESA) recovery of Columbia basin salmonids, the Nez Perce-Clearwater National Forest is bound by law and policy to conduct management activities in ways that mitigate for effects of forest management to ESA listed species. Meeting these requirements occurs for each individual project through ESA consultation and National Environmental Policy Act (NEPA) analysis where appropriate. The 2012 Planning Rule requires that the national forest contribute to ESA recovery at section 219.9. The definitions in the planning rule define recovery as "The improvement in the status of a listed species to the point at which listing as federally endangered or threatened is no longer appropriate." The directives further explain that development of, or changes to, plan components to provide for ecological conditions for threatened and endangered species should be based on a need to change the plan identified from the assessment of the ecological conditions necessary to contribute to their recovery and maintaining or restoring critical habitats (FSH 1909.12, ch. 10, sec. 12.55), or from information brought forward during the public and governmental participation process. (1909.12_20.23.13a). It is important to acknowledge that although the national forest supports recovery by considering recovery plans and integrating them into plan content and analysis, it is beyond the authority and responsibility of the Forest Service to solely achieve recovery for a species like salmon that spend so much of their life outside of National Forest System lands. Additionally, the administrative authority for ESA recovery lies with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service and is implemented through the development of recovery plans. The following text from National Oceanic and Atmospheric Administration describes the process and role of recovery plans:

"The Endangered Species Act requires National Marine Fisheries Service to develop recovery plans for listed salmon and steelhead species. The U.S. Fish and Wildlife Service develops and implements recovery plans for bull trout. Recovery Plans focus on collaborative planning that draws on collective knowledge, expertise, and partnerships. Recovery plans include the following elements: measurable goals for delisting the species from the Endangered Species Act, factors limiting viability, actions to address limiting factors, and recovery estimates.
The Endangered Species Act requires periodic reviews of species that are listed as threatened or endangered to ensure that the listing is still accurate. The review will determine whether species should be removed from the list or be changed in status from an endangered species to a threatened species or from a threatened species to an endangered species. These reviews are known as '5-year reviews.'
A 5-year review may result in a recommendation to reclassify or delist a particular species. The criteria for reclassification or delisting are based on reducing the five listing threat factors described in the species' final listing rule and recovery plan. A species' listing status can only be changed by the rulemaking process. Species may be removed from the endangered or threatened species list for three reasons: 1) The species has recovered to such an extent that it no longer needs Endangered Species Act protection. 2) The original information warranting listing has been shown to be incorrect, or new information suggests that the species is not actually endangered or threatened. 3) The species has become extinct. A 5-year review may also result in a recommendation to maintain the species' current classification status of threatened or endangered."
(https://www.fisheries.noaa,gov/national/endangered-species-conservation/endangered-species-act-5-year-reviews)

The 5-year status reviews and recovery plans provide a basic framework on how present watershed conditions limit the fish production by individual population or area of the listed species. Information from recovery plans, five-year status reviews, and research on the effectiveness of habitat restoration for fish production will evolve over the duration of the Land Management Plan. This information is valuable to project planners, especially through coordination with watershed partners from tribes; local watershed groups; and county, state, and federal agencies, including the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service.

The Nez Perce-Clearwater National Forest strives to fulfil its obligations to supporting recovery by considering and incorporating elements of the recovery plans into land management plan content. For aquatic species, this was primarily achieved through forest plan Section 7 consultation with the USFWS and National Marine Fisheries Service, as well as in cooperative sessions through the

Aquatic and Riparian Conservation Strategy (ARCS) working group, where cooperating agency and partner resource specialists had the opportunity to collaborate in reviewing the best available scientific information and provide input on language and determine the final form of plan components.

The Endangered Species Act (ESA) recovery plan continues to list freshwater threats that occur on National Forest System lands as limiting to recovery, including degraded habitat that persist across the basin, with simplified stream channels, disconnected floodplains, impaired instream flow, loss of cold water refugia. Many activities allowed by the revised plan within the Nez Perce-Clearwater National Forest have the potential to indirectly affect individual ESA listed fish and critical habitats in a beneficial or negative manner. Land management activities that disturb the soil surface or require added use of already disturbed features such as road prisms have a greater potential to interact and potentially cause adverse effects. Salmonids that overwinter (such as spring Chinook and steelhead) or otherwise have longer residence times in freshwater (such as bull trout) have greater potential to be affected than species with shorter freshwater residence (like fall Chinook) or migration times (like sockeye). Activities that have the greatest potential to disturb soils and indirectly affect ESA listed fish and critical habitat include some activities associated with vegetation management, fuels management, livestock grazing, roads, and recreation. While the cause-and-effect relationships from land management activities are not linear and are often indirect, results from PACFISH and INFISH Biological Opinion (PIBO) monitoring over the past 19 years has shown that with PIBO standards and guidelines applied consistently across the interior Columbia Basin, habitat degradation has been arrested and habitat conditions on nearly all National Forests are trending in a positive direction (Roper et al. 2019, Thomas et al. 2018).

With PACFISH and INFISH components updated and mostly carried forward in the proposed action, ESA listed fish habitat in the planning area is expected to continue a similar improving trend if similar standards and guidelines continue to be applied as they have in the last two decades. While larger vegetation restoration projects involving extensive road reconditioning and haul are likely to contribute fine sediment to streams at crossings and in locations where the road is close to and paralleling the stream, the active delivery is relatively short term, and in most instances, a relatively small amount is delivered when compared against management that occurred prior to PACFISH and INFISH. With culvert replacement and best management practice (BMP) use occurring before and during project work, and road storage applied when projects conclude, roads likely contribute less sediment than they otherwise would have before use. Of equal and likely greater importance, the sediment caused by current road use and harvest methods cannot be compared to the types of roads being built, the amount being built, and their locations prior to PACFISH and INFISH. The plan components in the revised plan are expected to continue the passive restoration occurring across much of the Interior Columbia Basin (Roper et al., 2019). Also, the identification of a Conservation Watershed Network (CWN) and objectives to reduce the interactions between roads and streams meet much of the intent of the unsigned Interior Columbia Basin Ecosystem Management Project (ICEBMP) that was expected to refine INFISH (U.S. Department of Agriculture, Forest Service, 1995b). Active restoration in key locations based on watershed condition framework (WCF) and the CWN are expected to further contribute to improving habitat conditions in managed portions of watersheds on federal lands.

Although the primary driver of changes in anadromous fish (such as spring and summer Chinook) abundance in Idaho is usually attributed to marine conditions (NOAA, 2022), freshwater habitat quantity and quality can amplify or attenuate changes in abundance, especially if there are population bottlenecks identified in freshwater habitat (Wilson et al. 2021). While detrimental effects of historical forestland management practices to fish habitat have been widely reported in the literature (Espinosa et al. 1997) Gibbons and Salo 1973, Ringler and Hall 1975, Culp and Davies 1983, Doeg and Koehn 1990), the effectiveness of modern practices at preventing degradation has also been widely reported, highlighting the effectiveness of tools like BMPs, and leaving riparian buffer strips (Newbold et al. 1980, Murphy et al. 1986, Warrington et al. 2017). In addition, some researchers have reported positive effects of forest management on juvenile salmonid production growth, or survival (Bilby and Bisson 1987, Gregory et al. 1988, Thedinga et al. 1989, Hicks et al. 1991).

A recent broad-scale study from British Columbia (Peacock et al. 2023) investigated relationships between 10 freshwater habitat pressure indicators (percent of agricultural development, percent urban development, percent riparian disturbance, percent linear development, kilometers of forestry roads, kilometers of non-forest roads, stream crossings per kilometer, percent forest disturbance, equivalent clearcut area, percent mountain pine beetle defoliation) that were hypothesized to have strong effects on salmon spawner abundance. The authors reported that evidence of relationships was weak across the entire province, and “variable in direction and magnitude at the watershed scale.” However, their vulnerability assessment was successful at identifying at-risk populations at smaller scales, and the authors reiterated the benefit of using multi-scale analysis to identify local population vulnerabilities (Peacock et al. 2023). As the authors observed, the lack of a strong province-wide relationships does not necessarily mean there are no effects (Peacock et al. 2023), but rather illustrates that effects of forestry management can differ greatly by locality, highlighting the need for site specific analysis using tools such as multi-scale analysis, which under the revised forest plan, will be available at the project level. It is also possible that the lack of expected strong negative effects reported in Peacock et al. (2023) is in part attributable to the province-wide adoption of the Forest and Range Practices Act in 2002, which required that BMPs be applied to forest management in British Columbia. Paired-watershed studies conducted over a nine-year (2006 to 2014) period in Oregon (Bateman et al. 2018, 2021) examining the effects of modern timber harvest (using BMPs) on trout and salmon failed to document any negative effects on fish from clearcutting, and in fact reported temporary positive effects on trout growth and abundance in harvest units post-logging, primarily due to increased stream productivity caused by the increase in light and temperature from the increase in forest canopy openings.

In addition, there are indications that freshwater habitat quality in much of Idaho is not functioning as the major population bottleneck for anadromous salmonids in north-central Idaho (NOAA 2017). For example, Thurow et al. (Thurow et al. 2020)), in an analysis on the production potential of the middle fork Salmon River (adjacent to the national forest), observed that:

“Although conditions are degraded in small, localized areas outside wilderness, habitats throughout most of the (Middle Fork Salmon River) are in excellent condition (NMFS 2017). Historical grazing, mining, and road impacts are being mitigated by natal habitat restoration efforts outside wilderness boundaries…(in various specific locations).”

Although this statement was specifically referring to an adjacent forest, this scenario is mirrored on the Nez Perce-Clearwater National Forest, where large tracts of intact high-quality habitat remain protected by protective land allocations and wilderness designation, and passive and active restoration are working toward improvement of degraded habitat in areas outside wilderness and roadless boundaries. In a modeling exercise that estimated carrying capacity and 24-year extinction risk of the Snake River evolutionary significant unit (ESU) of spring Chinook salmon, Hinrichsen and Paulsen (2020) reported low extinction probabilities for the two populations they analyzed on the Nez Perce-Clearwater, which happen to be largely protected by land allocations.

In addition to protecting Endangered Species Act listed fishes, the plan components are expected to move the landscape toward desired conditions based on natural range variation (NRV) by introducing disturbance back onto the landscape. The importance of attaining these ecological conditions to fisheries and aquatic ecosystems cannot be overstated. With the range of climate threats that are expected in the future, the best chance for recovery and persistence lies in attainment of desired conditions that are based on NRV. The NRV on the Nez Perce-Clearwater included frequent natural disturbance including fire, landslides, floods, windstorms, etc., however ecological processes were effective at shaping disturbance effects in ways that allowed for adaptation and persistence of native fish. Restoration of ecological functioning across the landscape will be key to recovery and persistence of salmonids. Chinook salmon, along with other anadromous salmonids (steelhead, sockeye) and native resident fishes (such as bull trout) on the national forest evolved in a landscape with a high frequency of disturbance (Waples et al. 2008), as a result, Bisson et al. (2009) concluded that maximization of a habitat restoration program's effectiveness in promoting salmonid resilience may require a paradigm shift that focuses on working within the habitat's natural range of variability, in some cases abandoning unhistorical and arbitrary attempts to create pristine conditions at a landscape scale), acknowledging that, as a result of natural disturbance, historically not all habitat would have been pristine at the same time (Bisson et al. 2009). Waples et al. (2008) suggested that using management strategies that attempt to replicate disturbance regimes within the NRV would provide the best opportunity for resilience in Pacific salmon. The plan components (including desired conditions) in the revised forest plan were developed based on the historical natural range of variability found across the Nez Perce-Clearwater National Forest, and the use of prioritization tools such as multi-scale analysis in project development will enable identification, analysis, and minimization of effects of management activities on Chinook, steelhead, and other migratory salmonids. Implementation of the revised forest plan under all action alternatives is intended to eventually (at different paces under each alternative) lead to a mosaic of habitat conditions and natural processes across the national forest that attempt to replicate conditions (like opening size and hydrologic regime) that native fish evolved with and are adapted to. Replicating a natural range of conditions and improving connectivity will provide the best opportunity for species resilience in the future (Bisson et al. 2009). The aquatic plan components in the revised plan are intended to accomplish this in part by retaining and improving upon PACFISH and INFISH direction, in addition to incorporation of evaluating progress toward desired conditions into decision-making.

The revised Land Management Plan components are designed to be similarly protective for aquatic and riparian resources at the sub-watershed scale. Table 139 displays a crosswalk of standards and guidelines between PACFISH and INFISH and the Land Management Plan. Specifically, FW-STD-CWN-01 and FW-STD-WTR-04 are designed to require that, where aquatic and riparian desired conditions are not yet achieved, projects shall restore or not retard attainment of desired conditions. FW-STD-CWN-01 is designed to require that in Conservation Network Watersheds (CWNs) not meeting aquatic and riparian conservation strategy desired conditions, activities shall be designed and implemented in a manner that supports and contributes towards the recovery of federally listed species and the achievement of these desired conditions and does not retard them when evaluated at the HUC12 subwatershed scale. Desired conditions within the Land Management Plan are more extensive than PACFISH and INFISH Riparian Management Objectives. Desired conditions would be evaluated through the Stream Condition Indicator Assessment and multiscale analysis as explained in Appendix 4. Where desired conditions are not met, restoration actions will be implemented to move conditions toward desired conditions.

The need for updated guidance for forest activities is in part due to the changing threats to listed species recovery. For example, some climate projections suggest the emergence of new threats over the life of the plan. For example, temperature related pre-spawn mortality of adult salmonids could become increasingly problematic as climate change warms rivers, especially within marginal habitat, or at the geographic edge of species' ranges (Hinch et al. 2021, Bowerman et al. 2021). The establishment of the CWN is designed to help mitigate for this threat and increase resilience of salmonid populations on the Nez Perce-Clearwater over the life of the plan. Beechie et al. 2023 modeled threat severity and individual species response to restoration actions in the Chehalis River, and found that spring Chinook and Coho benefitted more from habitat restoration than steelhead and fall Chinook; however, targeting restoration to the areas with the most potential was beneficial to all species analyzed in the Chehalis River, and the reported increases in resilience could be expected by establishing cool water climate refugia even without additional restoration. The importance of basin specific analysis to inform restoration cannot be overstated. Part of the intent of the revised plan is to identify and focus on mitigating for future threats to Endangered Species Act listed species (such as temperature related adult mortality associated with climate change, which can be mitigated for in part with the cold water refugia areas like the CWN (Beechie et al 2023).This requires a transition from focusing on past threats that may not be as virulent now and in the future (such as sediment from roads, as this can now be largely mitigated by incorporating BMPs into project design). This underscores the need to focus on future threats. There is an urgent need to conduct projects within the framework provided by the revised plan, which looks forward in terms of expected threats, and contains clarified, updated, and strengthened plan components for aquatic species.

Salmonids that inhabit similar systems and have similar habitat requirements (that is, cold water, clean gravels, connected systems, and complex habitat) are likely to experience effects from management actions in similar fashion. This is particularly valid in the context of programmatic actions at the scale of a revised forest plan where no direct on-the-ground actions are proposed. This section therefore analyzes indirect effects of proposed actions to all listed aquatic species together just as the preceding section analyzed critical habitat physical or biological features (PBFs) for multiple species together. Management area (MA) allocations would be largely beneficial for all federally listed aquatic species in the action area. This is because one of the primary changes would be to increase recommended wilderness by over 60,000 acres so that a greater number of acres would be unsuitable for several activity types that otherwise could adversely affect listed species (for example, permanent road building) and greatly constrain others (for example, timber production); Refer to MA2-SUIT-RWILD plan components for complete suitability direction for recommended wilderness. While MA2 lands would technically shrink by 22,658 acres and be converted to MA3 lands, this would not represent greater opportunity for adverse actions because the shift from MA2 to MA3 lands is largely the result of proposing fewer rivers for wild and scenic status; the number of rivers eligible for wild and scenic river designation would decrease from 29 under the 1987 plan to 12 under the proposed plan (11 suitable and 1 eligible). However, stream and riparian protections would not be compromised because the quarter-mile protection corridor (cumulatively equates to the 22,658 acres that would change from MA2 to MA3) afforded by the National Wild and Scenic Rivers System Act is larger than necessary to protect stream functions such that the proposed riparian management zone (RMZ) distances would offer sufficient protection as determined by PACFISH and INFISH. Furthermore, RMZ plan components provide guidance for management activities to re-establish disturbance patterns in areas where it is lacking to restore riparian processes according to proposed RMZ desired conditions (FW-DC-RMZ-01, 02).

Identifying areas for suitability of motorized and non-motorized access proposals have the potential to adversely affect listed species because lands suitable for motorized use are proposed to increase (pending likely future travel management decisions) for both summer (45 percent to 55 percent) and winter (39 percent to 60 percent); Roads and trails that support motorized use can cause sedimentation and large woody debris issues if not hydrologically disconnected. However, proposed standards and guidelines are expected to mitigate these effects. For example, FW-STD-ARINF-01 says: “Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat,” and FW-GDL-ARREC-02 says: “To reduce potential adverse effects to water quality and aquatic resources, construction of new facilities or infrastructure within floodplains should be avoided. Where new activities inherently must occur in riparian management zones (for example, at road and trail stream crossings, boat ramps, or docks), they should be located and designed to minimize adverse effects to floodplains and other riparian-dependent resource conditions (for example, within geologically stable areas and avoiding major spawning areas).” These standards and guidelines would be expected to ensure that if adverse effects to listed species were to occur in the future as the result of these motorized access suitability proposals, they would be minor and not preclude species’ recovery to a non listed status.

Aquatic and riparian management strategies in the proposed forest plan would be beneficial for Federally listed species as several RMZ and Conservation Watershed Network (CWN) plan components were specifically designed to maintain the intent of PACFISH and INFISH direction (for example, FW-RMZ-STD-07); the same direction that was largely responsible for passive restoration and upward trend in habitat conditions documented by the PACFISH and INFISH Biological Opinion (PIBO) program. Unlike the focus on passive restoration under the 1987 Forest Plan, the revised forest plan includes components that also emphasize active restoration. For example, FW-OBJ-RMZ-01 says: “Improve 300 to 700 acres of riparian habitat every 5 years, through improvements that are intended to meet desired conditions for riparian management zones, such as road obliteration, riparian planting, hardwood restoration, post assisted log structures, beaver dam analogs, and reconnecting floodplains by removing road prisms or berms.” This increased capacity for active restoration has the potential to have long-term beneficial effects to all listed species. Identifying inner and outer zones of riparian management zones (RMZs) that clearly allow for active restoration to occur where desired conditions are not currently being met as opposed to PACFISH and INFISH that was often interpreted as “exclusion zones” or areas that were not readily available for active management.

Indirect effects of proposed actions such as the monitoring program, potential management approaches, and other plan content would also be beneficial for listed species, as these elements are designed to facilitate implementation of the new forest plan. Because the net effect of most other proposed actions as described above are beneficial, proposals to evaluate progress towards meeting desired conditions and engage in partnerships, establish priority watersheds, etc. would likewise have beneficial effects all listed species.

The net effect of actions under the plan is one that promotes recovery of listed fish through a combination of passive and active management, while allowing actions with short-term adverse effects. Adverse effects are not expected to hinder progress of critical habitat or listed fish toward recovery due to the management constraints imposed by plan components that protect fish and critical habitat. The primary reason for this is the inclusion of desired conditions that identify what future projects would be designed to achieve. For example, projects in watersheds that contain listed species would have to “contribute to and enhance the conservation of aquatic species of conservation concern and recovery of threatened or endangered fish species” (FW-DC-CWN-01); “provide habitat that supports robust native fish populations, which are able to expand to and recolonize adjacent unoccupied habitats” (FW-DC-CWN-02); and ensure “critical habitat components (primary biological features) provide the ecological conditions necessary to achieve species recovery.

Spawning, rearing, and migratory habitat are widely available and inhabited. Listed aquatic species have access to historic habitat and appropriate life history strategies (for example, bull trout resident, fluvial, adfluvial, and anadromy) are supported" (FW-DC-WTR-10). It is important to note that while some plan components could temporarily have adverse effects to listed species (for example, FW-OBJ-TBR-01: Offer 190-210 million board feet timber per year.), those components would have to be implemented in a way that does not compromise the above-mentioned desired conditions.

See Table 140 for the alternatives and summary of expected effects for individual Endangered Species Act listed fish species.

Species of Conservation Concern

Pacific Lamprey

Under the Pacific Lamprey Conservation Initiative, a conservation agreement was signed by numerous tribes, states, and federal agencies, including the Northern Region of the Forest Service. As part of this effort, 18 regional management units (RMUs) were developed, and each developed a regional implementation plan. The Nez Perce-Clearwater falls within the Snake River RMU. Every five years, an assessment is completed by the U.S. Fish and Wildlife Service for each RMU. In addition, regional implementation plans are updated annually to identify, prioritize, and implement key conservation actions. The most recent Snake River implementation plan is problematic in that it makes several claims about lamprey abundance and threats but does not include citations or data to support these claims. As such, this document will consider the claims and threat ratings made in that document but will also include discussion of relevant data from other sources.

Pacific lamprey have experienced declines on the Nez Perce-Clearwater, which have been primarily attributed to adult passage concerns at mainstem Snake and Columbia dams downstream of the national forest. These declines led the Nez Perce Tribe to conduct trapping at mainstem Columbia River dams and translocations to streams both within and outside of the national forest beginning in 2007 (Hess et al. 2022). This action has resulted in increases of juvenile lamprey on the national forest. Issues traditionally related to forest land management such as stream passage, dewatering, water quality, stream and floodplain degradation all received low to insignificant threat scores for streams on the Nez Perce-Clearwater in the 2018 assessment by the U.S. Fish and Wildlife Service (USFWS), with the exception of the South Fork of the Clearwater and Lower Clearwater, which received medium threat ratings for stream and floodplain degradation in the 2018 assessment. The latest Snake River Lamprey Regional Implementation Plan (Lamprey Technical Workgroup 2022), updated in 2022, elevated floodplain degradation, dewatering and flow management, and water quality to high severity threats in the lower Clearwater, presumably because of an expansion in the analysis area to include the Potlatch River. The Potlatch basin was previously excluded from the analysis because lamprey were considered extirpated in that drainage (Hyatt et al 2006). The Nez Perce Tribe introduced lamprey to the Potlatch River in 2021 and are continuing supplementation efforts there. Across the Nez Perce-Clearwater, the highest rated threats to lamprey were related to effects that occur primarily beyond the scope of forest management, such as mainstem dam passage, lack of awareness, climate change, and small population size. The Forest Service, with partners, has recently completed four projects in the South Fork Clearwater that are expected to be beneficial to lamprey, in addition to one project in the Lower Clearwater in the Potlatch River drainage. In addition, the Potlatch basin currently has a very active stream restoration program led by the Latah Soil and Water Conservation District, so conditions for lamprey are expected to continue to improve as a result of active restoration.

Predation, by both native northern pikeminnow and non-native smallmouth bass was referenced as a threat in the USFWS 2018 Assessment. Predation was changed in 2022 in the Regional Implementation Plan to a high-level threat in the Lower Salmon River, and a moderate threat in the Lower Clearwater. The elevation of threat in the lower Clearwater was reported as part of an ongoing revision by the technical workgroup relating to warm-water fish present in the Potlatch River (John Erhardt USFWS, personal communication). This is somewhat confusing, as Idaho Department of Fish and Game inventoried the Potlatch River basin in 2003 and 2004, and found that the system primarily contained cold-water species, and that most abundant warm water fish (41 percent numerically) was dace. They did not report smallmouth bass but did report that 0.3 percent of the catch numerically was largemouth bass and that 0.1 percent of the catch numerically was northern pikeminnow (Bowersox and Brindza 2006). There is no literature or data that identify dace as a predator of lamprey. The lower Salmon River does contain smallmouth bass, however literature that identifies them as a threat to lamprey is sparse. Arakawa and Lampman (2020) tested predation rates of 10 native and non-native species on larval lamprey and reported that benthic feeders like carp and sturgeon were more efficient predators of larval lamprey than bass and pikeminnow, and that sediment provided refuge from consumption from bass. Schultz et al. (2017) did document lamprey predation by smallmouth bass in a small stream in Oregon, but only found lamprey in 6.2 percent of bass stomachs and had a limited (number = 303) sample size. In a series of recent studies published by U.S. Geological Survey that included almost 23,000 smallmouth bass stomach samples from the Snake River over several years, lamprey were not identified as a major diet item for smallmouth bass, even though intensive sampling occurred during spring and overlapped with juvenile lamprey outmigration timing (Erhardt et al. 2018, Hemingway and Tiffan 2021, Tiffan et al. 2020). This is not surprising, as out migrating juvenile lamprey in mainstem rivers and impoundments tend to move at night and in very deep water (CPUD 2000 in Groves et al. 2001), which would provide temporal and spatial separation from most suspected piscine predators. Additionally, the previous discussion of the capability of juvenile mortality to affect population size in fish with a type-3 survivorship curve applies to lamprey as well. The low proportions of lamprey in diet samples of predators in the literature fail to make the case for anything other than natural compensatory mortality. Given the lack of scientific information documenting prevalence of bass and pikeminnow in the Potlatch River, the lack of literature demonstrating a clear population level threat to lamprey from predators, and the lack of a clearly articulated rationale for the threat increase, the increased predation threat in the 2022 Regional Implementation Plan may be unwarranted. An updated species status assessment in expected to be released soon by the Lamprey workgroup, and it may contain more detailed documentation of changes to threats. The forest looks forward to continuing to work with cooperators in the Lamprey workgroup.

There is a great deal of uncertainty about the cause of recent declines in lamprey passage at large hydropower projects, and what can be done to reverse it. Using dam passage to estimate abundance is problematic for several reasons. It is important to note that most adult lamprey pass hydropower facilities at night (Keefer et al. 2013), and many fish find passage routes through the dam that avoid detection. In addition, data on night counts is not accessible via Data Access in Real Time (DART) or the Fish Passage Center, (FPC), so daytime counts are often cited by researchers, but must be interpreted cautiously, as they can only be used as a relative index of passage. Annual daytime lamprey counts at the Lower Snake Dams since 1999 are shown in Figure 55. Lower Granite Dam began day counts of lamprey in 1999. Annual day lamprey counts are useful for comparing passage between dams, and for examining trends over time, but are not suitable for abundance estimates, for several reasons, including that passage monitoring timing and effort have not been consistent across years. Annual adult day lamprey counts at all Snake River dams were highly synchronous and variable from 1999 to 2022. The destination of lamprey not detected at each upriver dam is unknown and should not be automatically assumed to represent mortalities because some fish may have stopped migrating or found adequate spawning habitat. In the only study of the fate of adult lamprey migrating past large dams on the Columbia River, Noyes et al (2015) reported survival estimates of 68 to73 percent for the three-year study, and that 12 to 27 percent of lamprey entered reservoir tributaries to spawn. In addition, if fish not detected at upriver dams are indeed mortalities, the cause of those mortalities has yet to be documented, and there are a range of possibilities, including predation of adults. Although adult lamprey are large enough to avoid most freshwater piscine predators, exceptions exist. For example, lamprey are a preferred diet item for adult white sturgeon which reside in the Lower Snake and Columbia rivers. Adult lamprey can undergo very heavy predation pressure. In a study in Europe, 80 percent of tagged adult sea lamprey (*Petromyzon marinus*) were consumed by European catfish (*Silurus glanis*), a very large non-indigenous catfish (Boulêtreau et al. 2020). Until there is less uncertainty around the fate of adult lamprey migrating up the Columbia and Snake rivers, dam counts should only cautiously be used as an index of abundance, with an acknowledgement that the mechanism for the observed decreasing passage at subsequent upstream dams is unknown. From 2009 to 2017, 24-hour passage at Lower Granite Dam (the last dam that fish pass on the way to the Nez Perce-Clearwater) increased, with sharp declines observed from 2017 to 2020 and a slight increase in 2021 (Erhardt et al. 2022).

There are several recent studies that are attempting to address knowledge gaps in lamprey assessment and conservation. A recent novel study at Lower Granite Dam on juvenile lamprey passage used hydro-acoustics to investigate passage routes and passage success of juvenile lamprey through a large hydropower project (PNNL 2023). Conservation efforts for lamprey are just beginning to be implemented on a larger scale, with several assessments and implementation plans published in just the last five years, with the first edition of best management guidelines published in 2020 by the U.S. Fish and Wildlife Service (Lamprey Technical Workgroup 2020).

Young et al. (2022) recently conducted and published a whole-basin assessment of Pacific lamprey distributions derived from eDNA sampling. They reported that there were 1,165 miles of river occupied by Pacific lamprey in the Upper Snake River basin (including the Clearwater and Salmon rivers). They reported positive eDNA detections at and above adult translocation sites, as well as in reaches with no translocations. They cited their own data, as well of that of Clemens et al (2017), to conclude that “access to and availability of suitable upriver and tributary spawning habitat is not limiting Pacific lamprey populations in this this region”. The notion of instream conditions not being limiting to lamprey on the national forest is supported by project data that have documented areas of high lamprey abundance. For example, during a bridge replacement activity during the Colette Mine rehab in 2014 on Lolo Creek that involved dewatering the channel temporarily, extremely high densities of juvenile lamprey were observed, and 2,983 juvenile lamprey were relocated from just the immediate vicinity of the project by the Forest Service and partners for that project.

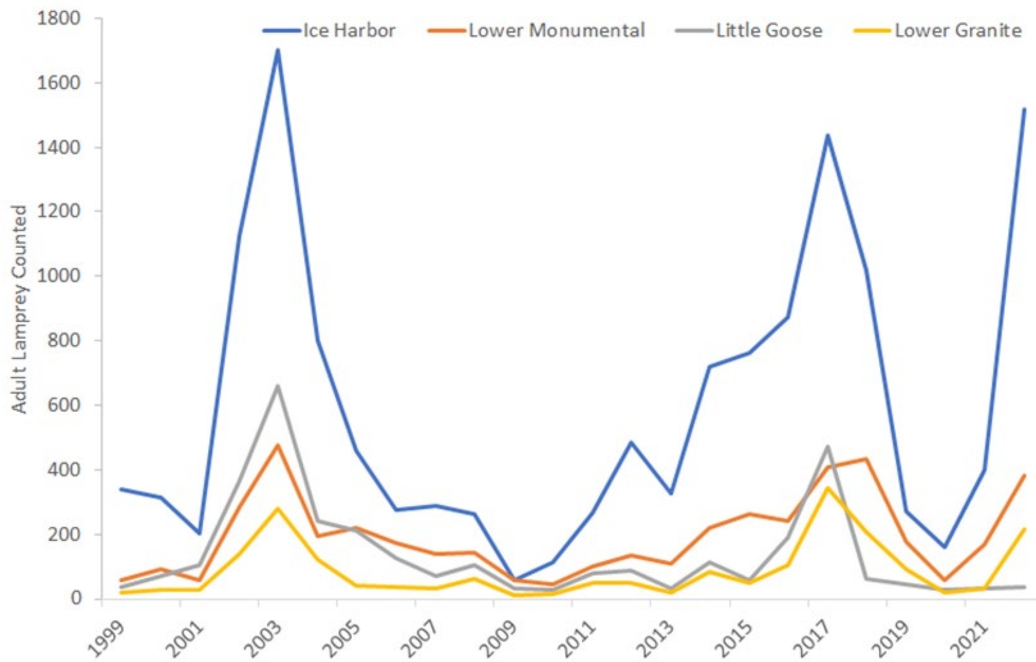


Figure 55. Adult Pacific lamprey passage (daytime counts) at Lower Snake River Dams from 1999 to 2021. Data from University of Washington Data Access in Real Time (DART).

The aquatic ecosystem plan components, the establishment of the Conservation Watershed Network (CWN), the identification of priority watersheds, are expected to be beneficial to lamprey on the national forest, and to provide the ecological conditions to maintain population viability.

Regional Forester's Sensitive Species List

Fish

The 2011 sensitive species list includes Pacific lamprey See above discussion under Species of Conservation Concern heading for lamprey. It also included Westslope cutthroat trout, redband trout and Clearwater Sping/Summer Chinook. For these species, see additional discussion under the Affected Environment-Aquatic Species section of this document..The aquatic and riparian plan components in the Land Management Plan are expected to adequately provide the ecological conditions for long term persistence of these species within the plan area.Mollusks

Both the Western ridged mussel and the Western pearlshell mussel are included on the current regional forester's sensitive species list. Although several West Coast states have reported enigmatic mass mortality events for Western ridged mussels, the most recent surveys by Idaho Department of Fish and Game indicate that they are widespread and abundant within their historic range on the Nez Perce-Clearwater. In addition, the most recent Western pearlshell mussel surveys by the U.S. Fish and Wildlife Service on the national forest reported some of the highest densities and numbers of Western pearlshell mussels ever reported in the literature. According to the most recent information, both species of mussel have secure populations on the national forest. This could be due to protective land allocation afforded by wilderness and roadless designations, as well as the protective measures (PACFISH and INFISH) that exist under the current forest plans. Because the aquatic plan components carry forward the protections afforded by PACFISH and INFISH, it is expected that ecosystem plan components that are designed to protect water quality and habitat for other aquatic species will be sufficient to protect habitat and water quality for mussels. Because the types of actions that would be allowed under the new plan are not different between action alternatives, and because the difference between alternatives are primarily pace and scale, management under the action alternatives are expected to have similar effects to mussels. As a result, it is expected that the revised forest plan will continue to provide for the continued persistence of these two mussel species on the Nez Perce-Clearwater. An additional plan component specific to mussels (FW-GDL-WTR-07) is designed to conserve existing Western ridged and Western pearlshell mussel populations on the national forest, by suggesting that individuals should be re-located to an alternative site with suitable habitat prior to de-watering channel work proposed in areas containing habitat for these species. This is a continuation of a practice that currently occurs on the national forest.

Insects

None of the aquatic insects that were evaluated were included on the Species of Conservation Concern list. Two (the Lolo Mayfly and the Rocky Mountain Refugium Caddisfly) are on the regional forester's sensitive species list as "may occur in the plan area." If present, it is not expected that any of the alternatives will have any long-term deleterious impacts on them. Most of the aquatic insect observations are in areas that are primitive wilderness areas and not subject to the types of management actions that would be expected to affect water quality and habitat. Although they may undergo short term impacts from potential natural disturbances, they have evolved and persisted under a natural disturbance regime. For those aquatic insects that were observed outside of the designated wilderness areas, that would potentially be in areas where active management would take place, it is expected that ecosystem plan components designed to protect water quality and habitat for other aquatic species will be sufficient to protect habitat and water quality for aquatic insects. Because the types of actions that would be allowed under the new plan are not different between alternatives, other than the No Action Alternative, and because the difference between alternatives are primarily pace and scale, management under the action alternatives are expected to have similar effects to aquatic insects; effects would just occur at different rates. Table 140 summarizes the effects of all alternatives to native aquatic species previously identified as at-risk or of public interest, along with rationale.

Table 139. PACFISH/INFISH planning, coordination, project implementation standards and guidelines crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH	Land Management Plan
WR-1. Design and implement watershed restoration projects in a manner that promotes the long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and contributes to attainment of riparian management objectives. WR-3 PACFISH ONLY: Do not use planned restoration as a substitute for preventing habitat degradation (that is, use planned restoration only to mitigate existing problems, not to mitigate the effects of proposed activities). FW-1. Design and implement fish and wildlife habitat restoration and enhancement actions in a manner that contributes to attainment of the riparian management objectives. WR-2. Cooperate with federal, state, local, and tribal agencies, and private landowners to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet riparian management objectives. FW-2. Design, construct, and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of the Riparian Management Objectives or adversely affect listed anadromous and inland native fish. For existing fish and wildlife interpretive and other user-enhancement facilities inside Riparian Habitat Conservation Areas, assure that Riparian Management Objectives are met and adverse effects on listed anadromous and inland native fish are avoided. Where Riparian Management Objectives cannot be met or adverse effects on listed anadromous and inland native fish avoided, relocate or close such facilities. FW-3. Cooperate with federal, tribal, and state wildlife management agencies to identify and eliminate wild ungulate impacts that prevent attainment of the Riparian Management Objectives or adversely affect listed anadromous and inland native fish. FW-4. Cooperate with federal, tribal, and state fish management agencies to identify and eliminate adverse effects on native fish associated with habitat manipulation, fish stocking, fish harvest, and poaching. RA-1. Identify and cooperate with federal, tribal, state, and local governments to secure instream flows needed to maintain riparian resources, channel conditions, and aquatic habitat. LH-4. Use land acquisition, exchange, and conservation easements to meet Riparian Management Objectives and facilitate restoration of fish stocks and other species at risk of extinction.	FW-STD-CWN-01. In Conservation Network Watersheds not meeting aquatic and riparian desired conditions, activities shall be designed and implemented in a manner that supports or contributes towards the recovery of federally listed species and the achievement of these desired conditions and does not retard them when evaluated at the HUC12 subwatershed scale. Short-term adverse effects from project activities may occur when they support the long-term recovery of aquatic and riparian desired conditions and federally listed species. FW-STD-WTR-02. Project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet soil and watershed desired conditions, and to protect beneficial uses. FW-STD-WTR-04. Where aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. Where aquatic and riparian desired conditions are not yet achieved, and to the degree that project activities would contribute to those conditions, projects shall restore or not retard attainment of desired conditions. Short-term adverse effects from project activities may occur when they support the long-term recovery of aquatic and riparian desired conditions and federally listed species. Exceptions to this standard include situations where Forest Service authorities are limited (1872 Mining Law, state water right, etc.). In those cases, project effects shall not retard attainment of desired conditions for watersheds, to the extent possible within Forest Service authorities. FW-STD-WTR-06. To restore watersheds, management activities in watersheds with approved total maximum daily loads should be designed to comply with the total maximum daily load allocations following project implementation.

Table 140. Effects summary for aquatic at-risk species and species of public interest

Species	Status	Effects summary
Snake River sockeye salmon	Endangered	No Action Alternative: Current management does not usually affect this species, since their distribution is limited to the mainstem Salmon River, and they do not spawn or rear in areas in or adjacent to the Nez Perce-Clearwater. The Salmon River is a migration corridor to their spawning and rearing habitat. Activities such as boat ramp construction and maintenance may result in short-term effects to individual fish, although activities are scheduled to avoid migration timing.
Snake River sockeye salmon	Endangered	Alternatives: W, X, Y, Z, and Preferred: Effects would be indistinguishable from No Action Alternative.
Snake River fall Chinook salmon	Threatened	No Action Alternative: Current management affects this species when projects add cumulatively to mainstem river sediment and temperature conditions. Generally, these effects are immeasurable.
Snake River fall Chinook salmon	Threatened	Alternatives: W, X, Y, Z, and Preferred: Effects are expected to be indistinguishable from No Action Alternative. These alternatives are not expected to result in cumulative mainstem effects that exceed those under No Action Alternative.
Snake River spring and summer Chinook salmon	Threatened (Salmon Basin)	No Action Alternative: Risk of effect is limited to projects in the Salmon basin only. Current management has resulted in short-term adverse effects to habitat and individual fish. Long term, stream habitat is static or improving based on PACFISH and INFISH Biological Opinion (PIBO) monitoring. Number of returning wild-origin adult salmon has both declined and improved in the past 5 years, due to many reasons that occur out-of-basin.
Snake River spring and summer Chinook salmon	Threatened (Salmon Basin)	Alternatives: W, X, Y, Z, and Preferred: Effects are expected to be indistinguishable from the No Action Alternative. The Conservation Watershed Network in the Salmon basin was in part based on major and minor salmon spawning areas. The Conservation Watershed Network has enhanced protection specified in components along with prioritized aquatic restoration. The components are expected to support salmon recovery efforts and recovery plan goals. Improving trends in habitat condition on the national forests are expected to continue. Projects could result in short-term adverse effects to habitat and individual fish, but to no greater degree than No Action Alternative.

Species	Status	Effects summary
Snake River steelhead	Threatened	No Action Alternative: Risk of effect is widespread and exists across most of Forests' land base, excluding the North Fork Clearwater upriver of Dworshak Dam and the Palouse subbasin. Current management has resulted in static or improving stream conditions. Improving conditions are noted in areas critical for steelhead spawning and early rearing in the Lochsa, Selway, Lower Salmon, and South Fork Clearwater subbasins, based on PIBO monitoring. Some projects have resulted in short-term adverse effects to habitat and individual fish, but long-term, conditions are either static or improving. Number of returning wild-origin adult steelhead has both declined and improved in the past 5 years, due to many reasons that occur out-of-basin.
Snake River steelhead	Threatened	Alternatives: W, X, Y, Z, and Preferred: Effects are expected to be indistinguishable from the No Action Alternative or result in improved outcomes. The Conservation Watershed Network was in part based on major and minor salmon spawning areas for steelhead and critical habitat, particularly in the Clearwater basin outside of the North Fork. The Conservation Watershed Network has enhanced protection specified in components along with prioritized aquatic restoration and recognizes the importance of national forest lands in the Clearwater basin in recovery of steelhead. The components are expected to support steelhead recovery efforts and recovery plan goals. Improving trends in habitat condition on the national forests are expected to continue where they are presently occurring, including those in the Lochsa, Selway, Lower Salmon, and South Fork Clearwater subbasins. Components are intended to support improving habitat trends in the national forest portions of the Lower Clearwater that include steelhead designated habitat. While long-term improvements are expected, projects could result in short-term adverse effects to habitat and individual fish, but to no greater degree than No Action Alternative and possibly less, given greater stringency and clarification of components.

Species	Status	Effects summary
Columbia River bull trout	Threatened	No Action Alternative: Risk of effect is widespread and exists across most of Forests' land base, excluding streams in the Palouse subbasin. Current management has resulted in static or improving stream conditions, except for the Upper North Fork Clearwater. PIBO data for this subbasin indicates a downward trend. This area of the national forests supports habitat critical for recovery of bull trout in Idaho. It contains high elevation streams with the most miles of stream reaches modeled at high probability for bull trout occupancy in the 2040 Climate Shield (Isaak et al. 2015). It currently supports extensive spawning and early rearing of fluvial and adfluvial bull trout. Both statewide and within the Clearwater basin, Idaho Department of Fish and Game has documented positive trends in number of bull trout since the early 1990s.
Columbia River bull trout	Threatened	Alternatives: W, X, Y, Z, and Preferred: Effects are expected to be indistinguishable from the No Action Alternative, but additional investigation is needed to confirm if the downward trend the Upper North Fork Clearwater is sustained, and identify what management actions, if any, have contributed. Several streams with documented bull trout spawning and early rearing in this subbasin are included in the Conservation Watershed Network. Aquatic components were developed in part to address this situation and would be expected to result in projects reversing any downward trend over the long term. Elsewhere on the national forests, improving trends in habitat condition are expected to continue where they are presently occurring, including those in the Lochsa, Selway, Lower Salmon, and South Fork Clearwater subbasins. While static conditions or long-term improvements are expected, projects could result in short-term adverse effects to habitat and individual fish, but to no greater degree than No Action Alternative and possibly less, given greater stringency and clarification of components.

Species	Status	Effects summary
Pacific lamprey	Species of Conservation Concern	No Action Alternative: Pacific lamprey are critically imperiled in the State of Idaho. The species is not addressed in the 1987 Forest Plans and has no components that speak directly to it. It is assumed the existing static and improving habitat conditions indicated by PIBO and Forest Plan monitoring data benefit lamprey as well. Risk of effect is widespread and exists across most of Forests' land base, excluding the North Fork Clearwater upriver of Dworshak Dam and the Palouse subbasin. While there are no components that address lamprey, recent in-channel habitat restoration projects have recognized the importance of lamprey and surveyed for them before de-watering streams. Where found, individuals have been re-located. Where these actions are not taken, it is likely that individual lamprey will be adversely affected if they are present in areas de-watered during project implementation.
Pacific lamprey	Species of Conservation Concern	Alternatives: W, X, Y, Z, and Preferred: Effects are expected to be fewer under these alternatives compared to the No Action Alternative because a component specifically addressing lamprey conservation (FW-GDL-RMZ-10) while conducting in-channel work is included. All the other aquatic components are expected to protect and enhance lamprey by supporting improving trends where they exist and initiating trends where they don't, particularly in the Conservation Watershed Network. The Conservation Watershed Network was in part based on sub-watersheds known to be important for lamprey. It is thus unlikely that these alternatives will result in projects causing adverse effects to lamprey. Like other aquatic species, short-term adverse effects to habitat could occur, but to no great degree than No Action Alternative and possibly less, given greater stringency and clarification of the components.
Westslope cutthroat trout	Sensitive Species List	No Action Alternative: Westslope cutthroat trout are widely distributed across the Nez Perce-Clearwater and provide renowned sport fisheries in mainstem rivers and larger tributaries. Risk of effect is widespread and exists across most of Forests' land base. Like other salmonid species on the national forests, current management has resulted in static or improving stream conditions. Some projects have resulted in short-term adverse effects to habitat and individual fish, but long-term, conditions are either static or improving.

Species	Status	Effects summary
Westslope cutthroat trout	Sensitive Species List	Alternatives: W, X, Y, Z, and Preferred: Effects are expected to be indistinguishable from No Action Alternative. The Conservation Watershed Network watersheds include habitats providing extremely important spawning and early rearing habitat for Westslope cutthroat trout, plus two subwatersheds supporting resident, allopatric Westslope cutthroat populations with known high genetic integrity (Moose Creek and Meadow Creek within the Selway subbasin). Improving trends in habitat condition on the national forests are expected to continue where they are presently occurring, including those in the Lochsa, Selway, Lower Salmon, and South Fork Clearwater subbasins. Components are intended to support improving habitat trends where they are not known to exist. While long-term improvements are expected, projects could result in short-term adverse effects to habitat and individual fish, but to no greater degree than No Action Alternative and possibly less, given greater stringency and clarification of components.

FW-STD-WTR-04 requires that where aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. Where aquatic and riparian desired conditions are not yet achieved, and to the degree that project activities would contribute to those conditions, projects shall restore or not retard attainment of desired conditions. FW-STD-WTR-04, as part of all action alternatives, carries forward the same expectation from PACFISH, using language consistent with the 2012 Planning Rule and eliminating the word "interim." The expectation that actions on the Nez Perce-Clearwater will not result in permanent, long-term degradation of aquatic habitat that is essential for aquatic species, is the same for all alternatives. Therefore, outcomes from Alternatives W, X, Y, Z, and the Preferred would be expected to be indistinguishable from those in the No Action Alternative.

Cumulative Effects

Adjacent Land and Other Management Plans

The Nez Perce-Clearwater encompasses the headwaters of nearly all watersheds flowing through and out of National Forest System lands. While there are inholdings of private lands within the Nez Perce-Clearwater boundaries and small communities, such as Elk City and Dixie, no major landowner or federal agency manages lands on a broad scale upstream of National Forest System lands. For the most part, stream systems on the Nez Perce-Clearwater originate on the national forest in protected headwaters and eventually flow downstream onto lands owned or administered by entities other than the Forest Service, ultimately flowing into the Lower Granite Reservoir on the Snake River. Many fish populations, whether they move off the national forest as part of their life cycle or remain entirely within a localized area, require interconnectivity of these streams to survive as a population. For almost all species, genetic interchange between subpopulations is necessary to maintain healthy fish stocks. The more wide-ranging a species is, the more critical interconnectivity may be for the fish to be able to access important habitat components.

Thus, activities off of the national forest that affect other stages of a fish's life history or migration corridors can have significant impacts to fish populations upstream. For anadromous fish, these include cyclic changes in ocean conditions, commercial and sport harvest, predation on juvenile and adult salmonids, operation of mainstem dams on the Snake and Columbia rivers, success of hatchery programs included in evolutionary significant units (ESUs), and potential effects from climate change. Therefore, the cumulative effects to consider include those that could be added to any effects the Nez Perce-Clearwater managers may have on lands downstream, and in the case of anadromous fish, out-of-basin effects to threatened or endangered populations. The recovery plans for Endangered Species Act (ESA) listed species published by U.S. Fish and Wildlife Service and National Marine Fisheries Service consider all of these types of cumulative effects on an ongoing basis, and update threats to listed species in their 5-year reviews. Threats change over time as status of populations change, threats are addressed, and new threats emerge. The national forest will continue to rely on recovery plans and 5-year status updates in ESA consultation for projects initiated under the revised forest plan. This coordination will ensure that projects on the national forest are considering the latest and best available scientific information during implementation of the revised plan. In addition, any activities that are conducted by the federal government or that have a federal nexus are not expected to have ESA cumulative effects, because these activities would be subject to Section 7 ESA consultation.

Bureau of Land Management (BLM) lands occur downstream of and, in many cases, immediately adjacent to National Forest System lands, particularly in the Lower Salmon and Lower Little Salmon subbasins. Activities occurring on BLM lands include but are not limited to timber harvest, livestock grazing, mineral development, and recreation. The BLM manages many recreation sites within the Salmon River corridor, including camping areas and boat ramps. These lands are managed under a management plan similar to forest or land management plans. The Bureau of Land Management (BLM) plan for areas adjacent to or downstream of the Nez Perce-Clearwater was revised in the past decade. The aquatics components in this plan are similar to PACFISH and INFISH. Under all alternatives, management of National Forest System lands upstream from BLM lands is not expected to affect implementation of the BLM or its ability to design and implement projects or manage recreation, nor is management of other federal lands expected to affect management on the Nez Perce-Clearwater national forest.

The action alternatives are expected to support recovery goals for threatened and endangered fish and support goals outlined in the plans highlighted in the State and Local Plans Section of this document. These include Idaho Department of Fish and Game's Five-Year Management Plan, State Wildlife Action Plan, and the Nez Perce Tribe Fisheries Management Plan, CRITFIC's Lamprey Plans. While complete restoration of all degraded habitat on the Nez Perce-Clearwater alone will not recover Endangered Species Act (ESA) listed anadromous fish or bull trout, actions that move conditions toward the desired conditions described in the revised forest plan are necessary to support and enhance recovery efforts both on the national forest and downstream. Recovery of bull trout and ESA listed anadromous fish cannot be fully supported without high quality spawning and rearing, and migration habitat provided in waters of the Nez Perce-Clearwater.

A host of activities occur on private lands within both the Clearwater and Salmon basins. These include water diversion, irrigation, livestock grazing, farming with varied crops, timber harvest, hunting, outfitted and non-outfitted angling, construction of subdivisions, housing, and commercial development, building and stocking of private fishponds, chemical treatment of noxious weeds, flood control, and stream channel manipulation. These activities all occur under the umbrella of state or federal regulation and permitting. The state, through agencies like the Idaho Department of Fish and Game or the Idaho Department of Lands, as well as the Nez Perce Tribe and federal agencies like the U.S. Department of Agriculture Natural Resource Conservation Service provide administration and oversight of these activities through the appropriate laws and management plans discussed earlier in this document. The administration of these state and federal programs is not expected to affect implementation of the revised forest plan, nor is implementation of the revised forest plan expected to have significant effects on these agencies' implantation of their plans and stewardships.

According to a recent Biological Opinion for hatchery steelhead programs in Idaho:

"*The Idaho Department of Lands is pursuing an ESA section 6 cooperative agreement. The intent is to develop forest management practices that would better protect aquatic habitat for ESA-listed fish. This forestry program, if approved, would apply to forestry management and timber harvest on state and private lands (voluntary) in the Salmon and Clearwater River Subbasins in Idaho*" (NMFS, 2020).

It is expected that this effort would be complementary with the land management plan and would provide benefit to listed species that occur on the forest.

As previously described, the Aquatic Ecosystems plan components are common to all action alternatives. The effects conclusions for these components indicated that they would be indistinguishable from those in the No Action Alternative or result in neutral or improved long term outcomes for riparian, aquatic habitat, and aquatic species. However, with the differences in pace and scale of restoration associated with each action alternative, there is an increase in risk as pace and scale increase between alternatives. This is because although plan components are intended to protect aquatic habitat and species, an increase in any activity could increase the risk that something could go wrong. An example of this could be if an accident caused an increase of sediment to wash into a stream, it is an acknowledgement that with increased activity comes increased risk. However, even if occasional mishaps occur, it is expected that they would be the exception. Therefore, substantial changes in the quality of water flowing, including sediment and temperature, on National Forest System lands are not expected and any changes in the populations of aquatic species are expected to result in improved conditions off of the national forest.

Climate Change

General climate change effects on fish

Predicting what effects future climatic changes may have on fish relies on complex climate change models. One of the difficulties associated with anadromous fish like salmon and steelhead, and highly migratory fish like bull trout, is understanding how climate affects all of the habitats that the fish use during different portions of their lives. In addition, climatic effects are expected to be different for various fish species, and effects that are detrimental to one species may be beneficial to another (Lynch et al. 2016). This section is not intended to be an exhaustive review or analysis of climate science. However, it is important to highlight some of the effects expected to occur on fish that rely on habitat within the boundaries of the Nez Perce-Clearwater. Climate modeling has suggested four general effects that are likely to occur relating to streams on the national forest. These are more of the annual precipitation will be rain, there will be less snowpack, there will be higher and earlier peak flows, and stream temperatures will rise (Crozier and Zabel 2006, Northwest Power and Conservation Council et al. 2007, Bisson et al. 2008, Isaak et al. 2012, Williams et al. 2015). These effects are likely to directly and indirectly affect multiple primary constituent elements (PCEs) or physical or biological features (PBFs), especially those related to flow and temperature (5, 7, 9). Most models of climate effects on fish make predictions at multiple temporal scales, with various target years as well (2080, 2090, etc.), but since the forest plan is intended to guide management for the next 15 years, the 20- to 40-year predictions are most relevant to this document. Climate vulnerability assessments that account for a species' exposure, sensitivity, and adaptive capacity are more robust (Wade et al. 2017, Wade et al. 2016) and are given preference in this section. A recent climate change vulnerability assessment from National Oceanic and Atmospheric Administration Fisheries characterized all evolutionary significant unit and distinct population segment groups of salmon and steelhead in the coterminous western United States based on both the population's vulnerability (exposure and sensitivity) to climate change, as well as its adaptive capacity or resilience (Crozier et al. 2019).

Bull Trout

Bull trout require the coldest water of any of the listed fishes on the Nez Perce-Clearwater. This is especially true for embryos and juveniles (Isaak, Wenger, and Young 2017). For this reason alone, they are thought to be highly sensitive to changes in climate. However, they also express multiple life history strategies on the national forest that may increase population resilience. Isaak et al. (2017) observed that although they have suffered range contraction in many locales (Eby et al. 2014), no populations have yet gone extinct due to climate change. Many of the streams on the national forest have been identified as strongholds for bull trout, where populations have been documented as stable or increasing (Isaak et al. 2015, High et al. 2008, Meyer et al. 2014, Erhardt and Scarnecchia 2014, Isaak et al. 2022). This is in part due to the high-quality habitat available on the national forest, as well as the life history variation expressed in these populations. Bull trout in streams on the national forest can exhibit three different life history strategies including resident, adfluvial, and fluvial. Resident fish remain in headwater streams for their entire lives, which can provide genetic insurance against downstream catastrophic disturbance events. Adfluvial bull trout on the national forest live in the cold, deep water of Dworshak Reservoir and migrate up the North Fork Clearwater to headwater streams to spawn. Erhardt and Scarnecchia (2014) found that this population had increased in the eight years from 2000 to 2008 and predicted that by 2019 it would likely pass the U.S. Fish and Wildlife Service recovery goal of 5,000 adults. Abundance data for validation of this prediction is still being analyzed. Fluvial bull trout live in large mainstem rivers like the Snake and Clearwater and undergo seasonal migrations to headwater streams to spawn. All of these life history forms can be found together on spawning grounds, and the subsequent genetic exchange adds to population resilience of bull trout on the national forest. Isaak et al. (2015) predicted areas of cold-water refugia that would be the most important factor in bull trout persistence in the northern Rocky Mountains. Isaak (Isaak et al. 2022) recently proposed a strategy to target restoration efforts in these stronghold areas, which comprised from 5 to 21 percent of habitat, but 72 to 89 percent of occupied habitat. Falke et al. (2015) assessed climate change vulnerability of bull trout in the Wenatchee basin in Washington (which, like the national forest, is a fire prone landscape) and found that fuels management and addressing connectivity could mitigate for climate vulnerability of bull trout in that landscape. Most of the headwater stream reaches on the national forest are found in Management Area 1 (roadless, wilderness, etc.) and the only management that would be occurring there is allowing wildland fire to burn.

Spring and Summer Chinook

Crozier et al. (2021) modeled life cycle climate effects on the Snake River Spring and Summer evolutionary significant unit (ESU) and predicted up to an 18 percent decline in survival during the freshwater stage by 2060. This prediction is similar to that of Tonina et al. (2022), who predicted a 20 percent reduction in rearing habitat for spring Chinook in the Salmon River basin and up to a 23 percent reduction in spawning habitat by 2040. Because spring Chinook are anadromous and spend most of their life in marine environments, climate effects on marine survival cannot be overlooked and help to add perspective to discussions of freshwater effects. National Oceanic and Atmospheric Administration Fisheries' life cycle model Crozier et al. (2021) predicted a much larger decline (83 to 90 percent) during the marine stage by 2060, primarily driven by a rise is sea surface temperature. Although most of the projected population effects of climate on this spring Chinook ESU will occur in the marine environment, there are few mitigation options available there. As a result, freshwater mitigation efforts such as protecting and restoring stream habitat may become more important to population resilience. This ESU of spring Chinook scored very high in vulnerability, but high in adaptive capacity during the recent climate change vulnerability assessment (Crozier et al. 2019).

Fall Chinook

Fall Chinook life history takes place largely downstream of the Nez Perce-Clearwater boundary, however climate effects that occur on the national forest will likely impact those downstream areas. Connor et al. (2019) modeled climatic effects on the Snake River fall Chinook ESU and noted that indirect effects of flow and temperature on migration and rearing would likely reduce reproductive success by up to 30 percent but noted that hypolimnetic water releases from storage reservoirs could become increasingly important in temperature mitigation. In particular, they predicted that releases of cold water from Dworshak Dam into the Clearwater River could concentrate reproduction success in that area and perhaps mitigate for losses in other river sections where cold water releases are not available. This ESU of fall Chinook scored high in both vulnerability and adaptive capacity during the recent climate change vulnerability assessment (Crozier et al. 2019).

Steelhead

Steelhead, like spring Chinook, utilize streams on the Nez Perce-Clearwater for extended (multi-year) juvenile rearing, as well as adult migration and spawning. Steelhead, unlike spring Chinook, are very widely distributed throughout the national forest, from mainstem rivers to headwater streams. They exhibit a wide range of life history variation, from resident fish that never leave headwaters, to fish that rear in freshwater for 1 to 5 years (most commonly 2 to 3) before exhibiting anadromy (Copeland et al. 2017). The prolonged and diverse use of habitat on the national forest, combined with a high degree of adaptability, makes it difficult to predict climate effects on steelhead. Steelhead that occur on the national forest are classified as summer steelhead, meaning that adults migrate upstream to spawn primarily in August and September. Many of these fish hold over fall and winter in larger mainstem rivers and reservoirs in the system before completing migration to natal areas during winter and spring and spawning in April and May (National Oceanic and Atmospheric Administration, 2021). Even before impoundment of the Snake and Columbia rivers, river reaches in the adult migration corridor commonly exceeded critical temperature thresholds (68° F) in summer (National Oceanic and Atmospheric Administration 2017), which may have created thermal barriers to migrating adults during summer months. In addition, base flows in some stream reaches drop to levels creating passage barriers that can impede adult migration. Much of the steelhead spawning and rearing habitat on the national forest is prone to wildfire during the late summer months. Adult steelhead behaviorally mitigate for warm migration temperatures by use of cold water refugia during summer for extended periods (Hess et al. 2016, Keefer et al. 2018). Strategies such as holding in mainstem habitats or other pockets of refugia until stream temperatures drop and flows increase and potential fires are extinguished by seasonal weather patterns, or straying to other suitable spawning locales, are adaptations developed over millennia and provide an evolutionary advantage in a landscape historically characterized and shaped by frequent natural disturbance. A wide range of phenotypic and behavioral plasticity, and a wider thermal tolerance (Sloat and Osterback 2013, Spina 2007) and migration ability has enabled steelhead to persist over a much larger geographical area than Chinook on the national forest. (Wade et al. 2012) conducted one of the first landscape scale climate vulnerability assessments on steelhead in the Pacific Northwest (PNW). They concluded that the most severe climatic effects would be seen in steelhead at the southern extant of their range, with a subsequent range shift northward, and concluded maintaining connectivity across the entire PNW would provide more of a buffer to climate effects than local-scale habitat restoration. The Endangered Species Act (ESA) recovery plan notes the current and potential future importance of seasonal cold hypolimnetic releases from hydropower projects in both the Snake and Clearwater basins, which maintain connectivity during summer months and may partially mitigate for more frequent temperature exceedance that is likely to occur under climate change (National Oceanic and Atmospheric Administration 2017). There is a high degree of uncertainty involved in assessment of net effects to a highly adaptable fish like steelhead. Using optimal temperature modeling, Zhang et al. (2019) predicted that steelhead survival rates in the Snake River basin are expected to increase by more than 10 percent by 2080 due to mean river temperature increasing into the optimal range for steelhead growth. Wade et al. (2003) predicted that population groups on the national forest would be less vulnerable to climate impacts than population groups within the distinct population segment (DPS) at lower elevations. This DPS scored high in vulnerability and moderate in adaptive capacity during the recent climate change vulnerability assessment (Crozier et al. 2019).

Sockeye

Although most of the life history of Snake River sockeye takes place outside of the Nez Perce-Clearwater boundaries, a portion of the migration corridor for adults and juveniles (mainstem Salmon River) forms the southern border of the national forest. Sockeye are critically endangered and particularly vulnerable to extinction based on their life history. Adult sockeye migrate up to natal areas during the hottest part of the summer, and lower snowpack could exacerbate in-river temperatures. In 2015, a large portion of the adult run died in the Columbia River due to record high temperatures and low flows in the basin encountered during their spawning migration. Crozier et al. (2020) projected that changes in temperature and flow that affect sockeye would be greatest in the free-flowing mainstem Salmon River. They predicted an 80 percent decrease in adults surviving upstream migration by the year 2040 under current climate predictions. There is likely little that can be done within the boundaries of the national forest to mitigate for this. The Endangered Species Act Recovery Plan (National Oceanic and Atmospheric Administration 2015) identifies coordinated management actions that need to occur and the agencies responsible for implementation, (Table 7.1, National Oceanic and Atmospheric Administration 2015), but all of the identified actions take place outside the Nez Perce-Clearwater National Forest boundaries. If future temperature and flow regimes approach what was observed in 2015, continued failure of spawning migrations could be expected unless there is "coordinated management throughout the migration corridor" (Crozier et al. 2020). An example of the type of mitigation action needed was cited by Crozier et al. (Crozier et al. 2020): in 2015, some fish were saved by Idaho Department of Fish and Game transporting them via truck from Lower Granite Dam to the hatchery, however transportation from Bonneville Dam would have likely been more effective because many fish died before reaching Lower Granite. This evolutionary significant unit scored very high in vulnerability and low in adaptive capacity during the recent climate change vulnerability assessment (Crozier et al. 2019).

Overall

The revised forest plan establishes plan components that continue, and in some cases exceed, the protection afforded by PACFISH and INFISH (Appendix E). These plan components are also intended to maintain physical or biological features (Appendix F). It is the intent of these plan components to continue to protect and enhance freshwater spawning and rearing habitat relating to future activities on the Nez Perce-Clearwater. In addition, the philosophical basis for management changes under the new plan, as activities on the national forest are intended to consider the natural range of variation (NRV) and move conditions at the landscape scale toward a set of desired conditions within the scope of NRV. Bisson et al. (2009) noted that restorative actions would be more "likely to foster salmon resilience if they consider processes that generate and maintain natural variability in freshwater." In the face of climate challenges, cultivating population resilience will likely play a larger role in the continued persistence of threatened fish species on the national forest.

The Northern Rockies Adaptation Partnership (NRAP) is a science-management partnership consisting of 15 national forests in the Northern Region of the U.S. Forest Service, three National Parks, U.S. Forest Service Rocky Mountain Research Stations, University of Washington, and numerous stakeholders. They published a volume (Halofsky and Peterson 2018) identifying climate change issues relevant to resource management in the northern Rocky Mountains and discussing solutions that minimize negative effects of climate change and facilitate transition of diverse ecosystems to a warmer climate. They included recommendations and adaptation options for a wide range of resources on the Nez Perce-Clearwater, including water resources and infrastructure, fisheries, forest vegetation, rangeland vegetation, wildlife, and recreation. It is intended that this document will guide and assist mitigation for climate effects at the project level, and potential climate adaptation strategies developed through NRAP have been incorporated into the development of plan components.

The revised plan addresses climate change impacts at the resource level through resource specific plan components, and at the national forest level by coordination of plan components to achieve desired conditions. There are individual resource plan components in the revised forest plan that will help to mitigate potential climate change effects on fish. For example, one of these is the creation of the Conservation Watershed Network, which, among other things, identifies areas of cold water refugia that are likely to persist into the future. This enables restoration actions to be focused on areas likely to be increasingly important to cold water fishes in the future. The Conservation Watershed Network (CWN) also focuses on maintaining and improving connectivity of watersheds, allowing for natural selection of advantageous adaptations among listed fishes, thus maximizing potential for genetic variability. In addition to resource specific examples, the revised plan in its entirety is designed to promote restoration of natural landscapes and natural processes, and plan components that address these issues will cultivate population resilience. For example, plan components from multiple resource areas will affect riparian areas, but all are designed to be beneficial by facilitating natural processes that slow evaporation, and provide shade and instream cover, and promote proper functioning of riparian areas. These processes contribute to stream health. Because healthy streams are most resilient to disturbance (Pelletier et al. 2020) and better able to adapt to changing climates (Bisson et al 2009), they provide the best opportunity for continued persistence of Endangered Species Act (ESA) listed fishes on the national forest. Restoration strategies can maximize benefits to fish by focusing on maintaining and improving connectivity and restoring and protecting natural stream processes (Bisson, 2009). The full benefit of the philosophy underlying the revised forest plan is that instead of reliance on specific technical strategies to ameliorate local scale effects (Bisson et al. 2009), the focus is now on moving the entire landscape toward desired conditions within the range of natural range of variation (NRV). Instead of relying on individual components that only provide benefit to one resource area, the philosophy underling the components in the revised plan is the same for all resource areas. Virtually all plan components are intended to maintain or increase resiliency to some degree. By focusing on protecting and maintaining natural processes, including streamflow, and allowing for maximum genetic exchange through the maintenance of connectivity, the entire forest plan will foster population resilience in ESA listed fishes and persistence in species of conservation concern. For more information on climate adaptation strategies, how specific plan components in the revised forest plan support the strategies established by the Northern Rockies Adaptation Partnership, and how these strategies will provide mitigation of potential climate effects on fish and aquatic organisms present on the national forest, see Appendix G.

All forest management activities that occur on the national forest are subject to Forest Service best management practices (BMPs). A detailed discussion of these is provided in the Final Environmental Impact Statement, Appendix K.

The use of an adaptive strategy that uses tools applying climate adaptation strategies, such as plan components, technical guidance found in documents like Halofsky and Peterson (Halofsky, Peterson, et al. 2018a, b), and Forest Service BMPs (Edwards et al. 2016)will enable the Forest Service to address the future challenges associated with climate change as they develop, with the flexibility needed to stay relevant in the face of this developing threat.

Effects to Resource from Other Resources

The following discussion focuses on effects to aquatic ecosystems and fisheries presented by the management of other resources areas. For each resource, the general effects of plan components that may contribute to or mitigate effects or maintain general conditions to the benefit of aquatic ecosystems and fisheries or habitats are presented. While effects are reviewed, most individual plan components are not cited as the effects are small or indirect and there are too many to list. Plan components from within a resource area that more directly apply to aquatic ecosystems and fisheries or habitat are specifically listed and discussed.

This section examines these effects from several perspectives, including potential effects to aquatic ecosystems from other relevant resource area objectives in the revised plan, continued expected effects under the No Action Alternative (continuing with the direction of the PACFISH and INFISH Biological Opinion[PIBO]), as well as an analysis of how the revised forest plan components in the action alternatives are designed to carry forward PIBO direction for applicable resource areas.

Effects of Other Resource Objectives and Plan Components on Resource

Terrestrial Ecosystems

The objectives for terrestrial ecosystems in the action alternatives were designed to restore various amounts of land in different vegetation types every five years. The rationale for this acknowledges that because of several factors, there is a lack of diversity in terrestrial ecosystems on the Nez Perce-Clearwater. These objectives set targets for restoration of the various habitat types found on the national forest. Restoration of these forest habitat types will be accomplished using various treatments including fire, timber harvest, and vegetation management. This category includes plan components for several different resource types, including cave and karst features, forestlands, carbon storage and climate change, meadows, grasslands and shrublands, fire management, invasive species, and soils resources. The primary impacts to aquatic ecosystems and fisheries are a result of the treatments used to accomplish these objectives. A more detailed discussion of these potential treatments is found below in individual sections concerning relevant resource areas such as infrastructure and timber harvest, but it is expected that the increase in diversity among habitat types, as well as the movement of terrestrial ecosystems closer to the historic natural range of variability that will result from these objectives will be beneficial in the long run for fisheries and aquatic ecosystems. Any temporary adverse effects of projects are expected to be of short duration and scope and will be outweighed by long term beneficial effects as terrestrial ecosystems become more diverse and natural structure and function is restored across the landscape.

Aquatic Ecosystems

The threats to aquatic ecosystems and fisheries include changes to hydrologic function and nutrient alterations. Mechanical vegetation treatments, off-road vehicles, roads and trails, livestock grazing, and high severity wildfires are some of the actions that affect the hydrologic regimes or nutrient inputs. The action alternatives include desired conditions that would specifically support aquatic ecosystems. The revised plan components have additional protection measures and an increased emphasis on the restoration and maintenance of riparian and aquatic resources.

As a result of these plan components, aquatic habitats are expected to be maintained and continue supporting aquatic species that occur in these habitats. The revised plan is more explicit on aquatic ecosystems protections, connectivity in riparian habitats, and groundwater-dependent systems, in addition to following state guidelines and best management practices in the previous plans.

These plan components are expected to contribute to stable populations for all aquatic species by preserving required habitat characteristics for these species. Habitat quality would be maintained or improved for all at-risk aquatic species.

Specific plan components that more directly benefit fish in wetland, riparian, and meadow habitats include FW-DC-WTR-02, which contributes to habitat connectivity that aids potential fish dispersal for aquatic species. FW-DC-WTR-07 contributes to instream flows sufficient to sustain riparian, aquatic, and wetland habitats. FW-DC-WTR-08 seeks to maintain groundwater dependent ecosystems, including fens, wetlands, seeps, springs, and riparian habitats, which are all habitats that support aquatic species. FW-GDL-ARINF-08 states that wetlands and seasonally wet meadows should be avoided when developing roads and landings and drainage features should maintain wetland functions and characteristics.

For a more in-depth discussion of how aquatic ecosystem plan components affect aquatic ecosystems and fisheries, see the section entitled Comparison of No Action Alternative vs Action Alternatives.

Wildlife

Several of the objectives relating to wildlife direction complement the aquatic ecosystem and fisheries needs by describing a desired condition to manage vegetation to approximate natural succession and disturbance processes and provide a mosaic of habitat conditions through time. These components would generally contribute to the maintenance of diverse habitats for aquatic species. Many National Forest System lands plan components contribute to these overall desired vegetative conditions as well.

Multiple use wildlife objective MA2-OBJ-WLMU-01 could potentially impact aquatic species, as it is designed to include using vegetation treatments and fire to improve elk habitat in Management Area (MA) 2, however much of MA2 is in Idaho Roadless Areas, and as such, impacts from vegetation treatment are expected to be less than if they occurred in more heavily roaded areas that are open to motorized use. Objective MA3-OBJ-WLMU-01 is designed to improve elk habitat use on 19,000 acres in five years. This activity could potentially affect aquatic species if it occurs in riparian areas or close to roads. However, this objective is designed to focus treatments on areas that are more than one-half mile from open motorized roads, which will lessen effects on aquatic ecosystems and fisheries. In addition, there are specific aquatic plan components that are designed to provide additional protection from activities occurring in riparian areas.

FW-GL-GL-01, FW-DC-WL-01, and FW-DC-WL-02 encourages cooperation and collaboration across multiple agencies to work on a variety of planning and management tasks to work toward recovery of federally listed species. While this component is geared mainly to wildlife, the benefits extend to all at-risk listed species. MA-GDL-WL-05 is designed to maintain large areas of unfragmented habitat, and restricts motorized trail use in Idaho Roadless Areas, which would provide benefits to aquatic species. Similarly, under the multiple-uses wildlife plan components, MA2-DC-WLMU-02 is designed to provide areas over 5,000 acres without public motorized access. This will be beneficial to aquatic ecosystems and fisheries by maintaining habitat in these areas.

Air Quality

Air quality can impact aquatic ecosystems and fisheries on the Nez Perce-Clearwater primarily through smoke and ash entering streams, thus altering water chemistry. Plan components FW-GL-AIR-01 and FW-GL-AIR-02 are designed to promote the coordination with partners to reduce air quality impacts prior to planned ignition activities and to cooperate with partners to meet air quality standards.

Tribal Trust

Tribal trust resource plan components are not expected to have negative effects on aquatic ecosystem and fisheries because any activities falling under this resource area are directed by standard FW-STD-TT-01, which is designed to require consideration of impacts, and long-term benefit to treaty rights and treaty-reserved resources. FW-OBJ-TT-01 is designed to restore 1,000 acres of forest in a manner that promotes huckleberry abundance. Huckleberry occurs on upland slopes, so this restoration will not likely affect riparian areas or streams. FW-OBJ-TT-02 is designed to increase wet meadow botanical species that are important to the tribe. Properly functioning wet meadows are important to aquatic ecosystems because they have potential hydraulic capacity to retain water and release it slowly, thus subsidizing stream flow during low flow periods. To increase wet meadow associated species such as camas, the requisite hydrologic capacity will also likely benefit stream flow.

Cultural Resources

This resource area is not expected to have effects on aquatic ecosystems and fisheries.

Municipal Watersheds

Municipal watersheds are protected for water sources (FW-DC-MWTR-01), which would also contribute to maintenance of habitat for aquatic ecosystems and fisheries.

Sustainable Recreation

Motorized and mechanical means of transport impact aquatic ecosystems and fisheries within road prisms and road maintenance activities can affect habitat in these areas. Vehicles that travel on or off-road can disturb and compress soil and generate sediment that can impact aquatic ecosystems and fisheries along designated travel routes and roads open to motorized use. In addition, motorized routes are primary vectors for aquatic invasive species.

Recreation impacts can include trampling, both by hikers and off-road vehicle use. Road building and the development of campgrounds and other facilities used by recreationists also contribute to aquatic and fisheries impacts, as these developments make more areas accessible and concentrated use. Dispersed camping and recreation have similar impacts, which are more difficult to monitor. Parking areas, particularly undesignated areas, pose a similar risk to aquatic species and fisheries especially if they are located near streams.

The recreation objective FW-OBJ-ARREC-01 is designed to mitigate, remove, or relocate two existing dispersed recreation sites from within riparian management zones to outside of riparian management zones every five years. This will help to spread out recreation effects on aquatic ecosystems and fisheries by managing public access at regular intervals. This will spread out effects at different sites on the landscape and should prevent any one site from being over impacted. The decision to apply plan components to achieve this objective will be made at the project level where needed to achieve FW-DC-ARREC-01.

The Aquatic and Riparian Recreation (ARREC) plan components are expected to contribute to the maintenance of aquatic ecosystems and fisheries on the Nez Perce-Clearwater by including protections associated with recreation opportunities. Most aquatic species are protected from recreational related damages by multiple resource areas plan components as well, reducing risk for species that occur in with these habitats. Wilderness Areas and Wild and Scenic Rivers are still protected under national guidance and would continue regardless of alternative. Under the recreation plan components, aquatic species habitat quality would remain similar between the No Action Alternative and action alternatives, with the most protections coming under Alternative W due to increased recommended wilderness.

Scenery

Objectives from the scenery resource are not expected to have effects on aquatic ecosystems and fisheries.

Public Information and Education

Public information and education plan components could benefit aquatic ecosystems and fisheries by connecting people to their environment and to the natural and cultural history of the area. It will do this with a combination of relevant and timely public information, creative interpretation, and stimulating education help the Nez Perce-Clearwater communicate with the public and enable visitors to be involved in the activities, actions, and expectations for activities on Nez Perce-Clearwater lands. These connections will provide opportunities for the development of strong stewardship ethics and appreciation for the natural and cultural history across these landscapes. As a larger proportion of the public that is connected and involved in natural resource management, more people will feel invested and act as instruments of sound public policy. In particular, the guidelines found in FW-GL-ED-1-5 are designed to foster partnerships and stewardship in appreciating and protecting natural resources. This will help to achieve desired condition FW-DC-ED-1-3.

Infrastructure

Infrastructure objectives such as those described in FW-OBJ-INF-01, FW-OBJ-INF-02, FW-OBJ-INF-03, can have potential impacts on aquatic ecosystems and fisheries on the Nez Perce-Clearwater. In general, increased ground disturbance associated with creation, maintenance, and decommissioning of roads corresponds with the potential for increased sediment to enter streams, and roads and trails can be vectors for nonindigenous species.

The primary concern with road and log haul activities in regard to aquatic ecosystems and fisheries is the generation of fine sediment, and the potential for it to enter streams. Although sediment production and transport are natural ecosystem and stream processes that occurs on the national forest, the timing and type of sediment can create problems if it enters streams. Historically and today, streams on the national forest transport vast amounts of sediment during spring snowmelt and other disturbance events. This sediment transport is vital to proper stream ecosystem function, and is important in several key ways including aquatic nutrient transport and the creation of rearing habitat for Endangered Species Act (ESA) listed salmonids. However, the wrong kind of sediment at the wrong time of year can cause deleterious impacts to spawning habitat. Snowmelt and large precipitation events that occur in spring can cause large amounts of overland and underground flow to streams. As stream levels rise, the hydraulic capacity of the stream to move sediment increases greatly, thus transporting sediment downstream, carrying some out of the plan area, and depositing some in natural beach areas along larger rivers in the plan area. These natural sand beaches are important rearing areas for some out-migrating juvenile salmonids. However, large input of fine sediment throughout the year, and especially during lower flow seasons, can cause sediment to collect and fill interstitial spaces in spawning gravels, reducing and degrading habitat for fish and aquatic species. Over time, this collection of sediment can lead to armoring, thus making it difficult for future high-water events to remove accumulated sediment. Thus, road construction and associated timber transportation can affect aquatic systems if they create fine sediment that enters streams during the wrong time of year, when water flow is not sufficient to relocate the sediment to natural locations (beaches estuary, etc.). Some aquatic species that rely on fine substrates for part of their life history, such as juvenile lamprey, or Western pearlshell mussel could benefit from some fine sediment accumulation.

Although there is potential for negative effects from infrastructure plan components, there is also potential for mitigation of negative effects, as well as positive outcomes. For example, the desired condition FW-DC-INF-02 is designed to direct that roads not needed are absent from the landscape, which implies that the road network will not be maintained above the minimum needed for administrative and public use. Maintaining a minimum road network should benefit aquatic species by limiting road effects on their habitats. In addition, FW-OBJ-INF-01 is designed to provide direction that priorities will include reducing effects on desired aquatic and riparian conditions from chronic sediment delivery of potential future road prism failures, which will provide protection from these potential threats. In addition, there is an entire suite of Aquatics and Riparian Infrastructure

(ARINF) plan components (7 standards and 11 guidelines) that are specifically designed to create progress toward desired condition FW-DC-ARINF-01 that is designed to describe a transportation system that has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity, lower sediment delivery, reduced floodplain impacts, and improved aquatic organism passage in areas where infrastructure affects these features.

Land Ownership

The national forest is expected to continue to own federal land and survey, mark, and maintain boundaries of that land. It also authorizes use of National Forest System lands by private individuals and corporations for a variety of uses, such as roads, utility corridors, communication sites, and other private or commercial uses that cannot be accommodated on private lands. These desired conditions are described in FW-DC-LND-(01-05). These plan components are not expected to have effects because there is an entire suite of Aquatic and Riparian Land and Special Use plan components (FW-DC-LND (4 standards and 1 guideline) explicitly designed to protect aquatic ecosystems and fisheries from land use actions. In addition, any government agency would be required to undertake Section 7 consultation for any actions that might affect listed species.

Ecosystem Services

Ecosystem services desired condition FW-DC-ES-01 describes the provision of benefits including clean water, clean air, wood products, forage, hunting, fishing, trapping, fish, cultural values, subsistence food gathering, spiritual and inspirational value, scenery, recreation, and flood control, soil stabilization. It is expected that plan components for this resource areas could have potential effects on aquatic ecosystems and fisheries, primarily through guideline FW-GDL-ES-01, which is designed to continue to provide motorized access to the public, and specifies that if a route is identified as adversely affecting aquatic values, re-routing and route improvement should be considered prior to closure, and that if a route does need to be closed, and alternate should be provided. This could affect aquatic resources if in practice it restricts the ability to close problematic roads. Alternately, it could benefit aquatic resources if problem roads are improved, re-routed, or closed. If old roads were decommissioned, or if new roads were built to maintain access, they would be subject to Aquatics and Riparian Infrastructure (ARINF) plan components, best management practices (BMPs), and would be required to undergo Endangered Species Act (ESA) consultation for effects to listed species at the project level.

Timber Production and Vegetation Management

Timber Production

Timber harvest is most likely to occur on lands identified as suitable for timber production. Harvest increases some threats to aquatic ecosystems and fisheries but also can create a mosaic pattern on the landscape and promote early successional stands with some treatments, such as regeneration harvest. Typically, aquatic ecosystems and fisheries would receive site-specific protection as a result of federal ESA consultation (Forest Service Manual 2670) and negative effects would be minimized for ESA listed species. However, ESA listing consultation requirements would cover virtually all of the streams where timber harvest is likely to occur. This would continue to occur with the proposed plan components following project-level evaluation procedures and continued required ESA consultation.

All alternatives have varying amounts of land suitable for timber production, but the impact of timber plan components on aquatic ecosystems and fisheries is consistent between action alternatives. The moist forest habitat guild would be most impacted by timber management, but all habitat guilds can be affected by timber production even if habitats guilds, such as aquatic, subalpine, meadow, rocky or grassland, are not directly harvested for timber. Mechanical activities include vegetation management treatments, whether for restoration or to meet timber production objectives. Activities, such as logging, can have impacts on aquatic ecosystems and fisheries through canopy removal, soil disturbance and erosion, and stream sedimentation. In addition, mechanical activities for vegetation treatment may require road building. Roads can increase access to aquatic ecosystems and fisheries and can fragment habitat, thus, providing an avenue for invasive plant species. Reconstruction and maintenance of designated roads can directly or indirectly affect stream habitat by introducing competitive weeds and altering availability of light, nutrients, and moisture.

Timber output targets in the action alternatives range from 8 to 100 million board feet (MMBF) in Alternative Z to 241 to 261 MMBF in Alternative X. The Preferred Alternative sets targets of 190 to 210 MMBF. This represents approximately four times the amount of harvest, and there have been concerns about a commensurate increase in forest roads. As discussed previously, the national forest permanent road system that currently exists on the Nez Perce-Clearwater National Forest was built with an intended capacity of approximately 400 MMBF, and although the increased targets in the Preferred Alternative represent an increase from the No Action Alternative, there is still only about half of the timber volume that the permanent road system is designed for. A significant increase in permanent roads is not likely to occur under the life of the plan. There will, however, likely be an increase in temporary roads. There are several ways that the national forest can limit impacts from temporary roads. First, every road constructed on the national forest, even temporary roads, is engineered. Engineering can incorporate design features and best management practices (BMPs) that have been shown to reduce sediment delivery to streams by 80 percent. In addition, with the increase in timber sale volume, there will also be an increase in timber receipts available for restoration and mitigation. There are also strong ecosystem plan components that protect and preclude activities that retard attainment of desired conditions. These will be accomplished by applying measures such as no new streamside roads, hydrologic disconnecting of roads, and culvert replacement for roads that already exist, a soils guideline that allows use of timber receipts to repair legacy damage in addition to mitigating for current disturbance. There is also direction designed to facilitate working together with partners such as Idaho Department of Fish and Game and the Nez Perce Tribe to achieve restoration. More discussion of potential road and sediment effects are found in the Effects to Resource from Other Resources section under the Infrastructure section.

As a result of plan components and policies, aquatic species and their respective habitats would be considered during vegetation management, and habitats are expected to be maintained and continue supporting aquatic species despite the potential for impacts in areas used for timber production. The revised plan is more explicit regarding resource protections, though similar guidance and policies are applied under the old plans. Habitat quality would remain similar between the No Action Alternative and action alternatives for aquatic species under the timber plan components. Threats would be reduced for aquatic species by the action alternatives plan components because they were designed to clarify previous protections afforded by PACFISH and INFISH Biological Opinion (PIBO) by including additional language.

Several plan components express a desired condition to restore a mosaic of forest vegetation that is closer to the natural range of variation (NRV) for species composition and opening size. As timber management is only permitted in Management Area (MA) 2 and MA3 lands, those are the categories that have plan components relating to timber harvest. Restoring a more natural structure to the national forest in these areas will help to restore function as well, including hydrologic processes such as FW-DC-FOR-03, FW-DC-FOR-06, MA1-DC-FOR-09, MA2-DC-FOR-10, MA3-DC-FOR-10, MA3-DC-FOR-07, and MA3-DC-FOR-12. Specific objectives directing the restoration of forest types that support successional stages that could benefit aquatic species include MA2-OBJ-FOR-01 and MA2-OBJ-FOR-03. Riparian forests, which are important to filtering sediment from overland flow and providing shading, and pool habitat by contributing large woody debris, would be supported by MA2-DC-FOR-10 and MA3-DC -FOR-10, which seeks to maintain old growth (much of which occurs in riparian areas). There are numerous plan components under this resource that will contribute to an array of forest cover types and structure to support general aquatic diversity and stream ecosystem function.

Vegetation Management

Aquatic ecosystems and fisheries are potentially affected by the action alternative's vegetation desired conditions. Broadly, the desired conditions for terrestrial vegetation on the Nez Perce-Clearwater are characterized by improvements in species composition, desirable densities, and general forest health and condition; vigorous non-forested plant communities; and maintaining native biodiversity on the landscape. The desired conditions are consistent with the Forest Service's understanding of the natural range of variation (NRV) and are most likely to be resilient in the future given expected drivers, such as climate change, drought, vegetation succession, wildfire, insects and disease, and the demands of people. Desired conditions for vegetation support native species and habitats within their NRV, including at-risk species.

Ground disturbing activities and changes in site conditions that could impact aquatic species are likely to result from the terrestrial vegetation plan components. The restoration of historical fire regimes and restoration of conditions towards historical range of variation with a range of seral stages for different potential vegetation groups may benefit some aquatic in the long term by restoring structure and ecological function to the national forest.

All of the action alternatives set targets for forest restoration treatments of 53,000 to 64,500 acres per year. This is an increase from the No Action Alternative, which sets a target of 40,000 acres per year.

These revised vegetation plan components are expected to maintain and continue supporting aquatic ecosystems and fisheries on the Nez Perce-Clearwater. Generally, habitat quality would be maintained or improved for aquatic species under the plan components in the action alternatives. Threats would remain similar for aquatic species in regard to vegetation plan components. While some occurrences could be impacted, generally activities would maintain a more diverse and natural range of vegetative habitats which would benefit aquatic species.

Plan components that maintain older forests are beneficial to the persistence of aquatic species in riparian areas. Contributing components include MA3-STD-FOR-01, MA3-GDL-FOR-02, MA3-GDL-FOR-03, MA3-GDL-FOR-04, and MA3-DC-FOR-10. Desired conditions that support aquatic, meadow habitats that support aquatic species include FW-DC-GS-01-08.

Fire

Under all alternatives, fire would be used as a tool to accomplish management goals and objectives. The objectives for fuel reduction are usually complementary to the other desired vegetation conditions, including those beneficial to aquatic ecosystems and fisheries especially as related to forest resiliency. There are several factors that are important to consider with regard to aquatic ecosystems and fisheries. One factor that is important to aquatic ecosystems is the risk of high severity wildfire resulting from high fuel loads. The current condition is an overall high risk of high severity burns across much of the Nez Perce-Clearwater due to high fuels load, which has resulted from past fire suppression and the outbreak of bark beetle infestations. Without some prescribed fire introduced to mitigate the threat of high severity fire, aquatic species populations are susceptible to being eliminated or reduced in areas on the national forest through the direct threat of fire, or high sediment loads following high severity fires. Many species tolerate, and in fact require, frequent low severity fire to maintain populations on the landscape. Stand replacing fires have the potential to directly kill aquatic species, or to indirectly kill or impact them through habitat impacts, such as the reduction or elimination spawning areas. This can make re-establishment difficult or even impossible for many years (Leonard et al. 2017 (Leonard et al. 2017)).

Another factor to consider is that some riparian or aquatic species benefit from regular small intensity fire to maintain a mosaic patten of openings that allow some light into the stream and can increase productivity. In addition, low intensity fire can help to create large woody debris in streams. Flitcroft et al. (2016) found that fire increased habitat quality for spring Chinook. Anadromous fish, because they are well adapted to natural disturbance regimes, highly migratory, and utilize different habitats over large scales, often benefit from habitat enhancing or maintenance effects of low intensity fire (Reeves et al 1995). The reduction of fire on the landscape has generally reduced the amount of available habitat for such species. In general, most aquatic species would benefit from the restoration to more historical fire regimes. There are also potential impacts to aquatic ecosystems and fisheries associated with wildfire suppression activities, such as fire line construction and other mechanical activities, reforestation following fire, and the increased potential for the spread of noxious weeds.

Aquatic habitats can have various reactions to fire. As a result of these plan components, all aquatic habitats are generally expected to be maintained and continue supporting aquatic species, including the species that are currently on the sensitive species list but that would not be specifically protected as a species of conservation concern once the new plan is implemented. Analysis prior to project implementation allows for appropriate mitigation to be developed when necessary to account for aquatic species.

Plan components MA2-OBJ-FOR-08 and MA3-OBJ-FOR-08 seek to restore cold forests through fire. This would benefit habitat conditions favoring cold water species such as bull trout, especially resident populations in headwater streams. Desired conditions that seek to support ecosystem function and meet desired conditions of other resources through a range of burn conditions, fire intensities, and fuel conditions of more historic fire regimes include FW-DC-FIRE-04, FW-DC-FIRE-05, and FW-DC-FIRE-06. Also, the goal of building understanding of fire's role in sustaining fire adapted ecosystems, as stated in FW-GL-FIRE-04, is important to anadromous fish habitat where fire is a component. Fire guidelines FW-GDL-FIRE-02 and FW-GDL-FIRE-03 are designed to decrease the expansion of invasive weeds and are important for all aquatic species.

Energy and Minerals

Locatable mineral entry is a non-discretionary Forest Service action; National Forest System lands are open to locatable mineral entry unless withdrawn from mineral entry.

Development of energy and mineral resources has the potential to adversely impact aquatic ecosystems and fisheries through all phases of development. Impacts could include mortality to individual aquatic species, or entire populations, as well as habitat loss and fragmentation if mineral resources are occurring in or near streams. Under plan components, aquatic habitat quality would remain similar between the No Action Alternative and action alternatives. Threats would be reduced for aquatic species by the action alternatives plan components including FW-GDL-AREM-01, which calls for avoidance of wetlands and riparian areas in mineral operations and requires the use of native revegetation efforts as part of operations.

A second set of plan components related to energy and minerals regarding aquatic ecosystems and fisheries is found in the Aquatic Ecosystems section. Specifically, FW-STD-AREM-01 requires mineral operations to have a bonded reclamation plan that avoids adverse effects to fish. In addition, FW-STD-AREM-03 requires mineral activities on National Forest System lands to avoid or minimize adverse effects to aquatic threatened or endangered species and populations or their designated critical habitat.

Livestock Grazing

Aquatic ecosystems and fisheries have the potential to be impacted by livestock, which when grazed improperly can cause hydrologic changes, trampling of fish redds, habitat degradation through bank trampling, and soil impacts. Aquatic ecosystems and fisheries are most likely impacted by livestock grazing in riparian habitats. Aquatic species would be protected by Forest Service manual guidelines and plan components during project level planning to prevent or mitigate negative impacts.

As a result of these plan components, the affected habitats are expected to be maintained and to continue supporting aquatic species in livestock allotments. There would be opportunities in the future to restore habitats that have become degraded over time. The language in the revised plan is more explicit than the other plans, but management direction to preserve habitat quality is generally similar. Habitat quality would improve with the action alternatives for aquatic species in aquatic ecosystems due to grazing components to improve or maintain quality habitat.

FW-GDL-GRZ-01 seeks to reduce impacts resulting from livestock use to benefit riparian areas, meadows, and other habitats that are important to Endangered Species Act listed fishes and species of conservation concern. FW-GDL-GRZ-03 directs that utilization occurs at levels that will maintain vegetative vigor and community health and planning considers the condition, timing, and use of the resource along with other values of the area. This is important to maintain overall health of riparian habitats and to prevent overall habitat degradation which harms aquatic species.

The guidelines FW-GDL-GRZ-01, FW-GDL-GRZ-02, and FW-GDL-GRZ-03 direct the mitigation or relocation of facilities to avoid impacts to riparian management zones. Such activity would benefit the aquatic species that depend on riparian areas.

Special Forest and Botanical Products

The special forest and botanical products resource is not expected to impact aquatic ecosystems and fisheries because these types of activities (for example, huckleberry picking and firewood gathering) are not expected to occur at a scale that could impact aquatic ecosystems and fisheries. If effects did occur, plan components FW-DC-SFP-01 and FW-DC-SFP-02 are designed to describe a desired condition that includes harvest that is sustainable and protects resources.

Land Allocation and Designated Areas

The alternatives vary in quantity and location of management areas. Designated wilderness areas, wild and scenic rivers, historic sites, and research natural areas do not vary in location or area. The alternatives vary in the number of inventoried roadless areas that are retained or recommended for wilderness. Management Area 3 changes slightly across the alternatives but is largely consistent.

Alternative W offers the most area protected in areas that would see the fewest management activities. These more undeveloped and protected areas would generally protect aquatic ecosystems and fisheries from ground disturbing threats and development, and these areas would be managed allowing natural fire regimes to contribute to a mosaic of different seral stages and diversity of habitats as much as possible. An increase in these protected areas decreases threats to aquatic ecosystems and fisheries overall from ground disturbing activities, such as vegetation projects, some motorized and mechanized access, and weed spread vectors, while promoting a naturally managed system that has the potential to improve the mosaic pattern on the landscape. However, cold water species like bull trout could see less protection in protected areas if there are large and extensive wildfires that reduce stream canopy and create risk of debris torrents in wilderness. Management Area 3 allocated ground is subjected to more vegetation management, but the needs of aquatic ecosystems and fisheries can be incorporated in planning efforts to protect them when necessary. See the Differences in Plan Direction and Land Allocation section for more details on the management differences between these land allocations.

All action alternatives would have the ability to achieve desired vegetation conditions within inventoried roadless areas using vegetation treatments. All have Land Management Plan direction that allows restoration activities to occur as long as the laws and policies governing such activities are met. Anticipated vegetation treatment activities would often be associated with the national forest restoration and salvage from existing roads, prescribed fire, and restoration of higher elevation whitebark pine forest communities. There may be other treatments occurring to achieve restoration objectives outlined in the plan components.

Several wilderness components direct management that maintains wilderness characteristics which exclude many activities that are potentially harmful to aquatic species and fisheries. Similarly designated wild and scenic river components protect the river corridors and the habitats contained from activities that may interfere with the protection and enhancement of the values for which the river was designated. In the case of suitable wild and scenic rivers, vegetation management is only allowed to protect users, maintain habitats for at-risk species, or maintain or enhance values (MA2-GDL-SWSR-09). Roadless areas provide undisturbed habitat for several aquatic species, including Endangered Species Act listed salmonids (MA2-DC-IRA-05) and enable dispersal and genetic exchange through habitat connectivity (MA2-DC-IRA-02). Disturbance from forest products for personal and commercial uses is not authorized in research natural areas (MA1-OBJ-RNA-01).

Research Natural Areas

There are 23 research natural areas (RNA) included in the revised plan. These are areas that are permanently established to maintain natural ecosystems and areas of special ecological significance. The majority of these occur in rivers, streams, lakes, or creeks. Plan components MA2-STD-RNA-01 and MA2-STD-RNA-02 are designed to prevent authorization of collection of forest products for personal or commercial uses and prevent uses that interfere with RNA objectives or purposes. These components will likely provide benefit to aquatic ecosystems and fisheries by preserving some of the unique ecological features found on the Nez Perce-Clearwater.

Geographic Areas

Plan components that concern Geographic Areas, including GA-OBJ-GH-(01-04) and GA-GDL-GH-(01,02), are designed to provide treatment targets for various locations within the geographic areas. The desired conditions that these treatments are intended to move toward are described in GA-DC-GH-01, which states that the areas provide multiple ecosystem services consistent with legislation. In doing so, these areas will be afforded protections afforded by guidelines GA-GDL-GH-01 and GA-GDL-GH-02, which are designed to implement timber harvest in a manner that initiates, supports, or contributes to a trend toward aquatic desired conditions at the HUC12 scale. This will likely benefit aquatic ecosystems and fisheries.

Area in the Lower Salmon River Geographical Area, GA-OBJ-SR-01 is designed to restore 100 acres of mountain quail habitat every five years. Desired condition GA-DC-SR-02 is designed to describe a Ponderosa pine forest where understory characteristics do not facilitate stand replacing fires and are resilient to climate change. These desired conditions will likely benefit aquatic ecosystems and fisheries by preventing severe fires that could impact aquatic species and habitat.

The other two geographic areas, Pilot Knob and the Lolo Trail, are primarily concerned with places that are culturally significant to the Nez Perce Tribe, and as such, plan components associated with these areas are unlikely to affect aquatic ecosystems and fisheries.

Special Areas

Plan components from the special areas resource are not expected to have effects on aquatic ecosystems and fisheries.

Comparison of No Action Alternative (PACFISH/INFISH) vs Action Alternatives (ARCS PLAN COMPONENTS)

Recommended Wilderness

No Action Alternative

The 1987 Forest Plans propose approximately 198,200 acres of recommended wilderness, across both the Nez Perce and Clearwater National Forests. In addition to lands already included in designated wilderness, continuing to manage these acres as recommended wilderness would continue to allow mostly natural processes to dominate riparian function and processes. Exceptions would include suppression of wildfires and some uses that would be non-conforming in an authorized designated area. Such uses that could affect riparian areas include building replacement where buildings are in riparian management zones and possibly continued motorized use on “cherry stem” routes associated with Fish Lake off the North Fork Clearwater and East Meadow Creek.

The No Action Alternative offers the second least amount of recommended wilderness behind Alternative W, which offers none. Natural disturbances such as fire, floods, blowdown, and avalanches would continue to be the main change agents to riparian zones in recommended wilderness areas, to the extent that fires are not suppressed.

Areas of minimal human development such as existing wilderness areas are often sources of high-quality runoff (Brown and Binkley 1994) and the importance of such water will increase as development proceeds. In general, the same can be said of recommended wilderness areas or other areas that are largely roadless and have minimal development. These areas typically provide the highest quality water. Surveys by Haas et al. (1986) and Cordell et al. (2008) indicate that, of the many reasons that citizens value wilderness, protection of water quality consistently receives the highest ranking.

The general high quality of water in wilderness and large, roadless, and undeveloped areas can be attributed to the lack of ground-disturbing activities, human development, and pollution sources such as roads and timber harvest. However, no studies explicitly compare water quality data from within and outside of designated wilderness lands or similarly managed areas. There is habitat data from PACFISH and INFISH Biological Opinion (PIBO) for managed versus reference streams and much of the data for reference streams are from wilderness areas.

Effects common to all action alternatives

For Alternative W, areas proposed include Bighorn-Weitas, Hoodoo, North Lochsa Slope, Mallard-Larkins, East Meadow Creek, Moose Mountain, Rapid River, North Fork Spruce-White Sands, Sneakfoot Meadows, and Meadow Creek-Upper North Fork. All these areas contain streams with high value to fish, including many reaches included in the 2040 modeled Climate Shield for bull trout occupancy and even more for westslope cutthroat trout. As for the No Action Alternative, managing these areas as recommended wilderness for the life of the plan would continue to allow natural processes to drive riparian process and function. Exceptions would include suppression of fires and some uses that would be non-conforming in an authorized designated area. Such uses exclude building replacement under this alternative, as well as recreational aircraft use. Continued motorized use of cherry stem routes to Fish Lake and into East Meadow Creek would be allowed, potentially offering some level of effects to riparian areas. Natural disturbances such as fire, floods, blowdown, and avalanches would continue to be the main change agents to riparian zones in recommended wilderness areas to the extent that fires are not suppressed.

For Alternative X, zero acres of recommended wilderness are included. While it is not clear what, if any, management actions or land access and development activities would occur, it is assumed some level of management actions would occur beyond those that would if they were included as Recommended Wilderness. It would also be expected that suppression of fires would be emphasized to a greater degree, as would motorized recreation opportunities. Given these assumptions, some level of departure of riparian conditions could occur, although since the Aquatic Ecosystems plan components would apply to this alternative and the other action alternatives, effects would be expected to be similar. For example, desired conditions such as FW-DC-WTR-04 and FW-DC-CWN-02 emphasize riparian and stream conditions within natural ranges. Standards such as FW-STD-WTR-04 and FW-STD-CWN-01 contain specific direction to achieve these desired conditions through restoration actions where desired conditions are not met and maintained where they are.

For Alternatives Y and Z, more acres of recommended wilderness are proposed than in the No Action Alternative, but less than Alternative W. Alternative Y includes Mallard-Larkins, Hoodoo with boundary changes, East Meadow Creek, and Rapid River, and has fewer uses that would be non-conforming in an authorized designated area than Alternative Z. Alternative Z includes West Meadow Creek, Hoodoo, Mallard-Larkins, East Meadow Creek, Rapid River, Meadow Creek-Upper North Fork, North Fork Spruce-White Sands, Sneakfoot Meadows, Rawhide, and Pot Mountain and has more of these uses than Alternative Y.

For the Preferred Alternative, recommended wilderness areas are proposed in 108,276 acres within Hoodoo, 77,139 acres within Mallard-Larkins, and 72,795 acres within both East Meadow Creek and West Meadow Creek. The total recommended wilderness in the Preferred Alternative is 258,210 acres. Administrative and commercial uses would be allowed under the Preferred Alternative.

The relatively high forestwide proportion of riparian areas that are within designated wilderness, Idaho roadless, and recommended wilderness, which are expected to have low to no harvest or other land management activities, would provide a high degree of protection to riparian conditions and associated ecological values, including wildlife and aquatic habitat, under all the action alternatives. Existing and recommended wilderness would generally provide the highest degree of protection because human actions are the most restricted in these areas.

Wild and Scenic River Suitability

Effects common to all (including no action) alternatives

Identifying segments of rivers and streams that are suitable for Wild and Scenic River designation would have no direct effect on aquatic habitat because no actions are associated with suitability; however, differences in suitability between alternatives as discussed in section 1.1.63.5.2.3 would provide a framework for future project level decisions and would affect aquatic habitat if suitability decisions lead to designation. Actual designation of the river or stream as a Wild and Scenic River would be the federal action upon which effects to aquatic habitat would need to be described. This decision would not be included under any of the alternatives, although management of eligible rivers as if they were designated would be considered in project planning. Such consideration would not affect aquatic riparian areas because current direction under the No Action Alternative incorporates PACFISH and INFISH and proposed direction included for the action alternatives includes the Aquatic Ecosystems plan components, which are designed to provide direction equal to or more rigorous than direction in the Wild and Scenic Rivers Act. In addition, there are suitability components for recommended Wild and Scenic Rivers that provide constraints and direction for these areas.

Livestock Grazing

Riparian area grazing management can succeed if it enables control of and variation in duration and timing, periods of grazing and recovery, livestock distribution, and intensity of use (Swanson et al. 2015). Several factors influence the impact on resources and recovery of them, including species of plants present, growing conditions, geomorphic setting, stage of stream channel, time within the cycle of droughts and floods, and time since major disturbance. These factors should be considered when considering duration, period, distribution, and intensity of grazing activities.

On the Nez Perce-Clearwater, there are currently 36 active allotments and nine vacant allotments. Of the 36 active allotments, 612,766 acres are included; there are nine vacant grazing allotments totaling 217,172 acres. On the Nez Perce-Clearwater there are 4,590 head of cattle permitted and 2,304 head of sheep permitted, pending a separate National Environmental Policy Act review. The primary grazing season is June 1 through September 30. The cattle grazing program averages approximately 31,608 head months. Currently, sheep grazing has been discontinued due to the risk of disease transmission to wild bighorn sheep.

No Action Alternative

The No Action Alternative would continue management of the grazing program under direction in the 1987 Forest Plans, as amended by PACFISH and INFISH. Current direction in PACFISH specific to grazing includes four standards and guidelines, three of which are relevant to the Nez Perce-Clearwater. They require modification of grazing practices that retard or prevent attainment of Riparian Management Objectives (RMOs) or are likely to adversely affect listed anadromous fish. They also require that new livestock handling facilities be located outside of riparian habitat conservation areas and that livestock trailing, bedding, watering, salting, loading, and other handling efforts be limited to areas and times where they will not retard or prevent attainment of RMOs.

In addition, project-level consultations have required that livestock are managed to avoid trampling of salmon, steelhead, and bull trout redds, which is generally accomplished through timing restrictions in areas where spawning is known to occur or exclosure fences.

In sensitive areas, such as meadows, fences have been installed to exclude cattle from grazing and trampling banks within riparian zones. The fences, combined with riparian re-vegetation and restoration, have resulted in improved conditions within these meadows. Several meadow systems have improved from excluding cattle through fencing. These meadows include, but are not limited to, McComas Meadow (Meadow Creek – South Fork Clearwater River), upper Mill Creek, American Creek/Buck Meadow, Merton Meadow, North Fork Slate Creek Meadow, and Musselshell Meadow, Deer Gulch Meadow, Goodwin Meadow, lower Swartz Meadow, and McGary Meadow.

When assessed at a broad scale, these measures appear to have resulted in either static stream conditions or improving trends based on PACFISH and INFISH Biological Opinion (PIBO) trend data and range implementation and effectiveness monitoring data, which are collected annually. Specifically, streambank stability is one of the PIBO metrics that show a statistically significant improvement when assessed at the national forest scale. Whether this is due to management of the grazing program since 1995 or not cannot be definitively concluded, but it can be concluded that management of the Nez Perce-Clearwater grazing program under PACFISH and INFISH has not made conditions worse. Streambank angle did not result in a statistically significant change in either direction. In the Lower Salmon and South Fork Clearwater subbasins, which combined support well over 50 percent of the Nez Perce-Clearwater allotments and animal unit months, a statistically significant improvement of the overall index has occurred (U.S. Department of Agriculture 2019a). Again, it is not possible to attribute that improvement to changes in grazing management, but it is evident that the program has not resulted in additional degradation at the national forest or subbasin scale.

When assessed at a broad scale, protective measures appear to have resulted in either static or improving trends in aquatic habitat, based on PIBO trend data and range implementation and effectiveness monitoring data, which are collected annually. These improvements would be expected to reduce indirect and cumulative effects to aquatic species.Finescale adverse effects to riparian management zones (RMZs) from livestock grazing are known to exist, although their extent, severity, and locations are highly variable from year to year. The effects have resulted in local changes to stream morphology, such as an increase in width to depth ratio. Monitoring of allotments over the last decade has shown some streambank alteration and reduction in stubble height, as well as specific areas of streambank instability. Any aquatic species present in these areas could be indirectly or cumulatively affected by effects to riparian and aquatic habitat and could be directly affected by the presence of cows. Given the variability of these effects from year to year, it is difficult to provide any conclusions on the extent and significance of any effects to aquatic species.

Effects common to all action alternatives

The action alternatives do not vary, either in terms of level of grazing activity in each alternative or the aquatic components that address their potential effects. The Aquatic Ecosystems plan components include three standards and three guidelines that address potential effects from grazing. Table 141 displays a crosswalk of standards and guidelines between PACFISH and INFISH and the Land Management Plan. The Land Management Plan components are similarly or more protective for aquatic and riparian resources. Specifically, FW-STD-ARGR-01 and FW-STD-ARGR-02 are very similar to analogous standards in PACFISH, FW-STD-ARGR-03 is new as it addresses potential redd trampling. All three guidelines, FW-GDL-ARGR-01, FW-GDL-ARGR-02, and FW-GDL-ARGR-03, contain additional direction for meeting Aquatic Ecosystems plan component desired conditions, focusing on maintaining water quality.

Table 141. PACFISH/INFISH grazing standards and guidelines crosswalk with Land Management Plan standards and guidelines.

PACFISH/INFISH	Land Management Plan
GM-1. Modify grazing practices (for example, accessibility of riparian areas to livestock, length of grazing season, stocking levels, timing of grazing, etc.) that retard or prevent attainment of Riparian Management Objectives or are likely to adversely affect listed anadromous fish or inland native fish. Suspend grazing if adjusting practices is not effective in meeting	FW-STD-ARGRZ-01. Livestock grazing shall be authorized or reauthorized only when measures are included in the authorization to avoid or mitigate adverse effects to fish and riparian habitat that may result from grazing practices. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, grazing practices shall be

PACFISH/INFISH	Land Management Plan
Riparian Management Objectives and avoiding adverse effects on listed anadromous fish. GM-2. Locate new livestock handling and/or management facilities outside of Riparian Habitat Conservation Areas. For existing livestock handling facilities inside the Riparian Habitat Conservation Areas, assure that facilities do not prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish. Relocate or close facilities where these objectives cannot be met. GM-3. Limit livestock trailing, bedding, watering, salting, loading, and other handling efforts to those areas and times that would not retard or prevent attainment of Riparian Management Objectives or adversely affect listed anadromous or inland native fish. GM-4. Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect listed anadromous or inland native fish.	modified by practices such as adjusting accessibility of riparian areas to livestock, length of grazing season, stocking levels, or timing of grazing. FW-STD-ARGRZ-02. Where livestock trailing, bedding, watering, salting, loading, off road vehicle use for managing or gathering livestock, and other related activities in riparian management zones are adversely affecting aquatic resources, annual operating instructions shall include measures to mitigate or relocate to other areas or times. FW-STD-ARGRZ-03. During livestock grazing authorizations, reauthorizations, or updates to annual operating instructions, include measures to prevent trampling of fish redds of federally listed fish species and species of conservation concern. FW-GDL-ARGRZ-01. New grazing authorizations and reauthorizations that contain low gradient channels of a less than 2.5 percent valley slope should require end of season stubble height be at least 10 to 15 centimeters along the greenline, by pasture or grazing unit depending on the Rosgen channel type or stream gradient, to help achieve conditions at site scales that enable attainment and maintenance of desired conditions in these locations. Application of the stubble height numeric value should only be applied when it reflects existing and natural conditions for the specific geo-climactic, hydrologic, and vegetative conditions where it is being applied. Indicator values should be adapted over time based on long-term monitoring and evaluation of conditions and trends. Alternative use and disturbance indicators and values, including those in current Endangered Species Act consultation documents, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline. Long-term monitoring and evaluation should be used to adapt this numeric range and/or the use of other indicators. FW-GDL-ARGRZ-02. To maintain water quality and minimize the sediment that is generated and delivered to watercourses from active livestock trailing, new grazing authorizations and reauthorizations should include measures for livestock trail stream crossings and approaches to be hardened or relocated, where needed, to achieve aquatic desired conditions. FW-GDL-ARGRZ-03. To maintain quality and quantity of water flows to, within, or between groundwater dependent ecosystems, water to new or reconstructed spring developments should be protected from livestock trampling.

When assessed at a broad scale, PACFISH and INFISH Biological Opinion (PIBO) monitoring has shown that the proper implementation of livestock grazing standards leads to less impacts to stream conditions. Effects of the action alternatives are expected to be mostly the same, except that the Preferred Alternative and Alternatives W and X might result in more transient forage since more timber harvest could be harvested and result in additional forage in areas that are currently forested.

This forage would tend to be located away from streams due to limited or no harvest within riparian management zones.

The outcome of grazing as proposed in these alternatives is expected to be the same or similar as the No Action Alternative with improved clarification to address any site-specific adverse effects to riparian condition or where grazing is preventing attainment of aquatic desired conditions. At a broad scale, riparian management zone (RMZ) conditions are expected to be maintained with any current improving trends continuing and, where degraded conditions are documented at specific sites, changes in grazing management as outlined in the Aquatic Ecosystems plan components is expected to result in improved conditions.

The outcome of grazing as proposed in these alternatives is expected to be the same or result in fewer effects to aquatic species as the No Action Alternative, with clarified and more detailed direction to address any site-specific adverse effects to riparian condition, or where grazing is preventing attainment of aquatic desired conditions. The addition of FW-STD-ARGRZ-03 addresses potential trampling of federally listed fish species and species of conservation concern fish redds, as well as FW-GDL-ARGR-03 that addresses source water protection for springs and may collectively result in fewer effects to aquatic species.

At a broad scale, RMZs conditions are expected to be maintained, with any current improving trends continuing, and where degraded conditions are documented at specific sites, changes in grazing management as outlined in the Nez Perce-Clearwater Aquatic Ecosystems plan components is expected to result in improved conditions. Improved riparian and habitat conditions would be expected to conserve and restore aquatic species. Desired conditions FW-DC-WTR-04 and FW-DC-CWN-02 emphasize riparian and stream conditions within natural ranges. Standards, such as FW-STD-WTR-04 and FW-STD-CWN-01, contain specific direction to achieve these desired conditions through restoration actions where desired conditions are not met and maintained where they are.

Timber Harvest and Vegetation Management

Several standards and guidelines in the plan guide and restrict the implementation of timber harvest and other vegetation management activities within RMZs. Refer also to Effects of Forestwide Direction on Riparian Areas above.

No Action Alternative

Effects specific to Riparian Areas and Riparian Management Zones

Table 121 summarizes the acres of past timber harvest within riparian habitat conservation areas by subbasin, nearly all of which occurred prior to 1995 when PACFISH and INFISH amended the 1987 Forest Plans. After 1995, only a very limited amount of timber harvest occurred in riparian habitat conservation areas. This harvest was generally limited to hazard tree removal at recreation sites, removal of trees in the right-of-way of constructed temporary roads where they crossed riparian habitat conservation areas, and sale of trees decked from fireline construction during fire suppression efforts, some of which were from riparian habitat conservation areas.

PACFISH and INFISH would continue to be implemented under the No Action Alternative. While standards and guidelines were written to allow harvest, salvage harvest, and other silvicultural treatments in riparian habitat conservation areas, there is ambiguity about the conditions under which these are appropriate actions. The 1995 and 1998 Biological Opinions for these amendments also apply. In Key or Priority watersheds, completion of a Watershed Analysis is required by these Opinions prior to harvest in riparian habitat conservation areas. Given ambiguity in the PACFISH standards and guidelines and perceptions that watershed analyses are difficult and time-consuming to produce, it is likely avoidance of timber harvest in riparian habitat conservation areas would continue.

Other silvicultural treatments, such as precommercial thinning, planting, prescribed fire, and other non-mechanical treatments, have occurred in specific areas in riparian habitat conservation areas since 1995. Project-level consultations have generally driven avoidance of fire ignition in riparian habitat conservation areas, while allowing fire to back into riparian habitat conservation areas instead.

Considering all indicators collectively, PACFISH and INFISH Biological Opinion (PIBO) monitoring data indicates this level of activity in riparian management zones (RMZs) has resulted in no additional degradation of riparian habitat conservation areas or stream habitat since monitoring began in the late 1990s and facilitated improving conditions forestwide (U.S. Department of Agriculture 2019a). Continuing to manage riparian habitat conservation areas the same or similarly would be expected to support this outcome through the next planning period.

PACFISH and INFISH, as well as direction in the 1987 plans and the litigation settlement on the Clearwater National Forest, would continue to be implemented under the No Action Alternative. As previously discussed, direction for timber harvest and other silvicultural activities appears to have resulted in improving trends in stream conditions in some subbasins but not others. In all cases except the Upper North Fork Clearwater subbasin, degradation is not evident. At the national forest scale with all PIBO data combined, an improving trend is indicated (Table 123). PIBO indicators most contributing to this trend include median substrate D50, large wood in the stream channel, percent undercut banks, and macroinvertebrate diversity.

As previously discussed in the effects section for riparian areas, only a very limited amount of harvest has occurred in RMZs since 1995, although other silvicultural treatments, such as planting and precommercial thinning, have been more widely implemented.

Continued management is expected to maintain these trends, which would be expected to result in improved habitat for aquatic species. Trends in the Upper North Fork Clearwater subbasin need further investigation to fully address the prognosis for areas important for bull trout spawning and early rearing.

Effects common to all action alternatives

The effects of timber harvest and vegetation management from the action alternatives, compared to the No Action Alternative, to aquatic habitat have been previously discussed under the Effects of Forestwide Direction and Effects of Forestwide Direction on Aquatic Habitat sections. In addition, there is discussion in the Effects of Other Resource Objectives and Plan Components on Resource section under Timber production.

The soils section of the Nez Perce-Clearwater plan components is designed to provide protection for soils that would also protect aquatic habitats and values associated with riparian areas.

The Land Management Plan riparian management zone (RMZ) components in Table 142 are designed to be more protective for aquatic and riparian resources than that of the standards and guidelines, in PACFISH and INFISH, likely improving compliance.

Table 142 . PACFISH/INFISH timber standards and guidelines crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH Standards and Guidelines	Land Management Plan Standards and Guidelines
TM-1 PACFISH: Do not include Riparian Habitat Conservation Areas (RHCAs) in the land base used to determine the Allowable Sale Quantity, but any volume harvested can contribute to the timber sale program. TM-1: Prohibit timber harvest, including fuelwood cutting, in Riparian Habitat Conservation Areas, except as described below. a. Where events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuelwood cutting only where present and future woody debris needs are met, where cutting would not retard or prevent attainment of other Riparian Management Objectives, and where adverse effects on inland native and listed anadromous fish can be avoided. For watersheds with listed salmon or designated critical habitat or priority watersheds, complete Watershed Analysis prior to salvage cutting in Riparian Habitat Conservation Areas. b. Apply silvicultural practices for Riparian Habitat Conservation Areas to acquire desired vegetation characteristics where needed to attain Riparian Management Objectives. Apply silvicultural practices in a manner that does not retard attainment of Riparian Management Objectives and that avoids adverse effects on listed anadromous and inland native fish.	FW-STD-RMZ-01. Vegetation management shall only occur in riparian management zones from the edges of the active stream channel to within 150 feet within Riparian Management Zone Category 1 and to the edges of the active stream channel to 100 feet within Riparian Management Zone Category 2, 3, and 4 to restore or enhance aquatic and riparian-associated resources. Non-mechanical treatments, for example, hand fuel treatments, prescribed fire, small diameter (for example, sapling, pole) conifer thinning, may be authorized if aquatic and riparian-associated resources are maintained. Timber Harvest in this zone shall leave trees on site or use for aquatic restoration. Vegetation management may occur in the outer Riparian Management Zones to meet desired conditions for fuel loading and silvicultural desired conditions, so long as project activities retain functions of the outer Riparian Management Zone, including sediment filtering, large wood recruitment to streams, and protection of the inner Riparian Management Zone from windthrow. Vegetation management in Riparian Management Zones shall not retard attainment of aquatic and riparian desired conditions. FW-STD-RMZ-04. Fuelwood cutting shall not be authorized within 150 feet of the stream edge. FW-STD-RMZ-07. The Riparian Management Zone definitions in the introduction of section 2.2.2 (Riparian Management Zones) shall be used for all actions and projects. FW-GDL-RMZ-01. New landings, skidding, staging, or decking and machine burn piling should be located outside riparian management zones to minimize effects to riparian and aquatic resources. Where new activities inherently must occur in riparian management zones, locate them so that they do not degrade or retard aquatic and riparian desired conditions. FW-GDL-RMZ-02. To reduce the likelihood of sediment input to streams, avoid new road and landing construction, including temporary roads and mechanical trail construction, in riparian management zones except where: • necessary for stream crossings, or • a road or trail relocation contributes to attainment of aquatic and riparian desired conditions, or • Forest Service authorities are limited by law or regulation (for example, General Mining Act of 1872). Temporary roads should be managed to protect aquatic and riparian desired conditions.

PACFISH/INFISH Standards and Guidelines	Land Management Plan Standards and Guidelines
	FW-GDL-RMZ-03. To prevent damage to stream channels, yarding activities should achieve full suspension over the active channel. FW-GDL-ARINF-01. Construction, reconstruction, and maintenance activities of roads, skid trails, temporary roads, and airstrips, should hydrologically disconnect the drainage system from delivering water, sediment, and pollutants to water bodies to prevent concentrated water from directly entering streams. FW-GDL-ARINF-02. To reduce the risk to aquatic resources when decommissioning roads, making roads impassable, or closing roads for longer than one year, roads should be left in a hydrologically stable condition where road drainage is routed away from water resources and landslide prone areas and towards stable areas of the forest floor to provide filtering and infiltration. FW-GDL-ARINF-03. To reduce the risk of sediment delivery from gully formation or mass wasting when closing travel routes such as roads, skid trails, and temporary roads with physical barriers (for example, berms), drainage features should be left in a condition that will function without any maintenance for the planned duration of the closure. FW-GDL-ARINF-04. To reduce road-related mass wasting and sediment delivery to watercourses, new and relocated roads, including skid trails and temporary roads, and other linear features should not be constructed on lands with high mass wasting potential. FW-GDL-ARINF-05. To maintain free-flowing streams, new, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other stream crossings, should be constructed to prevent diversion of stream flow out of the channels and down the road in the event the crossing is plugged or has a flow greater than the crossing was designed.
RA-2: Trees may be felled in Riparian Habitat Conservation Areas when they pose a safety risk. Keep felled trees on site when needed to meet woody debris objectives.	FW-STD-RMZ-05. Trees felled for safety shall be retained onsite unless more than what is needed to achieve aquatic and riparian desired conditions. Trees shall be directionally felled towards or into streams, where it is safe and practical to do so. If aquatic and riparian desired conditions for wood are met at the site, surplus wood can be transported to other aquatic and riparian restoration project sites. Exceptions to this standard are allowed in developed recreation and administrative sites where needed to address concerns for human safety or infrastructure and when not practicable to leave on site.

The Nez Perce-Clearwater Aquatic Ecosystems plan components for riparian management zones (RMZs) are designed to provide clarified direction for timber harvest, fuel treatments, and other silvicultural activities in RMZs. These components apply equally to all action alternatives; in other words, they do not vary by alternative. Standards and guidelines are intended to accomplish two broad objectives. First, they clarify the conditions under which harvest of timber in RMZs might be appropriate (FW-STD-RMZ-01). Secondly, they limit activities in RMZs associated with harvest and other silvicultural treatments (FW-STD-RMZ-02, 03, 04, 05, FW-GDL-RMZ-01, 02, 03).

Because RMZs are unsuitable for timber production and the purpose of harvest within the zones is limited to actions that are designed to achieve desired conditions for riparian-associated resources, the amount of harvest within RMZs is expected to be a minor amount compared to overall harvest levels. Timber harvest in the RMZs would be for the purpose of promoting desired conditions that maintain or improve ecosystem integrity and promote resilience of the vegetation, water, fish, wildlife, and soils resources. Timber harvest must also be consistent with desired conditions, standards, guidelines, management areas, and state laws. Completion of a multiscale analysis, in conjunction with the Stream Condition Indicator Assessment, as described in Appendix 4, is intended show under which conditions FW-STD-RMZ-01 is met. In addition, completion of a multiscale analysis, in conjunction with the Stream Condition Indicator Assessment, when ignition of prescribed fire is proposed in RMZs provides the background to support the conclusion that these treatments are needed to improve RMZ conditions and prevent degradation.

The Stream Condition Indicator Assessment, used in conjunction with multiscale analysis, assesses aquatic conditions in relation to desired conditions. Depending on the conditions of the aquatic indicators, potential stream and riparian restoration actions help maintain or improve conditions toward desired conditions. The level of restoration needed would be dependent on the extent of impact to the resource and the condition of the indicator during project development.

Due to the specificity included in FW-STD-RMZ-01, which outlines the conditions under which silvicultural treatments including timber harvest might be appropriate, and FW-GDL-RMZ-01, 02, and 03, which contain specific direction for harvest activities, these alternatives are expected to result in similar or the same outcomes as the No Action Alternative. First, given the stringency of FW-STD-RMZ-01, harvest in RMZs is not expected widespread or result in substantial acres of RMZs harvested. Second, given the components mentioned, current trends in RMZs, as indicated by PACFISH and INFISH Biological Opinion (PIBO) data, are not expected to change either on a forestwide or subbasin scale. Third, these components offer specificity not included in PACFISH and, therefore, remove any ambiguity in project planning. And fourth, changes in the definitions of RMZs could result in improved protection for RMZs. These changes include expansion of Category 4 RMZs widths to 100 feet over the entire Nez Perce-Clearwater, which mostly affects the North Fork Clearwater and Palouse basins, and refinement of the definition of Category 1 RMZs to include intermittent streams supporting fish at any time of the year.

These objectives are intended to facilitate meeting Aquatic Ecosystems plan components desired conditions in degraded watersheds, given projected increases in timber harvest under Alternatives W, X, and Y and the Preferred Alternative.

In addition to information contained in the above-mentioned section, the differences between the action alternatives in terms of their allowable levels of harvest and anticipated acres treated should be considered. The action alternatives vary in terms of projected timber sale quantity and the acres anticipated to be treated in Management Areas 2 and 3, in some cases widely as when Alternative X is compared to Alternative Z. Management Area 3 contains lands most departed from desired conditions in terms of vegetation composition but also contains streams most departed from aquatic desired conditions. It contains watersheds with the highest priorities for restoration to support recovery goals for listed anadromous fish in the Clearwater basin. Some of the aquatic restoration objectives vary by alternative according to the amount of timber harvest and other silvicultural treatments needed to move vegetation conditions towards their desired conditions.

These aquatics objectives are intended to facilitate meeting Aquatic Ecosystems desired conditions in degraded watersheds, given projected increases in timber harvest under Alternatives W, X, and Y and the Preferred Alternative. It is unknown if these objectives are sufficient to achieve aquatic desired conditions over the next 30 years, particularly considering projected increases in timber harvest, but the monitoring plan contains elements to address trends in aquatic habitat.

Therefore, it is expected that implementation of the action alternatives would result in the same or similar outcomes as the No Action Alternative since direction in the Nez Perce-Clearwater Aquatic Ecosystems plan components are designed to build and strengthen on direction in PACFISH and INFISH shown in Table 142; carries forward the principle of upward trend from the 1987 Nez Perce Forest Plan and expands it to watersheds on the Clearwater National Forest; and provides clarification for direction that is ambiguous in the No Action Alternative. It is the goal of the objectives, combined with all standards and guidelines, that improving trends that are evident in some subbasins will be maintained and enhanced and, for those where there is presently no improvement indicated on the Lower Clearwater and Upper North Fork Clearwater, movement towards meeting desired conditions will be initiated.

When FW-STD-WTR-04 and FW-STD-CWN-01 are assessed using the Stream Condition Indicator Assessment and multiscale analysis, respectively, stream and riparian restoration actions result based upon the conditions of the aquatic indicators in relation to desired conditions. Restoration actions would maintain or improve conditions toward desired conditions. The level of restoration needed would be dependent upon the extent of impact to the resource and the condition of the indicator during project development. In any case, degradation of existing conditions is not expected, and any improving trends are expected to be supported and not retarded by all action alternatives.

Minerals Development

Past mineral extraction activities have profoundly altered riparian conditions in many areas on the Nez Perce-Clearwater, most notably in tributaries to the Upper South Fork Clearwater River, Slate Creek, tributaries in the Upper North Fork Clearwater River, Lolo Creek, and the Palouse River. Presently, ongoing and new minerals projects are being evaluated, many of which are located in riparian areas.

No Action Alternative

PACFISH and INFISH contain standards and guidelines that address these activities, as shown in Table 143. In addition, a set of standard best management practices (BMPs) are generally applied to exploration activities, requiring reclamation of disturbed areas, particularly those within riparian management zones (RMZs). Many of these BMPs are similar to the standards and guidelines in PACFISH and INFISH. While mineral exploration activities have occurred in RMZs for decades and, in some cases, resulted in a large amount of disturbance, broad scale degradation is not evident in PACFISH and INFISH Biological Opinion (PIBO) monitoring data, even within the subbasins supporting the most recent mineral activity. It is likely aquatic species present in the vicinity of these activities are affected to some degree, however.

Table 143. PACFISH/INFISH minerals standards and guidelines crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH	Land Management Plan
MM-1. Avoid adverse effects to listed species and designated critical habitat from mineral operations. Minimize adverse effects to inland native fish species from mineral operations.	FW-STD-AREM-03. Mineral activities on National Forest System lands shall avoid or minimize adverse effects to aquatic threatened or endangered species and populations or their designated critical habitat.
MM-1 (PACFISH). If a Notice of Intent indicates that a mineral operation would be located in a Riparian Habitat Conservation Area, or could affect attainment of Riparian Management Objectives, or adversely affect listed anadromous fish, require a reclamation plan approved Plan of Operations (or other such governing document), and reclamation bond. For effects that cannot be avoided, such plans and bonds must address the costs of removing facilities, equipment, and materials; recontouring disturbed areas to near pre-mining topography; isolating and neutralizing or removing toxic or potentially toxic materials; salvage and replacement of topsoil; and seedbed preparation and revegetation to attain Riparian Management Objectives and avoid adverse effects on listed anadromous fish. Ensure Reclamation Plans contain measurable attainment and bod release criteria for each reclamation activity. MM-1 (INFISH). If a Notice of Intent indicates that a mineral operation would be located in a Riparian Habitat Conservation Area, consider the effects of the activity on inland native fish in the determination of significant surface disturbance pursuant to 36 CFR 228.4. For operations in a Riparian Habitat Conservation Area ensure operators take all practicable measures to maintain, protect, and rehabilitate fish and wildlife habitat which may be affected by the operations. When bonding is required, consider (in the estimation of bond amount) the cost of stabilizing, rehabilitating, and reclaiming the area of operations.	FW- GDL-AREM -04. Mineral operations should minimize adverse effects to aquatic and riparian- dependent resources in riparian management zones. Best management practices and other appropriate conservation measures should be included in plans of operations to mitigate potential mine operation effects.
MM-2. Locate structures, support facilities, and roads outside Riparian Habitat Conservation Areas. Where no alternative to siting facilities in Riparian Habitat Conservation Areas exists, locate and construct the facilities in ways that avoid impacts to Riparian Habitat Conservation Areas and streams and adverse effects on inland native fish. Where no alternative to road construction exists, keep roads to the minimum necessary for the approved mineral activity. Close, obliterate and revegetate roads no longer required for mineral or land management activities.	FW-GDL-AREM-01. To prevent adverse effects to streams, wetlands, and other riparian dependent resources, all proposed mineral operations should avoid riparian management zones. If the riparian management zone cannot be avoided, plan of operations should include practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian-dependent resources affected by the operations. Operations should not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this guideline include situations where the Forest Service has limited discretional authorities. In those cases, project effects should not prevent or retard attaining aquatic and riparian desired conditions to the extent possible within those authorities. FW-STD-AREM-01. Plans of Operation that propose activities in riparian management zones shall include a reclamation plan and a reclamation bond addressing the cost of removing facilities, equipment, and materials; re-contouring disturbed areas to pre-mining topography; isolating and neutralizing

PACFISH/INFISH	Land Management Plan
	or removing toxic materials; salvaging or replacing topsoil; and revegetating with trees and shrubs or native plant seed to move toward attainment of aquatic and riparian desired conditions and avoid adverse effects on native fish. FW- GDL-AREM -02. Mineral operations should reuse existing access routes and processing sites left from previous entries if they are not causing unacceptable impacts to aquatic and riparian dependent resources. Where new construction or relocation is necessary, to the maximum extent possible, construct and locate new structures, support facilities, and roads outside of riparian management zones. If new structures, support facilities, and roads cannot be constructed outside riparian management zones because of site limitations, then construct and manage them to minimize adverse effects to aquatic and riparian dependent resources. When no longer required for mineral activities, structures and support facilities should be removed and roads should be decommissioned or placed into intermittent stored service to achieve aquatic and riparian desired conditions.
MM-3. Prohibit solid and sanitary waste facilities in Riparian Habitat Conservation Areas.	FW-STD-AREM-02. Mine waste with the potential to generate hazardous material, as defined by the Comprehensive Environmental Response, Compensation, and Liability Act, shall not be authorized within riparian management zones where groundwater contamination is possible. The exception is temporary staging of waste during abandoned mine cleanup. FW-GDL-ARREC-01. To protect aquatic and riparian resources, new and reconstructed solid and sanitary waste facilities should not be located within 100 feet of water, unless no other alternative exists.
MM-4. For leasable minerals, prohibit surface occupancy within Riparian Habitat Conservation Areas for oil, gas, and geothermal exploration and development activities where contracts and leases do not already exist, unless there are no other options for location and Riparian Management Objectives can be attained and adverse effects to listed anadromous fish and inland native fish can be avoided. Adjust the operating plans of existing contracts to (1) eliminate impacts that prevent attainment of Riparian Management Objectives and (2) avoid adverse effects to listed anadromous and inland native fish. MM-6. Develop inspection, monitoring, and reporting requirements for mineral activities. Evaluate and apply the results of inspection and monitoring to modify mineral plans, leases, or permits as needed to eliminate impacts that prevent attainment of Riparian Management Objectives and avoid adverse effects on listed anadromous and inland native fish.	FW- GDL-AREM-03. To maintain water quality and to prevent biological, chemical, or industrial pollutants from being delivered to water bodies, mineral exploration, processing, and extraction projects should not have direct water flow paths to streams, lakes, or wetlands. Projects should install barriers between streams, lakes, wetlands, or groundwater dependent ecosystems and construction-related pollutant hazards, such as sumps, processing pits, fuel storage, latrines, adits, and shafts, underground workings, open pits, overburden, development rock and waste rock dumps, tailings impoundments, leach pads, mills, and process water ponds or natural pollutant hazards such as acidity, metals, sulfate, cyanide, or nitrate or a combination of the preceding.
MM-5: Permit sand and gravel mining and extraction within Riparian Habitat Conservation Areas only if no alternatives exist, if the action(s) would not retard or	FW-GDL-RMZ-09. New saleable sand and gravel mining and extraction should not occur within riparian management zones, to minimize ground disturbance

PACFISH/INFISH	Land Management Plan
prevent attainment of Riparian Management Objectives, and adverse effects to listed anadromous and inland native fish can be avoided.	and sediment inputs, and avoid adverse effects to riparian vegetation and water temperature.

Effects common to all action alternatives

The action alternatives do not differ in the level of mineral activity proposed or aquatic components. The Nez Perce-Clearwater Aquatic Ecosystems plan components provides three standards and four guidelines, as shown in Table 143, that are designed to refine the existing standards and guidelines in PACFISH and INFISH and require enhanced and strengthened consideration for aquatic resources. FW-STD-ARE&M-01 requires that the plans of operation include a reclamation plan to address any disturbance caused by activities. FW-STD-ARE&M-02 requires that mine waste with the potential to generate hazardous material shall not be authorized within the riparian management zones (RMZs). FW-STD-ARE&M-03 requires that mineral activities avoid adverse effects to aquatic threatened or endangered species and their critical habitat. FW-GDL-ARE&M-01 requires operations to prevent adverse effects to streams, wetland, and riparian dependent resources. FW-GDL-ARE&M-02 requires operations to use existing routes, or construct routes outside riparian management zones, or minimize effects to aquatic and riparian dependent resources. FW-GDL-ARE&M-03 requires barriers between biological, chemical, or industrial pollutants. Best management practices (BMPs) that apply under the No Action Alternative would also apply to activities conducted under these alternatives and are required in FW-GDL-ARE&M-04. Therefore, these alternatives are expected to result in similar or the same outcomes to riparian resources, aquatic habitat, and aquatic species as the No Action Alternative.

Recreation Activities and Recreation Facilities

No Action Alternative

PACFISH and INFISH provided three standards and guidelines for recreation management, as shown in Table 144 mainly related to relocating or constructing new developed and dispersed sites outside of riparian areas. No developed recreation sites have needed to be relocated due to adverse effects, although the continued presence of these structures results in ongoing alterations to the riparian management zones (RMZs) in which they are located. These facilities would continue to exist in RMZs and public use would continue as well. There are no known locations, however, that have resulted in pervasive and permanent degradation of aquatic habitat. These facilities would continue to exist and their public use would continue as well. Current PACFISH standards and guidelines would be expected to continue to be effective at maintaining aquatic and riparian resources.

Many dispersed and developed recreation sites are located within riparian areas and are adjacent to streams that support important spawning and early rearing habitat. Effects from repeated use of these areas include soil compaction and frequently the removal of ground vegetation. However, the Nez Perce-Clearwater has taken steps to address human use effects resulting in expansion of the footprint of these sites located in RMZs through placement of boulders. Vault toilets have been installed at heavily used dispersed sites, but less used sites do not have toilet facilities so they may have concentrations of human waste at some locations. Hazard trees have been felled for safety reasons in campgrounds and would continue to be felled for safety reasons. Once again, this impact is limited in nature, and monitoring does not show that large wood has been limited in the Nez Perce-Clearwater streams. Conversely, large wood in stream channels is one of the three PACFISH and INFISH Biological Opinion (PIBO) indicators that are contributing most to the improving trend in aquatic habitat forestwide.

The location of developed and dispersed recreation sites results in human use of these sites as most people enjoy recreating and camping next to streams and lakes. Human presence at these sites results in direct effects to aquatic species through disturbance to individual fish from fishing, swimming, and wading that probably would not, or to the degree they do if there was not an established site for parking and camping. Travel planning efforts for the Nez Perce-Clearwater attempt to address these effects through monitoring. PACFISH and INFISH include standard RM-2, which provides direction to mitigate these effects and move or close the site if they are not effective.

Table 144. PACFISH/INFISH recreation standards and guidelines crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH	Land Management Plan
RM-1. Design, construct, and operate recreation facilities, including trails and dispersed sites, in a manner that does not retard or prevent attainment of the Riparian Management Objectives and avoids adverse effects on listed anadromous and inland native fish. Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat Conservation Areas within key and priority watersheds. For existing recreation facilities inside Riparian Habitat Conservation Areas, assure that the facilities or use of the facilities would not prevent attainment of Riparian Management Objectives or adversely affect listed anadromous and inland native fish. Relocate or close recreation facilities where Riparian Management Objectives cannot be met or adverse effects on listed anadromous and inland native fish cannot be avoided. RM-2 Adjust dispersed and developed recreation practices that retard or prevent attainment of Riparian Management Objectives or adversely affect listed anadromous and Inland native fish. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities, and/or specific site closures are not effective in meeting Riparian Management Objectives and avoiding adverse effects on listed anadromous and inland native fish, eliminate the practice or occupancy. RM-3. Address attainment of Riparian Management Objectives and potential effect on listed anadromous and inland native fish in Wild and Scenic Rivers, Wilderness, and other Recreation Management plans.	FW-STD-RMZ-05. Trees felled for safety shall be retained onsite unless more than what is needed to achieve aquatic and riparian desired conditions. Trees shall be directionally felled towards or into streams, where it is safe and practical to do so. If aquatic and riparian desired conditions for wood are met at the site, surplus wood can be transported to other aquatic and riparian restoration project sites. Exceptions to this standard are allowed in developed recreation and administrative sites where needed to address concerns for human safety or infrastructure and when not practicable to leave on site. FW-GDL-ARREC-01. To protect aquatic and riparian resources, new and reconstructed solid and sanitary waste facilities should not be located within 100 feet of water, unless no other alternative exists. FW-GDL-ARREC-02. To reduce potential adverse effects to water quality and aquatic resources, construction of new facilities or infrastructure within floodplains should be avoided. Where new activities inherently must occur in riparian management zones (for example, at road and trail stream crossings, boat ramps, or docks), they should be located and designed to minimize adverse effects to floodplains and other riparian-dependent resource conditions (for example, within geologically stable areas and avoiding major spawning areas). FW-GDL-ARREC-03. To reduce the risk of sediment delivery when closing trails with physical barriers (for example, berms), drainage features should be sufficient to minimize risk to aquatic resources such as removing culverts from stream crossings. FW-GDL-ARREC-04. To reduce trail-related mass wasting and sediment delivery to watercourses, new and relocated trails should not be constructed on lands with high mass wasting potential. FW-GDL-ARREC-05. Trail construction, reconstruction, and maintenance activities should prevent concentrated water from directly entering streams, by hydrologically disconnecting the trails from delivering water, sediment, and pollutants to water bodies. FW-GDL-ARREC-06. To maintain channel stability and reduce sediment delivery to watercourses, when constructing or reconstructing trails, fords should be hardened to protect the stream bed, banks, and approaches.

Effects common to all action alternatives

The Nez Perce-Clearwater Aquatic Ecosystems plan components are designed to provide guidance for managing recreation sites within riparian management zones (RMZs). However, it is assumed that minor, localized impacts to riparian vegetation, woody debris, and water quality would still occur where recreational use and activities are allowed. Existing recreational facilities and actions within or affecting RMZs might need to be modified, discontinued, or relocated if they are identified as not fully meeting functional aquatic and riparian conditions and processes or improving impaired conditions and processes.

The Aquatic Ecosystems plan components are designed to provide guidance for managing recreation sites within RMZs. It includes FW-DC-ARREC-01 that provides expectations for recreation facilities in RMZs. It also includes FW-OBJ-ARREC-01, which includes removal or relocation of two existing recreation facilities every five years, including dispersed sites outside of RMZs, or other means if they are and degrading aquatic or riparian resources. FW-GDL-ARREC-01 and 02 address the effects of existing and new recreation facilities. Collectively, these components are expected to accomplish the same or similar outcomes as the No Action Alternative.

It is assumed that minor, localized impacts to riparian vegetation, woody debris, and water quality are still possible where recreational use and activities are allowed. Maintenance of recreation sites, including removal of hazard trees, would continue to occur. FW-STD-RMZ-05 addresses the disposition of hazard trees felled for safety reasons, including those in recreation sites. Continued monitoring of the effects of existing sites under current travel plans is expected to result in measures taken to address any effects that are unacceptable to aquatic species.

Recreation use related to roads and trails

Effects common to all (including No Action Alternative) alternatives

The Aquatic Ecosystems plan components are designed to provide guidance for managing recreation sites within riparian management zones (RMZs). However, it is assumed that minor, localized impacts to riparian vegetation, woody debris, and water quality would still occur where recreational use and activities are allowed. Existing recreation facilities and actions within or affecting RMZs might need to be modified, discontinued, or relocated if they are identified as not fully meeting functional aquatic and riparian conditions and processes or improving impaired conditions and processes. Changes in management according to the components for the action alternatives would be expected to maintain current trends in aquatic habitat condition.

Infrastructure, Including Roads, Trails, and Airstrip

Table 121 provides a summary by subbasin of the miles of roads located within RMZs, as well as the number of stream crossings. Streamside roads result in a permanent alteration of the riparian area, at least until such time as the road is decommissioned. Stream crossings result in localized changes to riparian areas at the crossing structure itself as well as the approaches. Trails and airstrips and their use can result in localized effects to riparian areas, but not to the extent of roads and their uses.

The most widespread alteration of riparian conditions, as well as stream process and function, across the Nez Perce-Clearwater is road development, particularly construction of streamside roads and roads with multiple stream crossings (U.S. Department of Agriculture 1998b, 2001b, 2003c, Ecovista 2003, U.S. Department of Agriculture 2003e, 1999). Road development has been correlated to instream conditions including substrate composition, low numbers of large wood in the stream channel, and number and quality of pools on both the Clearwater and Nez Perce National Forests

(Huntington 1998, U.S. Department of Agriculture 2003e). System roads cover an estimated 2,400 acres equaling 600 road miles within riparian management zones (RMZs) on the Nez Perce National Forest and an estimated 4,000 acres equivalent to 1,000 road miles within RMZs on the Clearwater National Forest. As long as the road prism persists on the landscape, there is little to no chance for recovery of floodplain function or condition. Routine maintenance, hydrologically disconnecting roads, storm proofing roads, and site-specific improvements, however, can be made to mitigate effects.

PACFISH and INFISH, while recognizing the significance of roads to riparian areas, aquatic habitat, and their role in potential recovery of spawning and early rearing habitat for anadromous and inland native fish, also recognized the complexity of managing a road network for access for timber harvest, fire suppression, and other human uses. Both strategies contained numerous standards and guidelines, many related to maintenance, road management, and access management. They also included requirements for Watershed Analysis, development of Road Management Plans, and prioritizing the closing, stabilization, and obliteration of roads not needed for future management activities. Among other things, they required construction of new stream crossings to accommodate 100-year floods and provide and maintain fish passage at all road crossings in known and potential fish-bearing streams.

While recognizing the correlations between existing population strongholds of at-risk salmonids and roadless and wilderness areas, PACFISH and INFISH stopped short of prohibiting new road construction in roadless areas that are known strongholds or potential strongholds, or other areas important for recovery of listed fish.

PACFISH and INFISH did not speak directly to trails, management of trails, or recreational use on trails or airstrips. They did, however, include standards and guidelines for recreational facilities, which included trails.

No Action Alternative

Under the No Action Alternative, standards and guidelines related to road management would continue to apply. Access management and motorized use on roads and trails would continue according to current travel plans. Not all standards and guidelines related to roads have been implemented to the degree directed in PACFISH and INFISH, yet construction of specified, permanent roads was de-emphasized on both the Clearwater and Nez Perce National Forests and mostly has not occurred since 1995. Rather, temporary road construction off existing roads, combined with enhanced maintenance and improvement of existing roads, has been emphasized to provide access for timber harvest. In addition, hundreds of miles of road decommissioning and road improvements have been completed, including many miles of streamside roads. In these areas, riparian process and function are expected to be restored over time.

Under the No Action Alternative, standards and guidelines in PACFISH and INFISH, as shown in Table 145, related to road management would continue to apply. Access management and motorized use on roads and trails would continue according to current travel plans. Not all standards and guidelines related to roads have been implemented to the degree directed in PACFISH and INFISH, yet construction of specified, permanent roads was de-emphasized on both the Clearwater and Nez Perce National Forests and mostly has not occurred since 1995. Rather, temporary road construction off existing roads, combined with enhanced maintenance and improvement of existing roads, has been emphasized to provide access for timber harvest. Temporary roads were decommissioned after timber harvest activities were completed. In addition, hundreds of miles of road decommissioning and road improvements have been completed, including many miles of streamside roads. In these areas, riparian process and function are expected to be restored over time.

Table 145. PACFISH/INFISH roads/infrastructure standards and guidelines crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH	Land Management Plan
RF-1. Cooperate with Federal, Tribal, State, and county agencies, and cost-share partners to achieve consistency in road design, operation, and maintenance necessary to attain Riparian Management Objectives. RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish by: completing watershed analyses prior to construction of new roads or landings in Riparian Habitat Conservation Areas and within priority watersheds.	FW-STD-ARINF-01. Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat.
RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish by: minimizing road and landing locations in Riparian Habitat Conservation Areas	FW-GDL-RMZ-02. To reduce the likelihood of sediment input to streams, avoid new road and landing construction, including temporary roads and mechanical trail construction, in riparian management zones except where: • necessary for stream crossings, or • a road or trail relocation contributes to attainment of aquatic and riparian desired conditions, or • Forest Service authorities are limited by law or regulation (for example, General Mining Act of 1872). Temporary roads should be managed to protect aquatic and riparian desired conditions. FW-GDL-ARINF-04. To reduce road-related mass wasting and sediment delivery to watercourses, new and relocated roads, including skid trails and temporary roads, and other linear features should not be constructed on lands with high mass wasting potential. FW-GDL-ARINF-08. To avoid adverse effects to water resources, wetlands and seasonally wet meadows should be avoided when constructing new roads and landings, including temporary roads. For all roads, and where reconstruction of existing roads cannot avoid water courses and wetlands drainage features should maintain wetland functions and characteristics. FW-GDL-ARINF-09. When constructing, reconstructing, or maintaining roads, including temporary roads, road drainage should be routed away from potentially unstable channels, fills, and hillslopes, to prevent destabilization of channels and hillslopes.
RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish by: Avoiding sediment delivery to streams from the road surface,	FW-STD-ARINF-02. Best management practices shall be used during dust abatement applications on roads, and ensure chemicals are not applied directly to watercourses; water bodies such as ponds and lakes; or wetlands. FW-GDL-ARINF-02. To reduce the risk to aquatic resources when decommissioning roads, making roads impassable, or closing roads for longer

PACFISH/INFISH	Land Management Plan
Outsloping of the roadway surface is preferred, except in cases where outsloping would increase sediment delivery to streams or where outsloping is infeasible or unsafe. Route road drainage away from potentially unstable stream channels, fills, and hillslopes.	than one year, roads should be left in a hydrologically stable condition where road drainage is routed away from water resources and landslide prone areas and towards stable areas of the forest floor to provide filtering and infiltration. FW-GDL-ARINF -03. To reduce the risk of sediment delivery from gully formation or mass wasting when closing travel routes such as roads, skid trails, and temporary roads with physical barriers (for example, berms), drainage features should be left in a condition that will function without any maintenance for the planned duration of the closure.
RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish by: avoiding disruption of natural hydrologic flow paths.	FW-GDL-ARINF-01. Construction, reconstruction, and maintenance activities of roads, skid trails, temporary roads, and airstrips, should hydrologically disconnect the drainage system from delivering water, sediment, and pollutants to water bodies to prevent concentrated water from directly entering streams. FW-GDL-ARINF-10. Transportation infrastructure should be designed to maintain natural hydrologic flow paths, including surface and subsurface flow, to the extent practical. For example, streams and seeps upslope from roads should have cross-drains or relief culverts with sufficient capacity to ensure water is not routed down ditches.
RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects on listed anadromous fish and inland native fish by: avoiding sidecasting of soils or snow on road segments within or abutting Riparian Habitat Conservation Areas in key or priority watersheds.	FW-STD-ARINF-03. To reduce or prevent sediment delivery to water, on roads other than outsloped roads, road surface and fill materials shall not be sidecast into streams during road construction or reconstruction, when occurring within or adjacent to riparian management zones. FW-GDL-ARINF-07. To reduce sediment delivery from maintenance activities, such as road blading and snow plowing, avoid sidecasting into streams. Care should be taken when plowing snow so as not to include road soil. Breaks should be incorporated in the snow berms to direct water off the plowed surface.
RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on listed anadromous and inland native fish by: reconstructing road and drainage features that do not meet design criteria or operation and maintenance standards, or that have been shown to be less effective than designed for controlling sediment delivery, or that retard attainment of Riparian Management Objectives, or do not protect priority watersheds from increased sedimentation. closing and stabilizing or obliterating, and stabilizing roads not needed for future management activities. Prioritize these actions based on the current and potential damage to listed anadromous and inland native fish in key and priority watersheds, and the ecological value of the riparian resources affected.	FW-STD-ARINF-05. When constructing or reconstructing roads, incorporating woody debris into the fill portion of the road prism shall be avoided. FW-GDL-ARINF-02. To reduce the risk to aquatic resources when decommissioning roads, making roads impassable, or closing roads for longer than one year, roads should be left in a hydrologically stable condition where road drainage is routed away from water resources and landslide prone areas and towards stable areas of the forest floor to provide filtering and infiltration. FW-GDL-ARINF-06. To maintain channel stability and reduce sediment delivery to watercourses, when reconstructing roads, fords should be hardened to protect the stream bed, banks, and approaches.

PACFISH/INFISH	Land Management Plan
RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives and avoid adverse effects on listed anadromous and inland native fish by: prioritizing reconstruction based on the current and potential damage to listed anadromous fish and their designated critical habitat and inland native fish and their priority watersheds, the ecological value of the riparian resources affected, and the feasibility of options such as helicopter logging and road relocation out of Riparian Habitat Conservation Areas.	FW-STD-ARINF-07. In the Conservation Watershed Network and HUC12 subwatersheds with Endangered Species Act critical habitat or listed aquatic species, when constructing or reconstructing roads, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network unless no further decreases are needed to meet desired conditions for Water and Aquatic Resources or Conservation Watershed Network. Treatment priority shall be given to roads or road segments that pose the greatest relative ecological risk to riparian and aquatic ecosystems. The net decrease is measured by project area.
RF-4. Construct new, and improve existing, culverts, bridges, and other stream crossings to accommodate a 100-year flood, including associated bedload and debris, where those improvements would/do pose a substantial risk to riparian conditions. Substantial risk improvements include those that do not meet design and operation maintenance criteria, or that have been shown to be less effective than designed for controlling erosion, or that retard attainment of Riparian Management Objectives, or that do not protect designated critical habitat and priority watersheds from increased sedimentation. Base priority for upgrading on risks in key and priority watersheds and the ecological value of the riparian resources affected. Construct and maintain crossings to prevent diversion of streamflow out of the channel and down the road in the event of crossing failure.	FW-STD-ARINF-04. New, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other permanent stream crossings, shall accommodate at least the 100-year flow, including associated bedload and debris. FW-GDL-ARINF -05. To maintain free-flowing streams, new, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other stream crossings, should be constructed to prevent diversion of stream flow out of the channels and down the road in the event the crossing is plugged or has a flow greater than the crossing was designed.
RF-5. Provide and maintain fish passage at all relevant road crossings of existing and potential fish-bearing streams.	FW-STD-ARINF-06. In fish bearing streams, construction, reconstruction, or replacement of stream crossings shall not impair passage of any life stages of native aquatic organisms, unless barriers are desired to maintain or prevent spread or invasion of non-native species in alignment with fish management agencies. FW-GDL-ARINF-11. Culverts and bridges in fish-bearing and perennial streams should allow for passage of fish and other aquatic and riparian dependent species through the establishment of banks inside or beneath the crossing structure and mimicking the natural channel features, unless precluded by site characteristics such as bedrock or high channel gradient.

Lack of new, permanent road construction combined with an emphasis on temporary road construction and road decommissioning to meet aquatic restoration goals may be the most important factor in achieving the improving trends in riparian and stream habitat evident in both PACFISH and INFISH Biological Opinion (PIBO) data and forest plan monitoring data. In addition, direction to provide for passage for aquatic species at road and stream crossings (standard RF-5 in PACFISH) reduces areas that are not accessible to fish and restores passage where currently blocked.

In addition, the Nez Perce Forest Plan Appendix A sediment yield guidelines, upward trend requirements from the 1987 Nez Perce Forest Plan, and the Clearwater's litigation settlement have contributed greatly towards reduced sediment yield since the mid-1990s. This direction, combined with sediment-reducing aquatic restoration road decommissioning projects, has undoubtedly resulted in improved sediment conditions in many streams across the Nez Perce-Clearwater. Improved sediment conditions in specific areas are evident in both PIBO and forest plan monitoring data. Since deposited sediment in streams has been identified as a primary limiting factor for both anadromous and resident salmonids in spawning and early rearing habitat, improved less sediment conditions are expected to result in improved spawning success and greater carrying capacity for juveniles.

Management of infrastructure under the No Action Alternative with this same management framework combined with additional aquatic restoration would be expected to maintain current conditions or further contribute to improving trends. These trends would be expected to result in improving conditions for aquatic species and their habitat.

Effects common to all action alternatives

Infrastructure components described in the Aquatic Ecosystems plan components, as shown in Table 145, are designed to provide additional clarification and specificity when compared to those in PACFISH and INFISH. FW-DC-ARINF-01 sets the expectation that the transportation system has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity of roads to streams, lower sediment delivery to streams, and improved aquatic organism passage. All standards and guidelines are intended to direct achievement of this desired condition. They are similar or the same as some standards in PACFISH and INFISH but contain additional clarification and specificity for many road activities. As for the No Action Alternative, motorized travel on roads and trails would continue consistent with current travel plan direction.

While none of the Conservation Watershed Network (CWN) components prohibit new road construction, FW-DC-CWN-03 sets the expectation of minimizing risks of roads to aquatic habitat. While similar to FW-DC-ARINF-01, the expectation in the CWN is that projects that achieve this desired condition are prioritized. FW-STD-ARINF-07 requires a net decrease in hydrologic connectivity of roads to streams when planning projects in subwatersheds with Endangered Species Act critical habitat or listed aquatic species, which can be accomplished through road decommissioning or various techniques that direct runoff from roads to areas other than streams, such as installing cross drain structures. FW-OBJ-CWN-01 and FW-OBJ-CWN-2 prioritize storm-proofing roads and treatment of road segments known to be adversely affecting riparian conditions and stream habitat. FW-STD-CWN-01 directs that all activities, including those associated with roads and trails, support or initiate achievement of aquatic desired conditions. Multiscale analysis aids in providing consistency with this standard.

When comparing alternatives, it is important to note that as the level of anticipated timber harvest varies among the action alternatives when compared to the No Action Alternative and each other, the transportation system needed to access and support these changes may increase similarly depending on the specific project and its location. It is expected that the aquatic components, particularly those in the CWN, will influence the type and management of any additional infrastructure needed for access and that they will reduce or minimize effects to riparian resources.

Further, while PACFISH and INFISH and their Biological Opinions referred to "Key" and "Priority" watersheds and contained direction specific to them, the Aquatic Ecosystems plan components are designed to further expand this concept by establishing the CWN and included components intended to address potential effects, particularly from roads and infrastructure. The CWN on the Nez Perce-Clearwater includes many subwatersheds within designated wilderness and roadless areas and Management Area 3.

Sediment delivery from roads to streams is a primary limiting factor across the Nez Perce-Clearwater. Desired conditions FW-DC-WTR-05, 06, and 07 are designed to set an expectation that sediment delivered to streams is transported at natural rates and maintains reference dimensions within streams. In order to maintain or achieve these desired conditions, FW-STD-WTR-04 is designed to require that projects shall restore or not retard attainment of desired conditions. Assessment of desired conditions using the Stream Condition Indicator Assessment is described in Appendix 4. Where desired conditions are not met, potential stream and riparian restoration actions are recommended to maintain or achieve those desired conditions.

To provide for social and economic sustainability of rural communities, access to activities such as recreation, hunting, fishing, gathering, egress, and wildfire management should continue to be provided for on routes or in areas designated as open to motorized use in the summer and winter. If a route is identified as substantially impairing aquatic ecological values, rerouting and route improvement should be considered prior to closure to preserve motorized access opportunities. If a route or area needs to be closed, alternate motorized access to maintain social and economic sustainability of rural communities should be provided.

The conclusion that the action alternatives will result in outcomes that are indistinguishable from the No Action Alternative's static or improving conditions, and possibly improved conditions and fewer effects, is supported by Nez Perce-Clearwater Aquatic Ecosystems plan components.

Lands and Special Uses

Effects common to all alternatives

Effects from lands and special uses would be primarily associated with activities occurring in riparian areas from special uses. Other potential effects would be through special use permits to outfitters who have camps and conduct activities within riparian areas. Effects would be the same under all alternatives because the plan components are the same for the action alternatives and have not changed markedly from PACFISH and INFISH amendment, as shown in Table 146, with the exception of reauthorizations. The Aquatic Ecosystems plan components contain two standards and one guideline, two of which are designed to address hydropower development. Existing special-use permits were consulted on when salmon, steelhead, and bull trout were listed under the Endangered Species Act or had site-specific consultation if issued after these listings and were determined to largely be "no effect," except for some outfitter and guide permits.

Table 146. PACFISH/INFISH leases and hydroelectric facilities standards crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH	Land Management Plan
LH·1. Require instream flows and habitat conditions for hydroelectric and other surface water development proposals that maintain or restore riparian resources, favorable channel conditions, and fish passage, reproduction, and growth. Coordinate this process with the appropriate State agencies. During relicensing of hydroelectric projects, provide written and timely license conditions to the Federal Energy Regulatory Commission (FERC) that require fish passage and flows and habitat conditions that maintain/restore riparian resources and channel integrity. Coordinate relicensing projects with the appropriate State agencies.	FW-STD-ARLND-01. When authorizing new lands special uses or reauthorizing existing uses, include conditions to avoid adverse effects to fish, water, and riparian resources. If adverse effects are unavoidable to Endangered Species Act listed fish, species of conservation concern, impaired water bodies, or stream habitat conditions, authorizations shall require actions that result in the re-establishment, restoration, mitigation, or improvement of conditions and ecological processes to ensure that projects that degrade conditions also include measures to improve conditions to the extent practicable. These processes include in-stream flow regimes, physical and biological connectivity, water quality, and integrity and complexity of riparian and aquatic habitat. FW-STD-WTR-01. New stream diversions and associated ditches shall have screens placed on them to prevent capture of fish and other aquatic organisms, using criteria established by the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, when listed fish may be present. FW-STD-ARLND-03. In the Conservation Watershed Network and subwatersheds with Endangered Species Act critical habitat or listed aquatic species, hydroelectric and other surface water development authorizations shall include requirements for instream flows and habitat conditions that maintain or restore native fish and other desired aquatic species populations, riparian dependent resources, favorable channel conditions, and aquatic connectivity.
LH-3. Issue leases, permits, rights-of-way, and easements to avoid effects that would retard or prevent attainment of the Riparian Management Objectives and avoid adverse effects on listed anadromous and inland native fish. Where the authority to do so was retained, adjust existing leases, permits, rights-of-way, and easements to eliminate effects that would retard or prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. If adjustments are not effective, eliminate the activity. Where the authority to adjust was not retained, negotiate to make changes in existing leases, permits, rights-of-way, and easements to eliminate effects that would prevent attainment of the Riparian Management Objectives or adversely affect inland native fish. Priority for modifying existing leases, permits, rights-of-way, and easements would be based on the current and potential adverse effects on inland native fish and the ecological value of the riparian resources affected.	
LH-2. Locate new hydroelectric ancillary facilities outside Riparian Habitat Conservation Areas. For existing ancillary facilities Inside the RHCA that are essential to proper management, provide recommendations to FERC to assure that the facilities would not prevent attainment of the Riparian Management Objectives and that adverse effects on listed anadromous and inland native fish are avoided. Where these objectives cannot be met, provide recommendations to FERC that such ancillary facilities should be relocated. Locate, operate, and maintain hydroelectric facilities that must be located in Riparian Habitat Conservation Areas to avoid effects that would retard or prevent attainment of the Riparian Management Objectives and avoid adverse effects on inland native fish.	FW-STD-ARLND-02. Locate new hydropower support facilities outside of riparian management zones to reduce effects to fish, water, and riparian resources. Support facilities include any facilities or improvements such as workshops, housing, switchyards, staging areas, or transmission lines not directly integral to its operation or necessary for the implementation of prescribed protection, mitigation, or enhancement measures. FW-GDL-ARLND-01. If existing hydropower support facilities are located within the riparian management zones at time of permit reissuance, reduce impacts on aquatic and riparian resources, such as moving support facilities outside of riparian management zones or further from water bodies where feasible. FW-STD-ARLND-04. In the Conservation Watershed Network and in subwatersheds with Endangered Species Act critical habitat or listed aquatic species, new hydroelectric facilities and water developments should not be constructed unless it can be demonstrated that there are no substantial

PACFISH/INFISH	Land Management Plan
	adverse effects to critical habitat or listed aquatic species. Exceptions to this standard include situations where Forest Service authorities are limited such as the Alaska National Interest Lands Conservation Act, 1872 Mining Law, or valid state water rights. In those cases, project effects shall not retard attainment of desired conditions for watershed function, to the extent possible within Forest Service authorities.

Other exceptions included water withdrawal structures to support private lands adjacent to Forest Service lands or inholdings. Effects from re-authorization of these special use permits are expected to be addressed by FW-STD-LSU-01.

Fire Management

Wildland fire management incorporates a spectrum of responses ranging from full suppression to managing for resource objectives. All wildland fires are managed on a continuum between meeting protection objectives and achieving resource objectives. Available data indicates riparian areas burn at a lower intensity than the surrounding uplands due to higher humidity next to streams. See Figure 35, Figure 36, and Figure 37. That does not mean, however, that riparian areas do not burn at high severity; rather, there is a lower percentage of high severity when compared to uplands. There have been notable instances when riparian areas have burned at very high severity, including the McGuire Fire in 2007 and the Sheep Fire in 2012. In these cases, as well as others, high severity of wildfire in riparian areas was included within a larger block of high severity in the uplands and there is no evidence that fuel conditions in riparian areas have contributed to higher fire severity when compared to uplands (U.S. Department of Agriculture 2019a).

Fire suppression activities can result in direct effects to riparian areas, particularly where machine firelines are constructed within riparian management zones (RMZs) and cross streams and wetlands. Much of the timber removed and sold from RMZs in the past decade is from merchantable trees removed during machine fireline construction and decked and sold after suppression actions cease. Well over 10 million board feet of timber have been sold from decked logs from fire suppression activities over the past decade, though it is not known the percentage that came from RMZs.

Fire camps, helibases, and other firefighting resources located within RMZs can result in effects as well, although these effects are often short-term.

Managing naturally ignited fires to meet land management plan resource objectives has been a tool used extensively in designated wilderness areas and some roadless areas to achieve resource benefits. Wildfires allowed to burn for resource benefits result in some level of effect to riparian areas and riparian resources, although as previously noted, riparian areas have been documented to burn at lower severities than uplands. The role of fire as a natural agent of change should be acknowledged and it should be recognized that its long-term effects are necessary to maintain and build high quality riparian and stream habitats, particularly where it burns within natural frequency intervals. In other words, wildland fire is a natural change agent to which riparian resources have evolved and it is one that is necessary to maintain and enhance riparian processes within their historic ranges.

A more detailed discussion of fire effects to riparian and stream habitat is included above and can be found in the Aquatic Ecosystems Assessment (U.S. Department of Agriculture 2019a).

No Action Alternative

Under the No Action Alternative, direction in PACFISH and INFISH, as shown in Table 147, would continue to apply to fire management on the Nez Perce-Clearwater. There are five standards and guidelines in these documents that guide this program. They provide direction for the design of fuel treatment and suppression actions; location of incident bases, camps, and helibases; avoidance of fire retardants to surface waters; design of prescribed burn projects; and development of fire rehabilitation plans. Ignition of fire within riparian habitat conservation areas has been avoided since 1995, although neither PACFISH nor INFISH includes direction to do so. Avoidance has largely been the result of project-level Endangered Species Act consultations. Fire has been allowed to burn within riparian habitat conservation areas where it has backed into them from upland areas.

Table 147. PACFISH/INFISH fire/fuels standards and guidelines crosswalk with Land Management Plan standards and guidelines

PACFISH/INFISH	Land Management Plan
FM-1. Design fuel treatment and fire suppression strategies, practices, and actions so as not to prevent attainment of Riparian Management Objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management actions could perpetuate or be damaging to long-term ecosystem function, listed anadromous, or designated critical habitat, and inland native fish.	FW-STD-RMZ-01. Vegetation management shall only occur in riparian management zones from the edges of the active stream channel to within 150 feet within Riparian Management Zone Category 1 and to the edges of the active stream channel to 100 feet within Riparian Management Zone Category 2, 3, and 4 to restore or enhance aquatic and riparian-associated resources. Non-mechanical treatments, for example, hand fuel treatments, prescribed fire, small diameter (for example, sapling, pole) conifer thinning, may be authorized if aquatic and riparian-associated resources are maintained. Timber Harvest in this zone shall leave trees on site or use for aquatic restoration. Vegetation management may occur in the outer Riparian Management Zones to meet desired conditions for fuel loading and silvicultural desired conditions, so long as project activities retain functions of the outer Riparian Management Zone, including sediment filtering, large wood recruitment to streams, and protection of the inner Riparian Management Zone from windthrow. Vegetation management in Riparian Management Zones shall not retard attainment of aquatic and riparian desired conditions. FW-STD-RMZ-06. Direct ignition of low severity prescribed fire in riparian management zones can achieve or maintain desired conditions so long as: • direct ignition within the riparian management zone will not retard attaining water, aquatic, and riparian desired conditions. • direct ignition within the riparian management zone maintains or enhances existing stream conditions and effects to threatened or endangered species and their designated critical habitat are considered.
FM-2. Locate incident bases, camps, helibases, staging areas, helispots, and other centers for incident activities outside of Riparian Habitat Conservation Areas. If the only suitable location for such activities is within the Riparian Habitat Conservation Area, an exemption may be granted following a review and recommendation by a resource advisor. The advisor would prescribe the location, use conditions, and rehabilitation requirements, with avoidance of adverse effects to inland native fish a primary goal. Use an interdisciplinary team, including a fishery biologist, to predetermine incident base and helibase locations during pre-suppression planning.	FW-GDL-RMZ-05. To minimize adverse effects to the Endangered Species Act listed species, riparian areas, aquatic habitat, and riparian dependent species, new incident bases, camps, helibases, helispots, staging areas, and other centers for incident activities should be located outside of riparian management zones. When no practical alternative exists, measures to maintain, restore, and enhance riparian areas, stream habitat, and riparian dependent species should be used.
FM-3. Avoid delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following a review and recommendation by a resource advisor and a fishery	FW-GDL-RMZ-04. Aerial application of chemical retardant, foam, or other fire chemicals and petroleum should be avoided in mapped aerial

PACFISH/INFISH	Land Management Plan
biologist, when the action agency determines an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.	retardant avoidance areas to minimize impacts to the riparian management zones and aquatic resources.
FM-4. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management Objectives.	FW-GDL-WTR-06. Firelines should be located and configured to minimize sedimentation to waterbodies, limit capture of overland and stream flows, and restrict development of unauthorized roads and trails. Firelines should be restored following suppression or prescribed fire activities. FW-GDL-RMZ-06. To minimize sediment delivery and adverse effects to stream channels, construction of machine fireline in riparian management zones should be avoided, except where needed to cross streams.
FM-5. Immediately establish an emergency team to develop a rehabilitation plan to attain RMOs and avoid adverse effects on listed anadromous fish and inland native fish whenever Riparian Habitat Conservation Areas are significantly damaged by a wildfire or a prescribed fire burning out of prescription.	FW-GDL-RMZ-07. To reduce sediment delivery to streams during or after fire suppression activities, disturbed areas in riparian management zones, such as firelines, drop-points, camps, roads, and trails, should be restored by actions such as scattering slash piles, replacing logs and boulders, scarifying soils, re-contouring terrain, and reseeding with native species.
Empty cell	FW-GDL-RMZ-08. To maintain water quality, pumping directly from a stream channel should be avoided if chemical products are to be directly mixed with water being withdrawn. When chemicals are used, pumping should be conducted from a fold-a-tank that is located outside the riparian management zones.

Fire suppression activities would continue to be implemented as they have in the past, including use of machine fireline as a primary tool, particularly where private lands and other human values are at risk from fires burning on National Forest System lands.

Managing wildland fires would continue to be used as a tool to achieve resource benefits in designated wilderness and roadless areas. While all these activities would be expected to result in site-specific, and in some cases broad, alterations of riparian vegetation and condition including potential effects aquatic species, when considered at the national forest and subbasin scale, adverse changes in riparian and stream conditions are not evident based on PACFISH and INFISH Biological Opinion (PIBO) monitoring from the early 2000s through 2019.

Effects common to all action alternatives

The Aquatic Ecosystems plan components related to fire management, as shown in Table 147, are designed to address fire management that would apply under all action alternatives. Fire management does not vary by alternative, nor do the Aquatic Ecosystems plan components. Unlike PACFISH and INFISH, direction for the conditions under which ignition of fire within riparian management zones (RMZs) could occur are included in FW-STD-RMZ-06. For prescribed fire, ignition in RMZs could result in a wider array of effects to riparian areas than not, except the conditions under which ignition would occur are stringent and would include an objective of meeting or contributing to attainment of Aquatic Ecosystems plan component desired conditions. Also, clarification on machine fireline construction in RMZs is included in FW-GDL-RMZ-06. Other components addressing fire management, as well as those more broadly addressing all activities (FW-STD-WTR-04) are similar to those in PACFISH and INFISH.

Effects from fire management activities conducted under these alternatives are largely dependent on the size, location, and extent of future wildfires and are therefore difficult to predict. In comparing their effects to the No Action Alternative, it would be expected that they would be similar or the same, as the incidence of wildfires would be same. There are, however, differences between direction in PACFISH and INFISH regarding fire management. For example, avoiding construction of machine firelines in RMZs (FW-GDL-RMZ-06) would be expected to result in fewer site-specific effects to riparian conditions than the No Action Alternative. Specific actions to reduce sediment and restore disturbed riparian areas following fire suppression (FW-GDL-RMZ-07, FW-GDL-WTR-08) may result in a greater degree of restored riparian conditions.

Allowing naturally ignited fires to play their role, particularly in wilderness areas and designated roadless, would result in long-term beneficial effects to aquatic habitat and aquatic species. This conclusion is based on many studies, including monitoring and inventory conducted on the Nez Perce-Clearwater, which have found that over various time scales the aquatic habitat resulting from disturbances caused by even high severity fire is more productive than similar habitats where the fire events were suppressed or altered by human influences (Reeves et al. 1995, Dunham et al. 2003, Rieman et al. 2003, Benda et al. 2003). In a report from monitoring conducted in the Upper Selway on the Bitterroot National Forest, Jakober (2002) found increased large woody debris, number of pools, residual pool volume, habitat complexity, and no evidence of long-term sedimentation of fish habitat. Jakober and Dentino (2003) described similar results after long-term monitoring of another fire in the Upper Selway, in addition to increased abundance of bull trout and cutthroat trout. They also documented a 35.6 to 37.4-degree Fahrenheit increase in stream temperatures but surmised this increase was not enough to preclude cold water species such as bull trout since numbers of bull trout had increased in the years following the fire.

For prescribed fire, ignition in riparian management zones (RMZs) could result in a wider array of effects to riparian areas than not, except the conditions under which ignition would occur are stringent and would include an objective of meeting or contributing to attainment of riparian and Aquatic Ecosystems plan components desired conditions.

FW-GDL-RMZ-04 addresses use of aerial fire retardants in RMZs and is expected to reduce risk of direct effects to aquatic species. FW-STD-RMZ-02, FW-GDL-RMZ-08, FW-STD-WTR-03, and FW-STD-WTR-05 address risks of direct effects to aquatic species from other firefighting activities, including use of pumps for water drafting, storage of fuel containers, staging of vehicles and equipment in RMZs, and use of screens on pumps. While some of these are also included in the No Action Alternative, the action alternatives provide more detail and specificity.

It should be recognized, however, that high severity wildfires in RMZs can result in direct and indirect mortality of fish from deleterious increases in stream temperature while the fire is burning and subsequent debris torrents in the months following the fire, and that these risks are a trade-off to the long-term benefits described above. In addition, long-term increases in stream temperature post-fire have also been documented (Sestrich et al. 2011, Mahlum et al. 2011), in some cases persisting for years after the fire (Dunham et al. 2007, Mahlum et al. 2011). As described in Rieman et al. (1997), fire may create changes in watershed processes, such as surface erosion and mass failure, that are often considered negative for fish, but the spatial and temporal nature of the disturbances are important (Reeves et al. 1995), and episodic contributions of large woody debris and coarse sediments that often occur after fires in many cases result in beneficial long-term effects and an amelioration of short or long-term negative effects, including increases in stream temperature.

Rieman et al. (1997), Rieman and Clayton (1997), Jakober (2002), Howell (2006), and others have documented increased abundance of fish years after fires, even in reaches where the fire had resulted in local extirpation of fish (Jakober 2002, Rieman et al. 1997). Sestrich et al. (2011) documented a decline in non-native brook trout over time and rapid recovery of native westslope cutthroat trout in severely burned areas in the Bitterroot River, suggesting fire may have shifted the competitive advantage in the favor of the native species.

In many cases, fire suppression actions, as well as the fact that successful suppression efforts temporarily remove fire from the landscape, may pose a greater risk to long-term process and function of streams than if the wildfire was left to burn. This could result in a decline in stream productivity for aquatic species over the long-term, depending on how successful suppression actions are. In areas where fire is utilized to meet land management plan objectives, the risks would be reduced.

In monitoring the effects to streams from a large fire that occurred in 1988 in the Lower Selway, Green and Gerhardt (1991) documented changes in stream channels and increased surface fines in 1989 and 1990 but, by 1991, surface fines were lower, indicating much of the fine sediment delivered after the fire had been moved downstream. Subsequent observations of the fire made in 2004 indicated little or no fine sediment deposition.

Therefore, the effects and outcomes related to fire management under the five action alternatives are expected to be similar to those described under the No Action Alternative. Static conditions and trends in riparian resources described by PACFISH and INFISH Biological Opinion (PIBO) monitoring that were achieved under the management described in the No Action Alternative are expected to be indistinguishable from those under the action alternatives. Action alternative aquatic components may result in fewer adverse effects at specific sites, as described above.

Summary of Consequences

Table 148 provides a summary of consequences by alternative.

Table 148. Summary of consequences to aquatic ecosystems and fisheries by alternative.

Measurement Indicator	No Action Alternative	Action Alternatives and Preferred Alternative
PIBO Indicators – condition and trend	This alternative has maintained existing stream conditions since the late 1990s and resulted in improved conditions Forestwide. Condition is static in some subbasins.	Aquatic components in Aquatic Ecosystems plan components are common to all action alternatives, except for some objectives. Alternatives expected to maintain existing stream conditions, maintain existing improving trends, and initiate improving trends in some watersheds where conditions have been static.
Effects to Aquatic Species	Effects to aquatic species mostly based on effects to aquatic habitat. PIBO data indicate habitat in managed watersheds is in worse condition than reference, when summarized at the national forest scale. While improving trends have been documented, trends in adult returns of anadromous fish (including Pacific lamprey) have been highly variable for the past 5 years. Bull trout trends have been static or improving state-wide.	Aquatic components in the Nez Perce Aquatic Ecosystems plan components are common to all action alternatives, except for some objectives. Based on addition and clarification of components designed to address direct effects (for example, water drafting, screening of pumps, redd tramping from livestock, etc.) direct effects are expected to be fewer than for No Action Alternative. Indirect and cumulative effects to aquatic habitat and trends are expected to support recovery goals for Endangered Species Act listed fish species and provide habitat conditions for long term persistence of Pacific lamprey.

Conclusions

Endangered Species Act Listed Species

The following represent the species determinations made in the Biological Assessment for Endangered Species Act (ESA) listed species, in addition to species determinations made for Species of Conservation Concern and Sensitive Species.

This section synthesizes the information in the Biological Assessment to substantiate an overall effect determination for each species and critical habitat listed by the ESA and each essential fish habitat listed by the Magnuson-Stevens Act. Consideration is given to distribution within the action area to determine how likely a species is to experience effects, baseline conditions, potential duration and magnitude of project effects, and cumulative effects to provide a comprehensive evaluation of how federally listed species might be affected by the revised forest plan.

Bull Trout and Critical Habitat

Almost all bull trout core areas in the action area have substantial portions of the watershed in either wilderness or Idaho roadless area which has kept habitat in near-reference condition and greatly reduces the risk of potential future project effects. Bull trout streams are subject to the most potential risk from future project effects, in Management Area (MA) 3 where suitability components generally do not preclude future actions that could adversely affect bull trout. Most core areas in the action area are showing either stable or increasing trends such that they are serving as strongholds within the larger Mid-

Columbia recovery unit. Only the South Fork Clearwater core area trend is inconclusive as discussed above. This trend data mirrors baseline conditions where those stable or increasing core areas are largely within MA1 or MA2 with habitat that is at or near reference condition. Conversely, PACFISH and INFISH Biological Opinion (PIBO) results indicate the South Fork Clearwater has several habitat indicators that are departed from unmanaged systems. Indirect effects of proposed programmatic actions would be mostly beneficial for bull trout, however, the proposed expansion of the motorized access suitability (10 percent increase in summer; 21 percent increase in winter) could lead to adverse effects in the future. Proposed plan components are expected to provide enough guidance that future activities would not threaten stable or increasing core areas nor hinder recovery in the South Forth Clearwater core area, but some adverse effects to individuals of the species or physical or biological features (PBFs) would likely be unavoidable. It is the combination of uncertainty about the trend in a core area, partially degraded baseline, expanded suitability for motorized use, and plan components that cannot completely prevent adverse effects to individuals that warrants a **May Affect, Likely to Adversely Affect** determination for bull trout and bull trout critical habitat (Table 149).

Snake River Steelhead Trout and Critical Habitat

Anadromous steelhead migrate in the mainstem corridors of the Snake River (up to Hells Canyon Dam) and Clearwater system rivers (up to Dworshak Dam in the North Fork Clearwater River). They spawn and rear in most subbasin tributaries where much of the production occurs in intermittent streams. This life history trait makes steelhead sensitive to management actions that could affect summer baseflows, pool formation, and floodplain inundation. As with bull trout, the risk of being affected is greatest for steelhead spawning streams in MA3. Recent biological viability assessments indicate the steelhead major population groups (MPGs) within the action area are either “maintained”, “viable”, or “highly viable.” Much of these trend data are related to habitat that is at or near reference condition (that is, MA1 and MA2); however, the South Fork Clearwater aggregated stocks appear to have a stable “viable” rating despite PACFISH and INFISH Biological Opinion (PIBO) results that indicate several habitat indicators are departed from unmanaged systems. Indirect effects of proposed programmatic actions would be mostly beneficial for steelhead except for the proposed expansion of the motorized access suitability (10 percent increase in summer; 21 percent increase in winter) which could lead to adverse effects in the future. Proposed plan components are expected to provide enough guidance that future activities would not threaten stable or viable stocks, but some adverse effects to individuals of the species or physical or biological features (PBFs) would likely be unavoidable. Despite the stable or viable trend within the action area, the combination of partially degraded baseline, expanded suitability for motorized use, and plan components that cannot completely prevent adverse effects to individuals that warrants a **May Affect, Likely to Adversely Affect** determination for Snake River steelhead trout and steelhead trout critical habitat (Table 149).

Snake River Spring/Summer Chinook Salmon, Critical Habitat, Essential Fish Habitat

Listed spring and summer Chinook salmon migrate in the mainstem corridors of the Snake River (up to Hells Canyon Dam) and Salmon River. They spawn and rear in many of the same subbasin tributaries as steelhead although not quite to the same extent; spring and summer Chinook would also have a substantial amount of exposure to management actions. A biological viability assessment reported in 2022 (Ford 2022) that the Upper Salmon and South Fork Salmon River major population groups (MPGs) have a “high” overall viability risk rating (Ford 2022). This is because despite improvements in abundance and productivity in several populations relative to the time of listing, most populations experienced sharp declines in abundance in the recent five-year period. This is thought to be related more to changing ocean conditions than from spawning or rearing habitat as PACFISH and INFISH Biological Opinion (PIBO) reports show several watersheds in the action area are near reference condition (that is, MA1 and MA2). Indirect effects of proposed programmatic actions would be mostly beneficial for spring and summer

Chinook except for the proposed expansion of the motorized access suitability (10 percent increase in summer; 21 percent increase in winter) which could lead to adverse effects in the future. Proposed plan components are expected to provide enough guidance that future activities would not hinder recovery of high-risk MPGs, but some adverse effects to individuals of the species or PBFs would likely be unavoidable. It is the combination of high-risk MPGs, partially degraded baseline, expanded suitability for motorized use, and plan components that cannot completely prevent adverse effects to individuals that warrants a **May Affect, Likely to Adversely Affect** determination for Snake River spring and summer Chinook and their critical habitat, and a **May Adversely Affect** determination for spring and summer Chinook essential fish habitat (Table 149).

Snake River Fall Chinook Salmon, Critical Habitat, Essential Fish Habitat

Fall Chinook currently spawn primarily in the mainstem Snake River (below Hells Canyon Dam), and the lower Clearwater River (below the North Fork Clearwater, largely downstream of the action area). Because most of the spawning takes place in larger mainstem rivers below and downstream of any potential forest management actions, fall Chinook are at lower risk of being affected by proposed actions than bull trout, steelhead, or spring and summer Chinook salmon, which use smaller stream habitat throughout the Nez Perce-Clearwater. The critical habitat designation is likewise located primarily at the western edge of the action area, although essential fish habitat includes entire watersheds upstream from mainstem rivers and therefore would have greater potential to be affected by the revised forest plan. Recent biological viability assessments indicate the overall status of Snake River fall Chinook salmon has improved compared to the time of listing such that the single population in the evolutionary significant unit (ESU) is currently meeting the criteria for an overall risk rating of "viable," although the entire ESU is still not meeting recovery goals. Baseline conditions in the lower Clearwater subbasin are measurably departed from reference conditions according to PACFISH and INFISH Biological Opinion (PIBO) data where median substrate size, pool tail fines, and observed versus expected aquatic macroinvertebrate were all degraded; the bank stability indicator also shows a negative trend. Indirect effects of proposed programmatic actions would be mostly neutral because fall Chinook and their critical habitat are generally restricted to mainstem rivers downstream of most forest management activities. Proposed plan components are expected to provide enough guidance that future activities would not threaten the population, but some adverse effects to individuals of the species or physical or biological features (PBFs) could be possible. Despite fall Chinook's viable trend near the action area, the combination of degraded baseline where they spawn and plan components that cannot completely prevent adverse effects to individuals warrants a **May Affect, Likely to Adversely Affect** determination for Snake River fall Chinook and fall Chinook critical habitat, and **May Adversely Affect** determination for essential fish habitat (Table 149).

Snake River Sockeye Salmon and Critical Habitat

Snake River sockeye salmon migrate from the ocean, up the Salmon River, passing through the Nez Perce-Clearwater on their way to natal, lacustrine habitats to spawn. There is no spawning or rearing habitat on the national forest and the critical habitat in the Salmon River that forms the southern boundary of the action area is used for migration only. In terms of natural production, the Snake River sockeye salmon evolutionary significant unit (ESU) remains at "extremely high risk" and the viability of ESU has likely declined since the time of the prior review so that the extinction risk category remains "high." The network of PIBO sites does not cover the Middle Salmon-Chamberlain subbasin but despite some minor degradation from isolated grazing and mining, the baseline condition is generally considered to be functioning appropriately because large portions of the watershed are either designated wilderness or roadless area. Indirect effects of proposed programmatic actions would be neutral because sockeye salmon and their critical habitat only skirt the edge of the action area. Furthermore, many of the Nez Perce-Clearwater tributaries to the Salmon River are within the Gospel-Hump and Frank Church-River of

No Return wilderness and roadless areas such that land management designations and forest plan components are expected to guide management of future activities in a manner that would not threaten the population or even allow effects to exceed beyond insignificant or discountable levels. For these reasons, the appropriate effect determination is **May Affect, Not Likely to Adversely Affect** for Snake River sockeye salmon and their critical habitat Table 149.

Coho Salmon

Coho salmon were historically present in the Clearwater basin but were officially declared extirpated in 1985. Coho have been reintroduced in some drainages on the national forest, but hatchery or reintroduced coho are not listed under the Endangered Species Act. The only federally listed entity that requires an effects determination is therefore the essential fish habitat in the Clearwater and Selway watersheds. Indirect effects of proposed programmatic actions would be mostly beneficial for coho essential fish habitat except for the proposed expansion of the motorized access suitability (10 percent increase in summer, 21 percent increase in winter) which could lead to adverse effects in the future. Proposed plan components are expected to provide enough guidance that future activities would not cause adverse habitat modification, but some negative effects to habitat elements would likely be unavoidable. For this reason, the appropriate effects determination for coho salmon essential fish habitat is **May Adversely Affect** (Table 149).

Table 149 Summary of effect determinations for individuals and critical habitat listed under the Endangered Species Act (ESA) and essential fish habitat listed under the Magnuson-Stevens Act (MSA).

Species	Listing Status	Individuals (ESA)	Critical Habitat (ESA)	Essential Fish Habitat (MSA)
Bull trout	Threatened	LAA	LAA	Not Applicable
Snake River Steelhead Trout	Threatened	LAA	LAA	Not Applicable
Snake River Spring/Summer Chinook Salmon	Threatened	LAA	LAA	MAA
Snake River Fall Chinook Salmon	Threatened	LAA	LAA	MAA
Snake River Sockeye Salmon	Endangered	NLAA	NLAA	Not Applicable
Hatchery Coho Salmon	Not Applicable	Not Applicable	Not Applicable	MAA

LAA = Likely to Adversely Affect
NLAA= Not likely to Adversely Affect
MAA= May Adversely Affect

Species of Conservation Concern

Pacific Lamprey

As research continues into the causes of population declines in Pacific lamprey, as lamprey conservation science matures, and the effectiveness of translocations and other conservation measures are evaluated, land allocation decisions and aquatic ecosystem plan components in the revised plan are designed to continue to protect suitable upriver and tributary spawning and rearing habitat for lamprey by not retarding attainment of desired conditions for aquatic habitat. Movement of stream and riparian areas toward aquatic desired conditions is expected to be beneficial for lamprey. Adult lamprey should benefit from plan components that are designed to protect spawning habitat for salmonids, because they use similar habitat for spawning. Juvenile lamprey are expected to benefit from plan components designed to protect and enhance low velocity, off stream habitat and channel complexity. Incidentally, juvenile lamprey may benefit from some fine sediment in streams on as they need fine sediment to burrow into and mature for several years before out-migrating to the ocean, so sediment effects that could be detrimental to salmonid spawning and overwintering could offer some to benefit juvenile lamprey. An individual plan component specific to lamprey (FW-GDL-WTR-07) is designed to conserve existing

Pacific lamprey populations on the Nez Perce-Clearwater, by suggesting that individuals should be re-located to an alternative site with suitable habitat prior to de-watering channel work proposed in areas containing habitat for these species. This is a continuation of a practice that currently occurs on the national forest. For areas on the national forest that are protected from land management effects by land allocation decisions, threat ratings were low, and are expected to continue to be low under the revised forest plan. For areas that did receive higher threat scores (whether warranted or not), it is expected that aquatic plan components, as well as continued habitat restoration projects will continue to protect and improve conditions for lamprey. Overall, the land management plan and especially the aquatic and riparian plan components are expected to provide the ecological conditions necessary to ensure long term persistence of Pacific lamprey within the plan area.

Other Species

Although they are not Endangered Species Act listed or included on an Species of Conservation Concern list because of ineligibility, hatchery produced Clearwater River spring Chinook and coho provide regionally important tribal and sport fisheries on the national forest, and a specific plan component (FW-GL-WLMU-02) was developed that is designed to foster cooperation and collaboration with the State of Idaho and Nez Perce Tribe for the perpetuation of those fisheries.

Conclusion

Although the material reproduced above from the Biological Assessment highlights that there may be effects to individuals on the Nez Perce-Clearwater, for National Environmental Policy Act purposes the concern is if there will be effects to populations on the national forest from various alternatives. Except for some land allocation details and some differences in risk as noted in this document, the effects on aquatic species and habitat are expected to be largely the same or similar between action alternatives, and the preferred alternative offers an improvement from the No Action Alternative. The risks associated with climate change effects including more frequent high-severity fire under the No Action Alternative outweigh the risks presented by the preferred alternative. In conclusion, most of the area that is covered by the forest plan (approximately two-thirds) is found in land allocations such as designated wilderness, proposed wilderness, Idaho Roadless Rule themes, and Wild and Scenic Rivers, that by design, offer sweeping protections from management activities. For the remaining one-third that is subject to forest management, there are strong ecosystem plan components that carry forward, clarify, and improve upon PACFISH and INFISH direction, and offer unprecedented protective measures to streams and aquatic organisms on the Nez Perce-Clearwater. Differences between action alternatives are muted by aquatic riparian buffers that are larger than adequate to protect aquatic resources. Additional benefit is expected from the strategy of integrated plan components in the revised forest plan, which is designed to move ecological conditions at the landscape scale toward a set of desired conditions developed based on analysis of natural range of variation. The combination of integrated plan components of the revised plan regarding desired conditions, as well as specific aquatic plan components are expected to continue to protect and enhance aquatic habitat on the national forest, in addition to increasing resilience of aquatic species, and these factors are expected to support recovery of Endangered Species Act (ESA) listed fishes on the national forest.

Because there are so many factors and stakeholders involved, recovery and protection of salmon, steelhead, and other native fishes on the forest can be a slow process, that requires a great deal of scientific expertise and coordination to identify and apply scientific outcomes to forest management in order to deal with continuing ecological threats. Although it began years before the latest Presidential Memorandum from the Biden Administration came out, the Forest Plan Revision process and especially the ARCS working group exemplifies the process that was directed in the White House memo:

to "pursue effective, creative, and durable solutions, informed by Indigenous Knowledge, to restore healthy and abundant salmon, steelhead, and other native fish populations in the Basin".

The forest has been doing this for over a decade, using the implementation of the forest plan revision process to pursue solutions that creatively engage with stakeholders, are that are effective and durable in the face of climate change and other threats; and the resulting revised Land Management Plan represents a durable and creative solution that was informed by collaboration and cooperation with many stakeholders including the Nez Perce Tribe.

In summary, the combination of large areas of intact high quality stream habitat protected by land allocations, the required application of U.S. Forest Service best management practices in management that occurs outside those protective land allocations, in addition to protective measures provided by aquatic ecosystem plan components, as well as the integrated nature of other forestwide plan components, and the application of results of the ESA consultation with is expected to be sufficient to protect ESA listed fishes on the national forest and to provide the conditions for recovery as it pertains to critical habitat on the national forest. The same factors are also expected to provide for continuing viable populations of Species of Conservation Concern on the national forest. The revised forest plan is thus expected to maintain the status of a select set of the ecological conditions required under § 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and provide long term persistence ofeach species of conservation concern.

3.2.9 Wildlife

The 2012 Planning Rule provides direction to maintain diversity of animal communities and the persistence of native species through a complementary coarse filter approach (FSH 1909.12 23.11 (1)(c)). The coarse filter components ensure that the broad habitat types and characteristics that support many native species are maintained. Fine-filter plan components can be added when additional direction is needed to support a specific species. The plan must provide the ecological conditions to maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area. As described in the Planning Rule and in the Directives, plan components developed for ecosystem integrity and ecosystem diversity are expected to provide for ecological conditions necessary to maintain the persistence of most native species within the plan area (FSH 1909.12, sec 23.11).

The Wildlife section evaluates terrestrial and aquatic wildlife species, including birds, mammals, reptiles, amphibians, and some invertebrates. The analysis evaluates the sufficiency of plan components and alternatives to meet the substantive requirements of the 2012 Planning Rule under sections 219.8—Sustainability, 219.9—Diversity of plant and animal communities, and 219.10—Multiple use and associated directives as they relate to wildlife.

Section 219.8—Sustainability of the 2012 Planning Rule requires that forest plans must provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area. Ecological sustainability is provided through ecosystem integrity, which is defined in the planning rule as:

The quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence.

An ecosystem is defined as the following (36 CFR 219.19): An ecosystem is a spatially explicit, relatively homogeneous unit of the Earth that includes all interacting organisms and elements of the abiotic environment within its boundaries. An ecosystem is commonly described in terms of its:

1. Composition. The biological elements within the different levels of biological organization, from genes and species to communities and ecosystems.
2. Structure. The organization and physical arrangement of biological elements, such as snags and coarse woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity.
3. Function. Ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances, including wind, fire, and floods.
4. Connectivity. Ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change.

Ecological integrity, as described above, influences the ecological conditions for wildlife in the plan area. Ecological conditions are defined in the Planning Rule as:

The biological and physical environment that can affect the diversity of plant and animal communities, the persistence of native species, and the productive capacity of ecological systems. Ecological conditions include habitat and other influences on species and the environment. Examples of ecological conditions include the abundance and distribution of aquatic and terrestrial habitats, connectivity, roads and other structural developments, human uses, and invasive species.
Section 219.8 also requires the plan to provide for social and economic sustainability, which includes multiple uses and ecosystem services. Multiple uses and ecosystem services both have implications for how wildlife is addressed in the plan as directed under Section 219.10 of the Planning Rule.

Section 219.9 of the 2012 Planning Rule adopts a complementary ecosystem and species-specific approach to maintaining the diversity of plant and animal communities and the persistence of native species in the plan area. It does so under two parts pursuant to Section 219.8 paragraph a and paragraph b. Paragraph a is intended to provide the ecological conditions to both maintain the diversity of plant and animal communities and support the persistence of most native species in the plan area. Paragraph a requires plans to maintain or restore the diversity of ecosystems and habitat types throughout the plan area. In doing so, the plan must include plan components to maintain or restore:

- Key characteristics associated with terrestrial and aquatic ecosystem types;
- Rare aquatic and terrestrial plant and animal communities; and
- The diversity of native tree species similar to that existing in the plan area.

Ecosystem diversity is defined as “the variety and relative extent of ecosystems” (36 CFR 219.19). Habitat types are defined as “a land or aquatic unit, consisting of an aggregation of habitats having equivalent structure, function, and responses to disturbance.”

Paragraph b of Section 219.9 of the Planning Rule requires that, when ecosystem plan components do not provide the ecological conditions necessary to provide for at-risk species, then additional species-specific plan components be included in the plan to provide such ecological conditions in the plan area. The term at-risk species is used in land management planning to refer to, collectively, the federally recognized threatened, endangered, proposed, and candidate species and species of conservation concern within a plan area (1909.9 zero code).

Pursuant to these requirements, this analysis will first evaluate how the suite of plan components and alternatives provide ecological conditions for 1) ecosystem integrity as it relates to wildlife, 2) how they provide for the diversity and abundance of wildlife, and 3) how the plan components and alternatives provide for at-risk species and "contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern within the plan area." Evaluation of how the coarse filter would provide for the diversity and abundance of wildlife is found in the Diversity and Abundance of Wildlife section. Evaluation of the consequences of the proposed plan for at-risk species are in two sections: the Abundance and Diversity of Wildlife section and the Threatened, Endangered, Candidate, and Proposed Wildlife Species section.

While meeting the requirements of 219.8 and 219.9 of the Planning Rule, the plan must provide for ecosystem services and multiple uses for wildlife and fish. Section 219.10 requires the deciding official to consider habitat conditions, subject to the requirements of § 219.9 for wildlife, fish, and plants commonly enjoyed and used by the public for hunting, fishing, trapping, gathering, observing, subsistence, and other activities. Plan components for wildlife uses were developed in collaboration with the Nez Perce Tribe and the Idaho Department of Fish and Game. The suite of plan components and alternatives will be analyzed for whether they provide for habitat conditions for species commonly enjoyed and used by the public as described above. This analysis can be found in the Wildlife for Multiple Uses section.

These wildlife reports provide information on the degree to which the revised plan and alternatives provide components that will maintain the diversity of animal communities and support the persistence of most native species in the plan area. By design, this report relies in part on the coarse filter information in the Forestlands section as a key part of that analysis. The directives state "for most species, the only practical quantitative evaluation of their required ecological conditions is an assessment of habitat conditions (ecological conditions)" (FSH 1909.12 23.13). In all reports, the analysis will evaluate how plan components and alternatives provide ecological conditions for wildlife, first through a coarse filter approach and then, if needed, through fine filter plan components. The fine filter plan components provide for the needs of wildlife species that are not well captured by coarse filter components and require individual attention. Some discussion is included from other resource reports as needed, particularly the Forestlands, Soil Resource, Water Resources, and Aquatic Ecosystems and Fisheries sections, for describing additional ecological conditions relevant to evaluation of wildlife habitats.

A brief description of the habitat needs of each species known to occur in the plan area can be found in Appendix C of the Final Environmental Impact Statement. To facilitate analysis of coarse filter ecosystem plan components, all wildlife species known to occur in the plan were grouped into one of seven broad categories or groups based on their habitat preferences. Species were further divided into habitat subgroups or subcategories, which are also presented in Appendix C. Rather than analyzing the effects of the plan on individual wildlife species, the analysis evaluates the effects of the plan and alternatives on these habitat groupings or subgroupings. The habitat groups are described and analyzed in the abundance and diversity of wildlife report, and a crosswalk of ecosystem plan components with habitat groups can be found in Appendix C. At-risk species were included in these groupings and individually analyzed.

At-risk species analyzed separately include the federally listed threatened Canada lynx (*Lynx canadensis*) and grizzly bear (*Ursus arctos horribilis*), wolverine (*Gulo gulo*), and the following species of conservation concern: fisher (*Pekania pennanti*), harlequin duck (*Histrionicus histrionicus*), white-headed woodpecker (*Dryobates albolarvatus*), bighorn sheep (*Ovis canadensis*), and mountain quail (*Oreortyx pictus*). Appendix C includes an evaluation of the threats to each at-risk species using the methods described below. The analysis in the wildlife report then goes on to evaluate the threats to these species in the plan area and how those threats are addressed in plan components. A crosswalk of at-risk species back to their risks and how plan components address these risks are included in Appendix C.

Additional sections of the Final Environmental Impact Statement analyze aspects of ecosystems that contribute to wildlife habitats. The Forestlands section describes how plan components in the No Action Alternative and action alternatives would provide for ecological sustainability and ecological integrity of ecological conditions for species that rely on forest vegetation characteristics, as directed by the 2012 Planning Rule. The Forestlands section discusses the degree to which some key ecosystem characteristics, which are identified as indicators for that analysis, would be maintained or restored by each alternative. More specifically, that report provides information regarding the potential impacts of the revised plan and alternatives on a variety of ecosystems, plant communities, and vegetation characteristics. These plant communities and vegetation characteristics provide many, but not all, of the habitat components required by terrestrial animal communities and native wildlife species.

Plant communities in the Forestlands section are discussed as broad potential vegetation type (PVT) groups and analysis in that report addresses succession, dominance types, density, resilience, size class, old growth, aspen, both live and dead large diameter trees, and some non-forested types. These characteristics will support many wildlife species. Many species depend on vegetation structural characteristics as key requirements and will be evaluated under ecosystem plan components. Plant communities for non-forested vegetation and their conditions, as well as effects, are discussed in the non-forested vegetation section of the Forestlands report.

A broad variety of wildlife, both terrestrial and aquatic associated species, use aquatic habitats, riparian areas, rivers, ponds, wetlands, and lakes. Aquatic habitats are discussed in the Aquatics Ecosystem and Fisheries and the Water Resources sections. These sections describe how plan components in the No Action Alternative and action alternatives would provide for ecological sustainability and ecological integrity of aquatic habitats, as directed by the 2012 Planning Rule. The Aquatics Ecosystem and Fisheries section discusses the degree to which key ecosystem characteristics of aquatic habitats would be maintained or restored by each alternative from a mostly fisheries perspective. More specifically, that report provides information regarding the potential impacts of the alternatives on a variety of aquatic ecosystems characteristics. These aquatic communities and vegetation characteristics provide many of the habitat components required by aquatic wildlife communities and native aquatic wildlife species. While the Aquatic Ecosystem and Fisheries and the Water Resource sections focus on fisheries and water quality and quantity, the Abundance and Diversity of Wildlife section evaluates the effects of the plan on aquatic and riparian habitat from a wildlife perspective.

Terrestrial wildlife species are important as contributors to biological diversity and ecosystem integrity, as well as providing benefits to humans in the form of viewing, hunting, trapping, cultural relevance, and sense of place. Many species serve ecological roles that contribute to the function of an ecological system. For example, some wildlife species disperse seeds and play an important role in reforestation after disturbance. Other species disperse fungi, many of which form symbiotic relationships with vegetation required for nutrient exchange between plants and their environments. Several bird species forage heavily on insects, which provide important checks and balances system on insect pests. Ensuring that native wildlife species are present, abundant, diverse, and will persist over the long term in the plan area will guarantee that ecosystems function properly and safeguard that wildlife continue to be available for a variety of human uses.

The 2012 Planning Rule requires that the plan must include components, such as standards or guidelines, to maintain or restore connectivity. As it pertains to wildlife, connectivity is defined as “the ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the daily and seasonal movements of animals within home ranges, the dispersal, and genetic interchange between populations, and the long-distance range shifts of species, such as in response to climate change” (36 CFR 219.19). Habitat connectivity is widely recognized as a crucial component for maintaining biodiversity and managing for sustainable populations of native species (Hansen 2009, McIntyre and Ellis 2011, Parks et al. 2012, Cushman and Landguth 2012, Wade et al. 2015, Haber and Nelson 2015, McClure et al. 2016, Western Governor's Association 2008, Thomas 1979).

Relevant Laws, Regulations, and Policy

Federal Laws

The following includes the key set of statutory authorities that affect wildlife management on National Forest System lands. They are briefly identified and described below to provide context to management and the Final Environmental Impact Statement evaluation of the wildlife resource. Many other laws, regulations, executive orders, and policies not described below also guide the management of this resource.

Bald and Golden Eagle Protection Act of 1940: This act prohibits unauthorized possession of bald and golden eagles, as defined through subsequent regulations.

Endangered Species Act of 1973, as amended: This act provides requirements for federal agencies with regard to species listed as threatened, endangered, or candidate under the act. Section 2 requires all federal agencies to “seek to conserve endangered species and threatened species.” Section 5 directs the Secretary of Agriculture to "establish and implement a program to conserve fish, wildlife, and plants," including federally listed species. Section 7 requires federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats.

The Federal Cave Resources Protection Act of 1988: The purpose of this act is to protect and preserve significant caves and cave resources, including animal and plant life occurring naturally in caves, on federal lands and to foster cooperation and exchange of information between governmental authorities and those who use caves for a variety of purposes. A list of significant caves is to be maintained and periodically updated and significant caves are to be “considered in the preparation or implementation of any land management plan.”

Migratory Bird Treaty Act of 1918: This act prohibits unauthorized take of migratory birds, as defined through subsequent regulations. The language of this act, as amended, is as follows “unless and except as permitted by regulations…it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill…any migratory bird, any part, nest, or egg of any such bird…included in the terms of the conventions.”

National Forest Management Act of 1976: This act states that the Secretary shall “promulgate regulations” under the principles of the Multiple-Use Sustained-Yield Act of 1960 to “provide for diversity of plant and animal communities based on the suitability and capability of the specific land area to meet overall multiple-use objectives, and within the multiple-use objectives of a land management plan adopted pursuant to this section, provide, where appropriate to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by the Plan”

(Pub. L. 94-588, Sec. 5 (g)(3)(B)). The 2012 Planning Rule was determined to be consistent with this act (77 FR 21162).

Nez Perce Treaty of 1855: This treaty retained certain rights to hunt, fish, graze, and gather on the lands ceded to the United States. These rights, retained on ceded lands, are known as “off-reservation treaty rights” or “other reserved rights.” These treaty rights include hunting, gathering, and grazing rights on federal lands within the plan area. Trust responsibility arises from the United States' unique legal and political relationship with Indian tribes. It derives from the Federal Government's consistent promise, in the treaties that it signed, to protect the safety and well-being of the Indian tribes and tribal members. The federal trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal treaty rights, lands, assets, and resources, as well as a duty to carry out the mandates of federal law with respect to all federally recognized American Indian and Alaska Native tribes and villages.

Sikes Act of 1974, as amended: This act states that Forest Service policies recognize the fact that state agencies and Indian tribes are responsible for management of animals, whereas national forests manage wildlife habitats in cooperation with those entities. The Sikes Act directs the Secretaries of Interior and Agriculture to cooperate with the states in developing comprehensive plans to plan, maintain, and coordinate the conservation and rehabilitation of wildlife, fish, and game, including but not limited to protection of species considered threatened or endangered pursuant to Section 4 of the Endangered Species Act (16 USC 1533) or considered to be threatened, rare, or endangered by the state agency.

Executive Orders

Executive Order 11644—Use of Off-Road Vehicles—1972, as amended by Executive Order 11989: This order addresses the use of off-road vehicles on public lands. It requires the Forest Service to “establish polices and provide for procedures that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.” The order directs agencies to designate the “specific areas and trails on public lands on which the use of off-road vehicles may be permitted and areas in which the use of off-road vehicles may not be permitted.” The minimization criteria are identified in the final rule for Travel Management—Designated Routes and Areas for Motor Vehicle Use. This rule is commonly referred to as the 2005 Travel Management Rule and implements provisions of Executive Orders 11644 and 11989 regarding off-road use of motor vehicles on federal lands. Regulations implementing this rule are found in 36 CFR § 212. The portion of the rule pertaining to motor vehicle use is subpart B and the portion of the rule pertaining to motorized over-snow vehicle use is subpart C, which was updated in January 2015. The “minimization criteria” referenced in the 2015 circuit court opinion and district court order are in 36 CFR § 212.55(b), where specific criteria for designation of trails and areas relevant to wildlife specify that “in designating National Forest System trails and areas on National Forest System lands, the responsible official shall consider effects on the following with the objective of minimizing… (2) Harassment of wildlife and significant disruption of wildlife habitats.” The Nez Perce-Clearwater designates specific areas and trails for the use of motor vehicles, including off-road vehicles. These areas and trails are displayed on the Nez Perce-Clearwater’s motor vehicle use maps, as required by 36 CFR § 212 subpart B.

Executive Order 12898—Environmental Justice—February 11, 1994: This order directs federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations to the greatest extent practicable and permitted by law.

Executive Order 13112—Invasive Species—February 3, 1999: This order called upon executive departments and agencies to take steps to prevent the introduction and spread of invasive species and to support efforts to eradicate and control invasive species that are established.

Executive Order 13186—Migratory Birds—January 10, 2001: This order was issued by President Bill Clinton in furtherance of the purposes of the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Acts, the Fish and Wildlife Coordination Act, the Endangered Species Act, and the National Environmental Policy Act. This order requires including effects of federal actions on migratory birds as part of the environmental analysis process. On January 17, 2001, the Forest Service and the Fish and Wildlife Service signed a memorandum of understanding to complement the executive order. The memorandum of understanding expired in 2017; however, other sections of the executive order, coupled with the Migratory Bird Treaty Act and Bald and Golden Eagle Act, address Forest Service avian compliance to protect migratory birds.

Policy

2001 Roadless Area Conservation Rule (36 CFR § 294 subpart B; 66 FR 3244-3273): This rule includes a prohibition on road construction and road reconstruction in inventoried roadless areas and prohibits timber cutting, sale, or removal except in certain circumstances.

2012 Planning Rule: The rule requires national forests to maintain the diversity of plant and animal communities and support the persistence of native species within the plan area. National forests are directed to use a "complementary ecosystem and species-specific approach to provide for the diversity of plant and animal communities" and to maintain species persistence in their planning.

Relative to wildlife species, the rule directs national forests to consider:

- habitat conditions for at-risk species, subject to the requirements of 36 CFR § 219.9;
- habitat conditions for wildlife, fish, and plants commonly enjoyed and used by the public for hunting, fishing, trapping, gathering, observing, subsistence, and other activities in collaboration with federally recognized Tribes, Alaska Native Corporations, other federal agencies, and state and local governments (§ 219.10 (a)(5)), subject to the requirements of § 219.9;
- dominant ecological processes, disturbance regimes, and stressors such as natural succession, wildland fire, invasive species, and climate change;
- the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change (§ 219.8);
- habitat and habitat connectivity; and
- riparian areas (§ 219.10 (a)(1)).

The 2012 Planning Rule requires that forest plans use a complementary ecosystem and species-specific approach. The responsible official determines whether the plan components provide the ecological conditions necessary to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and provide ecological conditions to maintain a viable population of each species of conservation concern within the plan area. If the responsible official determines that the ecosystem plan components are insufficient to provide such ecological conditions, then additional species-specific plan components, including standards or guidelines, must be included in the plan to provide such ecological conditions in the plan area (36 CFR § 219.9 (b)(1)). If the responsible official finds that it is beyond the authority of the Forest Service or not within the inherent capability of the plan area to maintain or restore the ecological conditions to maintain a viable population of a species of conservation concern in the plan area, then the responsible official must show that the plan includes plan components, including standards or guidelines, to maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range.

The term "recovery" is defined in the 2012 Planning Rule as "the improvement in the status of a listed species to the point at which listing as federally endangered or threatened is no longer appropriate." The term conserve is defined as "to protect, preserve, manage, or restore natural environments and ecological communities to potentially avoid federally listing of proposed and candidate species." The term "conservation" is defined as "the protection, preservation, management, or restoration of natural environments, ecological communities, and species" (36 CFR 219.19).

2015 Final Land Management Planning Directives: These directives provide specific information regarding implementation of the 2012 Planning Rule, including identifying at-risk species and guidance for development of plan components to provide ecological sustainability for at-risk species. The directives state that plan components developed for ecosystem integrity are expected to provide conditions that will maintain the persistence or contribute to the recovery of native species within the plan area. They also state that if components for ecosystem diversity are not adequate to do that for at-risk species, then species-specific plan components should be developed.

Plan components developed for multiple uses may contribute to, or detract from, ecological conditions needed for at-risk species. For example, on some forests or grasslands a portion of the plan area may have a desired condition for undeveloped remote recreation. Such a desired condition should be taken into account when evaluating the ecological conditions for at-risk species because it may mitigate some stressors, contribute to ecological conditions, or provide refugia.

Development of plan components for proposed and candidate species should be based on the ecological conditions necessary to conserve proposed and candidate species that were identified in the assessment phase or through information brought forward during the public and governmental participation process and maintain or restore their habitats in the plan area to contribute to preventing them from being federally listed (FSH 1909.12, Ch. 10, sec. 12.55).

Additional policies specific to Wildlife include the following:

- 36 CFR 212 Travel Management
- 36 CFR 223 Special Forest Products
- 36 CFR 228 Minerals
- 36 CFR 241 Fish & Wildlife
- 36 CFR 251 Land Uses
- 36 CFR 254 Land Ownership Adjustments
- 36 CFR 262 Law Enforcement Support Activities
- 36 CFR 293 Wilderness

State and Local Policy

Title 36—Fish and Game: This policy provides the State of Idaho's comprehensive wildlife laws.

State and Local Plans

Clearwater County Natural Resources Plan: This plan establishes a framework for the county's resource management activities

Clearwater County Community Wildfire Protection Plan

Idaho County Natural Resources Plan: This plan clearly states the desires and objectives of the county regarding management of the natural resources located on public lands located within the county.

Idaho County Wildland-Urban Interface Wildfire Mitigation Plan: This plan was developed to address the National Fire Plan, consistent with Federal Emergency Management Agency requirements, at the county level and it describes the risks and potential treatments within the wildland-urban interface of Idaho County.

Benewah County Natural Resources Plan

Idaho Elk Plan: This plan functions as an action plan to provide specific goals, strategies, and performance objectives for elk management. The planning process outlines the status of hunter preferences and wildlife populations to determine goals, strategies, and performance objectives that will drive future management direction. The plan provides guidance to Idaho Department of Fish and Game's staff to manage Idaho's elk habitat and populations.

Idaho Whitetail Deer Plan: This plan provides guidance to Idaho Department of Fish and Game staff to manage Idaho's white-tailed deer habitat and populations.

Idaho Moose Plan: This plan provides guidance to Idaho Department of Fish and Game staff to manage Idaho's moose habitat and populations.

Idaho Mule Deer Plan: This plan provides guidance to Idaho Department of Fish and Game staff to manage Idaho's mule deer habitat and populations.

Idaho Bighorn Sheep Plan: This plan provides guidance to Idaho Department of Fish and Game staff to manage Idaho's bighorn sheep habitat and populations.

Idaho Mountain Goat Plan: This plan provides guidance to Idaho Department of Fish and Game staff to manage Idaho's mountain goat habitat and populations over the next six years. The plan directs Idaho Department of Fish and Game to sustain or increase mountain goat populations across the state. To accomplish this goal, Idaho Department of Fish and Game has identified statewide management direction and strategies, as well as specific strategies for each Population Management Unit (PMU).

Latah County Community Wildfire Protection Plan

Shoshone County Fire Mitigation Plan

State Wildlife Action Plan: Idaho's statewide plan for conserving and managing Idaho's diverse fish and wildlife and the habitats they depend on serves as strategic direction to implementing proactive, nonregulatory, action-based solutions to conserve fish and wildlife. The Plan provides a checklist of wildlife species in the state; provides criteria for identifying species of greatest conservation need; and provides an assessment of each species of greatest conservation need, including their extirpation risk in Idaho. The document identifies associated conservation targets, such as habitat and species assemblage, and a narrative description for each conservation target, its viability, and prioritized threats and strategies.

Methodology

Changes Between the Draft and Final Environmental Impact Statements

Many plan components underwent editing and revision between the Draft and Final Environmental Impact Statement in response to comments, feedback from cooperating agencies, internal Forest Service review, consultation with the U. S. Fish and Wildlife Service, and consultation with the Nez Perce Tribe. Changes to coarse filter ecosystem plan components occurred within several sections of the plan including the forestlands, aquatic ecosystems, and in the meadows, grasslands, and shrublands sections, for example. There were also changes to species specific plan components including for bighorn sheep related to pack goats, the fisher plan component, the plan components for multiple use wildlife including elk (*Cervus canadensis*), and the addition of plan components designed to contribute to grizzly bear recovery.

The wildlife analysis for the Final Environmental Impact Statement is far more developed than it was at the Draft Environmental Impact Statement phase. Improvements include more rigorous spatial overlays in nearly every section of the wildlife analysis to evaluate the effects of land allocations, improved vegetation modeling and queries to evaluate the effects on habitat, a more robust grizzly bear analysis, and changes in response to plan component changes. For example, there were significant improvements in the model to evaluate the trend in riparian habitat conservation areas (RHCAs) under the plan. This included improved delineation of riparian areas, improved vegetation data, and improved pathways to predict their growth patterns. They were also calibrated with our understanding of fire behavior from on the ground surveys in the plan area. A second example is that there was a more refined habitat model to evaluate the trend in fisher habitat including the development of a spatial query to evaluate how the plan would affect the spatial distribution of preferred female home ranges. In a third example, the elk query was combined with a nutrition potential model to evaluate the changes in available high-quality nutrition as a result of the plan which should support higher elk and other ungulate populations for multiple uses. There was improvement to the analysis of coarse filter ecosystem plan components to evaluate how the plan would provide for the diversity and abundance of wildlife based on key ecosystem characteristics, and effects on habitats. Appendix C provides a new crosswalk of species, their habitat, key ecosystem characteristics of habitats, and how plan components provide for those habitats. It also provides a crosswalk of how plan components address threats to at-risk species.

Spatial Scale

The spatial scale is the plan area of the Nez Perce-Clearwater. However, in some cases, the evaluation looks at the broader landscape when evaluating cumulative effects, connectivity, and wide-ranging species. The plan area was chosen because it represents nearly 4 million acres of habitats for wildlife, which is sizable enough to contain populations of most species. Furthermore, the Nez Perce-Clearwater only has control over activities and actions within the plan area.

In general, the analysis area for wildlife includes all lands managed by the Nez Perce-Clearwater; however, for the purposes of this document it may include segments outside National Forest System boundaries. In some cases, National Forest System lands may provide all, or a high percentage, of the habitat for a given species; however, in most instances, wildlife generally move from area to area without regard for boundaries. Cumulative effects analyses generally include lands within other ownerships immediately adjacent to the Nez Perce-Clearwater, although for some wide-ranging species the analysis area may have been larger and included an evaluation of connectivity between larger areas of habitat, such as connectivity for grizzly bears between recovery zones.

Temporal Scale

In most cases, the temporal scale of analysis included the life of the Land Management Plan. Some habitat analyses are evaluated over a longer timeframe. The Ecosystem Research Group report (Ecosystem Research Group 2019, 2021), for example, assessed habitat changes for the next five decades. Past actions were also considered, as they play a role in determining the existing conditions and may interact cumulatively with the effects of the Land Management Plan. In some cases, it may be appropriate to evaluate a longer time scale. Such instances include situations where a wildlife species' generation time or lifespan is longer than the life of the plan. Some habitat management may have effects that last much longer than 50 years. For example, management in mature or old forest that could occur under the selected alternative may affect habitat conditions at a site for hundreds of years. These effects would be of little consequence at a landscape scale unless they occurred at a pace that affected the proportions of those habitat types through time in the plan area. To account for these situations, the analysis used modeling for 120 years through SIMPPLLE and 120 and 150 years in PRISM. However, the farther out predictions are made the more uncertain they are. Most reporting from SIMPPLLE and PRISM modeling is for 50-year periods to limit uncertainty. The analysis recognizes that effects can last over longer time periods.

Some changes that would occur under the plan may be permanent and consequences may be permanent. The conversion of native habitats to a condition dominated by exotic vegetation could have effects that would be more or less permanent. The loss of very live old trees could be permanent from a practical standpoint given the length of time needed for trees to reach that age. Similarly, in the event the climate changes enough so that forest conditions of the past could not be maintained, the effects of some management may never return to their historic range of variability. The question then becomes whether those systems are sustainable through time. In summary, effects for most species will be the life of the plan, except in the cases described above when generation times are long, when species are dependent upon old growth or climax stage forest, or in cases where effects are more or less permanent. In those instances, the analysis used different timeframes on a case-by-case basis.

Use of Models, Maps, and Data

The Nez Perce-Clearwater relied on a variety of databases to support the development of plan components and assess the consequences of alternatives to native species. The Nez Perce-Clearwater's map-based information is stored in a geographic information system (GIS) database maintained by the Nez Perce-Clearwater's GIS specialists. GIS-based data includes layers such as forest vegetation layers, topography layers, administrative boundaries, management areas, road and travel layers, recreation sites, timber suitability layers, range, wildlife databases, wildlife habitat models, and others.

The models used are identified in the individual section for each species. Wildlife analyses relied on quantitative and spatial outputs from multiple modeling exercises, using GIS and other tools. Such models were used to evaluate:

- proportions of unique habitat types affected by permanent human developments, such as roads and other infrastructure
- amounts and types of habitat for species, such as lynx and wolverine
- important areas for wildlife habitat connectivity
- predicted changes in climate patterns and potential impacts to wildlife and habitat.

Statistician George Box famously wrote "all models are wrong, but some are useful" (Box 1979). This statement implied that models do not perfectly represent reality exactly, but models often do provide remarkably useful approximations (Box 1979). A model is a simplification or approximation of reality and will not reflect all of reality. In this analysis, it is not assumed that the models are exact representations of reality, only that they approximate reality in a useful way through the parameters they are meant to inform. It is important to understand that models have limitations. There is uncertainty with all models, including models of the natural range of variation that occurred in the past, as well as the changes predicted to occur in the future. In addition, models, maps of habitat, and numeric estimates of habitat or species populations may change over time due to changes on the ground, as technology changes to acquire better data, or as on-the-ground inventories are conducted that better inform our understanding. Inventories, models, maps, and data may be updated periodically for the implementation of projects.

A variety of sources were used to determine historic and existing vegetation conditions on the Nez Perce-Clearwater. The development of management recommendations for the Final Environmental Impact Statement to maintain or restore ecological conditions was based on the natural range of variability and desired future conditions influenced by climate change. Movement towards the desired conditions for vegetation under the Land Management Plan would provide for an array of ecological communities of sufficient size, structure, and distribution that is expected to maintain habitats for most native species that occur on the Nez Perce-Clearwater. See the Forestlands section for additional information.

The natural range of variation (NRV) reflects the ecosystem conditions that have sustained the current complement of wildlife and plant species on the Nez Perce-Clearwater and provides context for understanding the natural diversity of ecosystems and processes, such as wildfire, insects and disease, and plant succession. The NRV, current conditions, future trends, and effects of alternatives for vegetation were estimated using the SIMPPLLE and PRISM models, which use the Northern Region's Existing Vegetation Database (VMap) and Forest Inventory and Analysis (FIA) data sets for inputs and calibration of the models. SIMPPLLE estimates the NRV for vegetation composition, size class, canopy cover, density, pattern, patch size, and patch distribution (Ecosystem Research Group 2019). SIMPPLLE is a spatially interactive, dynamic landscape modeling system for projecting temporal changes in the spatial distribution of vegetation in response to insects, disease, wildland fire, and other natural and management-caused disturbances. SIMPPLLE must be calibrated with disturbance data so that predictions are good estimates of outcomes.

Vegetation outputs from SIMPPLLE simulations can be queried to estimate effects to wildlife species. The analysis used several wildlife queries to estimate outcomes of plan alternatives. Wildlife queries are composed of a set of measurable vegetation characteristics, such as size classes, canopy cover, dominance type, or tree density, that are thought to indicate habitat conditions selected by wildlife. Several wildlife queries were developed to estimate outcomes for wildlife species. Queries were developed for fisher, American marten (*Martes americana*), Ponderosa pine associated species, elk, mountain quail, Canada lynx, and others for evaluation of Land Management Plan outcomes. The Ecosystem Research Group interpreted vegetation model outputs to estimate outcomes of the plan and alternatives on a select set of wildlife species over the next 50 years. Wildlife models are derived from a query or subset of the full SIMPPLLE model outputs which represent habitat characteristics known to be selected by these species based on the best available scientific information. The model outputs estimate the trend or outcome of the alternatives on the subset of vegetation characteristics that represent the habitats used by the species.

For example, the Canada lynx habitat model was created, as described in the 2014 Threatened, Endangered, Proposed, and Candidate Species Assessment (U.S. Department of Agriculture 2014d). This model used vegetation data for broad potential vegetation types that are known to contribute to lynx habitat. The lynx habitat model was queried in SIMPPLLE to estimate the natural range of variability for lynx habitat in the plan area. A combination of PRISM and SIMPPLLE modeling was then run for lynx vegetation queries to simulate future conditions and evaluate the effects of plan components and alternatives on lynx habitat.

Although model outputs show future trends over the next 50 years, there is uncertainty regarding the timing and magnitude of trends due to the uncertainty associated with the models. SIMPPLLE simulates disturbance randomly and grows vegetation to make predicted outcomes, but disturbances simulated by the model do not represent actual events. However, events simulated in SIMPPLLE, like wildfire or insect outbreaks, are typical and common in the plan area. The amounts of these disturbances in the model are informed by a variety of data sources to ensure proper calibration. More information about SIMPPLLE modeling methods can be found in the Forestlands report.

In some cases, we relied on models that were developed by scientists, state agencies, or within the Forest Service. For example, similarly, a fisher habitat model developed by Joel Sauder (2014) was used to evaluate similar overlays of alternatives on fisher habitats. Models developed by scientists from the Intermountain Bird Observatory (Miller and Carlisle 2018) were used to identify threats within their distribution and evaluate the effects of the plan on white-headed woodpeckers and mountain quail. Such overlays lend context to effects of alternatives. Models used and how they were used are outlined as follows:

- SIMPPLLE Model was used to estimate the natural range of variation (NRV) for large landscapes and provide predictive vegetation response or outcomes resulting from following desired conditions, objectives, and alternatives. Landscape outputs were then queried to inform outcomes for a suite of habitats that provide for wildlife. Queries included dry forest or large tree associated species (Ponderosa pine associates), fisher, American marten, Canada lynx, Burned Forest associates (for example black-backed woodpecker [*Picoides arcticus*] and three-toed woodpecker [*Picoides dorsalis*]), snags and coarse woody debris associates, summer elk nutrition, mountain quail, riparian habitat associated species, and patch size.
- we employed models of wolverine habitat model (Inman 2013), to evaluate the effects of the plan on wolverine habitat. This model was used to understand the scope of effects to wolverines by overlaying them on various alternatives. The Inmann models are composed of wolverine maternal, wolverine primary, and wolverine female dispersal habitat. This model was used to understand effects to wolverines by overlaying wolverine habitat with the different alternatives for land allocations. For example, the amount of recommended wilderness was overlaid on wolverine habitat to evaluate those effects.
- Lynx habitat model as described in as described in the 2014 Threatened, Endangered, Proposed, and Candidate Species Assessment (U.S. Department of Agriculture 2014d). Used as a model input into SIMPPLLE to model effects of Northern Rockies Lynx Management Direction, and as the basis for restrictions in lynx habitat. The model was also used to evaluate the effects to lynx habitat from the alternatives for various land allocations.
- Fisher habitat model developed by (Sauder 2014). This model was used to evaluate overlays of alternatives on fisher habitats, assess threats to the species in the plan area, and to calibrate the fisher query in SIMPPLLE. An additional spatial query for SIMPPLLE was developed to evaluate how the plan components and alternatives would contribute to the distribution of fisher habitats.
- White-headed woodpecker model (Miller and Carlisle 2018). Used to evaluate threats to White-headed woodpecker and to calibrate and validate the query for dry forest or large tree species query in

SIMPPLLE. Because the Miller and Carlisle model was not forestwide, a white-headed woodpecker query based on VMap vegetation data was used to qualitatively evaluate the spatial overlap with land allocations and the effects of the alternatives.

- Mountain Quail model (Miller and Carlisle 2018). Used to evaluate threats to mountain quail and to calibrate and validate the query for dry forest or large tree species query in SIMPPLLE.
- Elk nutrition models developed within the plan area to predict existing and potential elk nutrition (Cook et al 2018). The existing and potential nutrition models were crosswalked with vegetation types and used as inputs into SIMPPLLE to predict nutritional response of desired conditions, objectives, and alternatives.
- Bighorn sheep habitat models presented in Mack et al (2017). These models were used to understand the current and potential bighorn sheep habitat, evaluate threats to bighorn sheep, evaluate the alternatives and develop plan components.
- Downscaled climate models were used to predict the effects of a changing climate. For the Final Environmental Impact Statement, the Nez Perce-Clearwater used a compilation of climate change effects published for the U.S. Forest Service Northern Region Adaptation Partnership (Halofsky, Andrews-Key, et al. 2018, Halofsky, Peterson, et al. 2018a) that summarizes climate change projections by subregions. Furthermore, McKelvey and Buotte McKelvey and Buotte (2018) provided a summary of modeled climate change effects on wildlife in the northern Rocky Mountains.

A wide variety of wildlife location data was used in conjunction with habitat models to understand the distribution of wildlife species in the plan area.

Past, Present, and Future Activities Used in the Analysis

Past and present activities have affected habitat conditions in the plan area. Activities and factors include fire suppression, past timber harvest practices, road development, exotic forest diseases, invasive plants, fuels, and mining. Before about the 1980s, timber management, coupled with fire suppression, favored dominance by shade intolerant forest species, reduced old growth, increased forest density, changed patch size, reduced patch heterogeneity, changed landscape pattern, and reduced amounts of non-forested habitats. Since the 1987 plans were signed, timber harvest has declined, but fire suppression has continued which has exacerbated some conditions like encroachment of grand fir into Ponderosa types, decreased early seral and non-forested habitats, increased mature seral stages, favored fire intolerant trees, and decreased heterogeneity across the landscape.

Roads increased throughout the Nez Perce-Clearwater, especially in the managed front country with associated timber harvest through the 1980s, but the road system has been reduced by hundreds of miles through Forest Service closures since the 1987 plans were signed. Roads were also reduced or prevented through the Idaho Roadless Rule. Still, some areas in the managed front have relatively high road densities usually on lands where timber harvest is emphasized.

Exotic and native forest disease and insects have affected forest health. For example, blister rust has caused substantial decline in two important tree species, the western white pine and the whitebark pine. Whitebark pine provides mast as a food source for a number of wildlife species. The effects of the widespread loss of western white pine are unknown for wildlife but probably could be an important change in wildlife habitat.

Mining was extensive in the days of early European settlement and several areas of the Nez Perce-Clearwater were impacted by the gold rush. Most of the impacts were to river systems where, in some cases, extensive changes to stream geomorphology occurred. Mining continues today but is much less intrusive. It is mostly constituted of small-scale operations that are conducted to minimize impacts to federally listed fish.

Several invasive plants have become established and spread. In some cases, these species have displaced native vegetation, especially in the warmer drier, non-forested habitats. These serve as important winter habitats for big game and important habitats for species that use non-forested habitats. These changes can be more or less permanent without comprehensive restoration and an integrated approach to control the spread of invasive weeds. Existing invasive weed species continue to spread and new invasive weed species continue to be introduced outside of Forest Service control. Ongoing efforts to control and prevent invasive weed species continue through cooperative weed partnerships.

These factors and conditions were considered during the development of plan components and alternatives and evaluation of the proposed Forest Plan and Preferred Alternative.

Evaluation of Threats

The Nez Perce-Clearwater adopted a framework for the evaluation of threats similar to those used by a number of conservation organizations, including The Nature Conservancy, the International Union for Conservation of Nature, and NatureServe (Salafsky et al. 2003). The general approach is to evaluate the scope and severity of threats to assign the magnitude of the threats. The NatureServe method uses a combination of the scope of the threats and the severity of the threats to assign an estimated impact. The Nez Perce-Clearwater adjusted the scale of the threats to the spatial distribution of the Nez Perce-Clearwater and used the NatureServe criteria for assigning scope and severity (Table 150). The definitions used for scope and severity in threats evaluations are presented in the following table.

Table 150. Definitions of scope for evaluation of threats to wildlife in the plan area

Threat Scope
Pervasive = Affects all or most (71-100%) of total population for a species or occurrences in plan area or affects area/percent of habitat
Large = Affects much (31-70%) of total population for a species or occurrences in plan area or affects area/percent of habitat
Restricted = Affects some (11-30%) of total population for a species or occurrences in plan area or affects area/percent of habitat
Small = Affects a small proportion (1-10%) of total population for a species or occurrences in plan area or affects area/percent of habitat
Negligible = Affects a negligible proportion (<1%) of total population or occurrences
Unknown
Does not occur = Threat does not occur within plan area

Table 151. Definitions of severity for evaluation of threats to wildlife in the plan area

Threat Severity
Within the scope, the threat is:
Extreme = Likely to destroy or eliminate occurrences or reduce population or distribution of habitat 71-100%
Serious = Likely to seriously degrade/reduce affected occurrences or habitat or reduce population 31-70%
Moderate = Likely to moderately degrade/reduce affected occurrences or habitat or reduce population 11-30%
Slight = Likely to only slightly degrade/reduce affected occurrences or habitat, or reduce population 1-10%
Negligible = Likely to have only negligible negative effects on occurrences or habitat or reduce population <1%
Neutral or Benefit Potential = Not a threat

Threat Severity
Unknown

The scope of a threat is the spatial overlap of each threat with that of the conservation target. The severity of the threat is the extent to which it will either reduce the percent area of a conservation target or reduce the population numbers, extent, or distribution of a species. The scope was informed by evaluating the distribution of the threat against either 1) the distribution of modeled habitat within the Nez Perce-Clearwater or 2) the distribution of observations within the habitat preferences of the species when habitat models were not available. The severity is the degree to which a threat is likely to destroy or eliminate populations or reduce distribution within the next 15 years. The impacts or magnitude of the threat were assigned based on a matrix that assigns a severity score based on the combination of these two factors (Salafsky et al. 2003, Master et al. 2012). Depending upon the combination of scope and severity, the method assigns a relative threat impact that ranges from very high, high, medium, and low (Table 152).

Table 152. The rule-based threat category based on a combination of scope and severity

Severity	Pervasive in Scope	Large in Scope	Restricted in Scope	Small in Scope	Unknown Scope
Extreme	Very high	High	Medium	Low	Medium
Serious	High	High	Medium	Low	Medium
Moderate	Medium	Medium	Low	Low	Low
Slight	Low	Low	Low	Low	Low
Unknown	Medium	Medium	Low	Low	N/A

The distribution of the threats was often constrained or determined by land allocations or designations, such as designated wilderness, Idaho Roadless Rule areas, wild and scenic rivers, or multiple-use lands. Because management areas by nature are spatial in extent, the analysis found it easy to evaluate the scope of threats by nesting them within management area direction. For example, designated areas, such as wilderness, prohibit many management actions. Whereas, in the general forest areas such as Management Area 3, more management actions are allowed that could be considered threats, such as timber production, motorized recreational uses, road construction, or other threats that are allowed. Therefore, the analysis could analyze the effects of the threats from the plan direction, plan components, and alternatives by evaluating the percent of overlap of a species habitat or area occupied by various land allocations. For any given threat, if that activity is not allowed under the management direction for the land designation, then it was not considered a threat for that portion of the Nez Perce-Clearwater. When a threat was present regardless of management area direction, the distribution and intensity of the threat was informed by published literature, models, or agency expertise.

Threats were evaluated in detail in this report when they were identified as medium through very high or if a threat was identified within the best available scientific information as significant threats to threatened, endangered, or candidate species. Plan components and alternatives were developed to address threats within Forest Service control to federally listed threatened, endangered, proposed, or candidate wildlife species and are evaluated below. The intended effect of plan components is to reduce the scope or severity of threats. Alternatives considering land allocation, such as those for management areas, recommended wilderness allocation, and Wild and Scenic River suitability, often altered the scope of the threats.

The unified classifications of threats (Salafsky et al. 2008) was used as the basis to identify the list or definition of threats. This classification system is a hierarchical listing of terms and associated definitions that are comprehensive and exclusive at the upper levels of the hierarchy, expandable at the lower levels, and simple, consistent, and scalable at all levels. In some cases, the analysis found it was necessary to use expanded definitions at the third level. For example, the analysis evaluated the effects of several types of practices associated with silviculture distinctly as third level threats because their effects are different. For example, regeneration harvest has different effects than thinning and the Nez Perce-Clearwater thought it useful to distinguish these. Examples of these categories include commercial and noncommercial thinning, intermediate harvest, clear cuts, site prep, and firewood gathering. Similarly, the analysis expanded recreation and evaluated more specific categories of recreation than is generally included in in the standard lexicon (Salafsky et al. 2008). To focus our analysis, some threats were eliminated altogether because they did not occur within the plan area. So, the analysis evaluated these threats only once for the whole plan area and, when the threat did not occur, the analysis did not continue using that category of threats. For example, agricultural and aquaculture do not occur within the plan area as defined. The Nez Perce-Clearwater is not aware of any oil and gas production in the plan area. The analysis considered the plan area to be absent of war, military exercises, and civil unrest as these are not threats at this time and are not likely to be threats within the life of the plan. These categories were considered but eliminated from future evaluation. Threats determinations for species of conservation concern and federally listed species can be found in Appendix C. Plan components were developed to address the threats specific to each at-risk species.

Assumptions

The Land Management Plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carry out a project or activity, including ground-disturbing actions. As a result, it does not result in direct effects to wildlife but may result in indirect or cumulative environmental consequences under this programmatic framework. Before ground-disturbing actions take place, they must first be authorized in a site-specific environmental analysis. Therefore, none of the alternatives would cause unavoidable adverse impacts or an irreversible or irretrievable commitment of resources. The Land Management Plan's desired conditions, objectives, standards, guidelines, management area allocations, and suitability will be followed when planning or implementing new site-specific projects and activities. Laws, regulations, and policy regulations will also be followed when planning or implementing new site-specific projects and activities. Terms and conditions and reasonable and prudent measures resulting from U.S. Fish and Wildlife Service consultation on the programmatic framework of the Land Management Plan will be followed when planning or implementing new site-specific projects and activities, unless modified by site-specific consultation.

The planning rule assumes that natural systems will provide the ecological conditions for most native species in the plan area if they are operating within their natural range of variability and have ecological integrity. This framework is identified by the planning rule as the coarse filter. The coarse filter approach is much more practical from a management standpoint in providing for the diversity and abundance of wildlife, which moves away from single species management. Implementation will be subject to testing with appropriate monitoring data. See the Land Management Plan Appendix 3. Effects analyses, including some of the modeling efforts, are based on the following assumptions:

- There is some degree of uncertainty with all modeling efforts, but the models used in the effects analysis provide a reasonable approximation of past, current, and predicted future environmental conditions upon which to base assessments and form conclusions.

- Data collected at the national forest, regional, and national scale have varying levels of accuracy and completeness but provide a reasonable representation of wildlife occurrence, abundance, distribution, and habitat conditions on the Nez Perce-Clearwater.
- The natural range of variation reflects ecosystem conditions that have sustained the current complement of wildlife and habitats on the Nez Perce-Clearwater and provides the context for understanding natural diversity of ecosystems and processes, such as wildfire, insects and disease, and natural plant succession. The analysis assumes that managing habitats within their natural range of variation would provide for the diversity and abundance of wildlife in the plan area and for the ecological conditions for long-term persistence of most native species.
- Population trends of wildlife species may change as a result of effects from national forest management practices. However, due to the natural range of vegetation patterns and disturbance processes in the northern Rocky Mountains, fluctuations in wildlife populations and distribution are normal and often result from natural factors, such as predation, starvation, disease, or widescale habitat changes resulting from fire, flood, drought, and other natural disturbance processes. For migratory species, a change in population may not reflect a change in local habitat conditions but rather occur as a result of activities or conditions experienced elsewhere in the United States or even in other countries.
- Effects of permanent changes to habitat are more impactful than those that temporarily alter habitat conditions but do not result in permanent habitat loss. Permanent habitat loss includes construction of buildings, paved or permanent roads, dams, invasive plants, and some aquatic alterations. Temporary impacts result from changes to habitat that will recover through time. Examples of these types of impacts include vegetation treatments, fuels treatments, and wildfire. These impacts do not result in permanent loss of habitat.
- Effects of threats vary based on the combination of scope and severity they pose to wildlife. Threats that have wider scopes and higher severity have more impacts, while those with small scopes and lower severity have less impacts.
- Global and state species rankings are indices of species status at the relative scale but may or may not be indicative of local wildlife populations in the Nez Perce-Clearwater.
- Wildlife habitat occurs as a function of the biophysical composition of the landscape. Habitat for wildlife is a product of the vegetation, water, soils, topography, and associated both natural and human-induced ecological processes from the micro-site level to local, regional, and global extents. The wildlife analyses rely on, and often tier to, information and analysis presented in other sections of this document.

Wild animals are mobile, wary, and often actively avoid humans. Therefore, it can be difficult to locate and study individuals, let alone obtain meaningful scientific information for entire populations. Population trend information is extremely difficult to obtain because it requires data for at least a reasonable reference set of individuals over broad areas, including information on survival and reproduction rates and immigration and dispersal. Considering the large number of wildlife species inhabiting the vast expanse of the Nez Perce-Clearwater for at least part of their life cycle, there is limited scientific information on biology, ecology, and population trends for most species present that is specific to the plan area. Some species are rare or associated with remote, rugged environments or are present here for a relatively short time before moving elsewhere, making detection and observation even more difficult. Sometimes, population trends can be inferred indirectly through indices, upward trends in observations, or though trends in harvest success rates.

Habitat, on the other hand, is generally stationary and can be readily surveyed, monitored, and studied over time. However, the large geographic extent and wide range of habitat diversity within the Nez Perce-Clearwater generates considerable complexity for research and monitoring purposes. Demonstrating causality and relationships between the myriad of factors affecting wildlife habitat is not only difficult but also costly. As a result, uncertainty exists regarding the direct, indirect, and cumulative impacts of various collective management activities on individual animals, habitat, and wildlife populations. While there is an appreciable body of science on the topic and information is growing at a considerable rate, uncertainty can lead to different conclusions on not only the potential impacts to habitat but also how such impacts might affect wildlife populations.

The analysis assumes that there is variability in the abundance of different species but that the coarse filter would provide for most of these species. The analysis assumes that most species have a distinctive ecological niche that allows them to persist or thrive despite competition from other species. The competitive exclusion principle is an evolutionary theory that suggests that species evolved to avoid competition with other species and so nearly all species have differentiated niches. While many species have a distinctive niche, most habitat features that make up the niches of species are common and, in most cases, will be present without specifically describing these features in desired conditions. Therefore, the analysis assumes that, in most cases, the habitat features that make up ecological niches of common species will typically be present when habitats are functioning within their natural range of variability.

Providing for ecological integrity is an intended outcome of the Land Management Plan. It starts with a comparison of the current abundance and condition of various habitats with ecological reference conditions, including the historic range of variability, based on our knowledge of the past and on our understanding of ecological processes, such as fire, flooding, insects, and disease. This coarse filter approach to providing ecological conditions that provide for the diversity and abundance of wildlife and viable populations of the Forest Service's Species of Conservation Concern is reflected in the vegetation desired conditions in plan components and alternatives for the Land Management Plan. The coarse filter approach forms the foundation of the analysis for each species. The report by the Ecosystem Research Group (Ecosystem Research Group 2021) assessed the effects on habitats of selected species in response to plan components with the assumption that declines are not a concern unless conditions fall below the lower level of the natural range of variation.

The companion approach to the course filter of ecosystem diversity is the "fine filter" approach in which conservation strategies are used for individual species or groups of species to contribute to species diversity. The fine filter approach narrows the focus to those species that require ecological conditions that may not be provided through coarse filter plan components. This fine filter approach is reflected in the species-specific plan components for wildlife found in the Land Management Plan. Each species' assessment in this report evaluates the effects of the coarse filter, fine filter, and other components in the Land Management Plan.

A variety of sources were used to determine historic and existing vegetation conditions on the Nez Perce-Clearwater. The development of management recommendations to maintain or restore ecological conditions was based on the historic range of variability and desired future conditions influenced by climate change. Movement toward the desired conditions for vegetation under the Land Management Plan would provide for an array of ecological communities of sufficient size, structure, and distribution that is expected to maintain habitats for the vast majority of native species that occur on the Nez Perce-Clearwater. See the Forestlands section for additional information.

Measurement Indicators

Key ecosystem characteristics were identified as indicators of ecological integrity in terms of composition, structure, function, and connectivity. Some of these components are addressed in detail in other sections of the Final Environmental Impact Statement. Since wildlife habitat is largely dependent upon hydrologic and vegetative conditions, the wildlife and habitat analyses presented within this report often tiers to key indicators and measures found in the other sections. Other key indicators and measures of wildlife habitat quality vary by wildlife species and unique habitat types and are addressed in those sections that follow. Unless noted otherwise for a particular species or habitat, key indicators for indirect and cumulative effects include quantitative measures of anticipated changes to species' habitats, as well as qualitative descriptions of plan component contributions to, or potential to address, key stressors for species and their habitats.

For forested habitats, key characteristics include the percent of various size classes, the relative density, tree species composition, dominance type, the amount and size of snags, the amount and size of downed wood, the presence of large and very large live trees within many age classes, connectivity of forested habitats, and the landscape configuration and distribution of forest patches. Also important are the presence and distribution of stands of deciduous forest.

For non-forested habitats, key indicators are condition, species composition, extent, and distribution. As non-forested habitats are uncommon in the plan area, the connectivity of non-forest vegetation is an important consideration. These are discussed in conjunction with early seral conditions as many species use both.

As many species use ecotones, which are the edges between two habitats, the interface between non-forested and early seral forest and mature forest is an important feature of habitat for many species. This is best indicated by the landscape configuration and distribution of patches of non-forested and early seral forest and mature forest. The size and shape of patches influences the quality of habitats for species that use ecotones. A landscape that reflects natural disturbance patterns provides this patch heterogeneity.

For aquatic wildlife habitats, key indicators are the amount and distribution of aquatic habitats relative to management areas, the condition and types of vegetation surrounding aquatic habitats, the condition of water quality, stream geomorphology, and hydrology. The connectivity of aquatic and riparian habitats is also an important consideration.

Many species are vegetation generalists, occurring in many vegetation types and conditions. Rather than vegetation conditions, these species require features like rock outcrops, talus, cliffs, cutbanks, caves, or soils suitable for burrows, rocks, or logs for hiding. These habitats are collectively referred to as substrate habitats and the presence of wildlife that depend upon them often depends upon their presence but is not often dependent upon their condition. While these habitats are often long-term, they can be impacted by some activities that cause disturbance, loss, or alteration. Examples include mining and quarrying and road construction. Some species that use these habitats might be sensitive to recreation like rock climbing. Their presence, distribution, and threats are the key indicators for these habitats.

Some species are habitat generalists, occurring in many habitats, but are reliant upon the presence of the resources they require. Resources include mast, grain, fruiting plants, nectar, prey, and carrion. Examples include hummingbirds relying mostly upon nectar resources and predators like coyotes (*Canis latrans*) occurring wherever prey is present or turkey vultures (*Cathartes aura*) who seek out carrion. From a habitat standpoint, the species that use nectar resources would require flowering plants. Therefore, flowering plants are an indicator for some wildlife species. Species that depend upon mast require mature mast producing trees, for example.

A few species are high elevation or alpine specialists. Examples of these species are the wolverine, the grey crowned rosy finch (*Leucosticte tephrocotis*), and American pipit (*Anthus rubescens*). Their habitats have few threats, except for perhaps future climates. High elevation vegetation functioning within the natural range of variation are indicators for some of these species. Wolverines require persistent snow into spring for denning. Whitebark pine is important to Cananda jays (*Perisoreus canadensis*) as they exploit the mast resource these trees provide. Whitebark pine is another indicator for alpine habitats.

About one-third of all wildlife species in the plan area are dependent upon either snags or downed wood or both, so snags and downed wood are analyzed in their own section. Snag retention guidelines vary by alternatives and various species use different size classes and decay stages. Indicators for snags are whether they will be present and usable by a variety of wildlife based on the sizes and decay classes available under the plan components and alternatives.

Some species use or are associated with hardwood or deciduous tree habitats. Hardwood tree dominance type and presence is an important indicator for the wildlife species associated with hardwood tree habitats. Hardwood or deciduous tree habitat can dominate a stand or more commonly are a component within conifer dominated stands. Hardwood species often occur along riparian areas. Trends over time in the non-coniferous vegetation types, such as hardwood and grass and shrub plant communities, are difficult to portray through modeling. Persistent non-forested plant communities are relatively rare types on the Nez Perce-Clearwater and are naturally fragmented in nature. Therefore, model results, although helpful, should be supplemented with other information for discerning the trend and amounts of these communities over time. Since hardwood trees are largely associated with early-successional forest conditions, modeling of forest successional stages, including forest size classes, and disturbance processes and their effects on deciduous vegetation can provide insight and information for the assessment of trends in hardwood species over time.

Deciduous trees and shrubs tend to grow along streams and are typically seral components that result from fires, insects, and disease. Some tree species, like cottonwoods, are maintained by periodic flooding. Riparian vegetation was modeled in SIMPPLLE to generate an estimate of natural range of variation for the amount of deciduous vegetation occurring as a result of disturbance within riparian habitats. Outcomes of the plan for riparian vegetation were predicted by SIMPPLLE modeling to evaluate the outcomes of plan components and alternatives on riparian vegetation. The query was designed to assess the availability and relative proportions of habitats that provide shrubs and deciduous trees within riparian habitat conservation areas and riparian management zones. Current conditions for deciduous trees were assessed using a combination of Forest Inventory and Analysis (FIA) and VMap data with cover types dominated by shrubs and deciduous trees to quantify the extent of these habitats. For purposes of modeling future vegetation treatments, areas that are mapped as riparian habitat conservation areas and riparian management zones are not suitable for timber production. Future habitat was modeled as forest openings containing riparian shrubs and hardwood trees, primarily resulting from moderate- or high-severity wildfires and insects and disease within 20-years following the disturbance.

Many species of wildlife are associated with ecotones or edge habitats. In particular, some species require or prefer forested habitats adjacent to early seral or non-forested habitat. Therefore, the landscape pattern of patch size and distribution functioning within the natural range of variability is an important indicator for habitat of these species. Landscape patch and pattern within the natural range of variation is also an indicator for connectivity.

Forest density often matters for wildlife species that use mature forest habitats. Some wildlife species prefer mature forest with higher tree densities whereas other species use mature forest with lower tree densities. Therefore, tree densities operating within the natural range of variation is an indicator for wildlife species that use forested habitats.

Some wildlife species are sensitive to roads, motorized trails, or motorized uses. While the plan does not make travel management decisions on the ground, the alternatives identify areas suitable for motorized uses where new roads or motorized trails could be constructed in the future. Some land allocations also restrict or constrain the construction of new motorized routes whereas other land allocations are suitable for motorized uses. Furthermore, the plan proposes timber harvest objective and sale quantity. Timber harvest often requires infrastructure like roads to access or transport harvested trees. The plan contains plan components that direct how or where motorized uses would not be allowed in the future. Therefore, the plan indirectly influences future development of motorized uses. How the plan would influence or guide the development of future motorized uses, and where motorized uses are suitable, is an important indicator for some wildlife species.

In some cases, population trend data for wildlife species are available. For example, population and occupancy trend data is available for many migratory birds through the Intermountain Bird Observatory's Integrated Monitoring in Bird Conservation Regions, coordinated by the Bird Conservancy of the Rockies, in partnership with federal agencies. For purposes of this analysis, migratory bird trend data was reported within the Idaho Bird Conservation Region 10 in Idaho and trends are reported within habitat groups. The focus therefore is not on trends of individual species but trends within the habitat group that might indicate habitat conditions.

Additionally, the Idaho Department of Fish and Game provides information on population trends for big game. These were used as an indicator for habitat conditions for species used by people and are evaluated within the Multiple Uses Wildlife section below.

Lastly, important indicators are related to the threats identified for each at-risk species and whether the Forest Plan would contribute to or constrain such threats. Threats are specific to each at-risk species and so the indicators are often specific to those threats.

Abundance and Diversity of Wildlife

The following analyses address the effects to wildlife and their habitat from the suite of plan components and range of alternatives considered in the Land Management Plan. This section emphasizes evaluating how ecosystem plan components, also called coarse filter plan components, provide the ecological conditions to provide for the diversity and abundance of wildlife. These plan components also provide the basis for ecological conditions to provide for the long-term persistence of species of conservation concern and contribute to the recovery of federally listed species.

The diversity in habitat and topography contributes to the biodiversity of the wildlife community. The plan area is located within the Northern Rockies. Wildlife communities are typical of the Northern Rockies. The State of Idaho's Species Diversity Database represents the best available scientific information for the species that occur here and within a half mile around the administrative boundary of the plan area. The database contains observations of approximately 370 species of wildlife, including gastropods within the Nez Perce-Clearwater and lands within one-half mile of the plan area's boundary. It also contains several observations of insects like bumblebees, aquatic insects, butterflies, and more. The Idaho Species Diversity database was accessed multiple times throughout the planning process and the species list considered in planning was updated multiple times. The most recent update of the Idaho Species Diversity Database was made available to the Forest Service in July 2022.

Identifying a species list for this analysis was a distinct process from the criteria used to identify and evaluate species of conservation concern. For species of conservation concern, we limited species only to those observed within the plan area boundaries. Therefore, there were some species identified within one-half mile that were not included in the evaluation as potential species of conservation. Of note are several species of endemic gastropods that have not been documented within the plan area but have been observed within one-half mile of the plan area boundary. They were not evaluated as potential species of conservation concern because species must be known to occur in the plan area to be a species of conservation concern.

Table 153 shows the number of species of birds, mammals, reptiles, amphibians, and mollusks recorded in the plan area, as identified in the Idaho Species Diversity Database. The database query used to identify wildlife species below does not include the fish species that occur in the plan area. For additional analysis of effects on aquatic habitats and fish, see the Water Resources and Fisheries sections in the Final Environmental Impact Statement.

Table 153. Number of recorded species documented in the plan area, by assemblage

Assemblage	Number of Species
Birds	203
Mammals	70
Reptiles	11
Amphibians	11
Gastropods	70
Mussels	3
Terrestrial Insects of conservation interest	3
Total	**371**

Data Source: Idaho Species Diversity Database

There are undoubtedly thousands and perhaps tens of thousands of arthropod species that reside in the plan area, including insects, arachnids, isopods, crustaceans, and decapods, most of which are not identified in the Idaho Species Diversity Database and in some cases, likely not even described by science yet. Consider for example that in the United States, the number of described insect species alone is approximately 91,000. The undescribed species of insects in the United States, however, is estimated at some 73,000 (Smithsonian Institute 2021). It would be impossible to analyze for all these species so, in this case, it is assumed that coarse filter ecosystem components would provide for most arthropod species. Gastropods or snails and slug species are analyzed because of the unique diversity and endemic gastropod fauna present in the plan area.

There are more than 260 uniquely identified arthropods or other invertebrate species observed in the Idaho Species Diversity Database and more than 200 unique observations of arthropod taxa not identified to species. They include insects, spiders, worms, leeches, harvestmen, crustaceans, and others. Of these, 22 are of conservation interest or are identified in the Statewide Wildlife Action Plan as species of greatest conservation need. Often these species have gaps in scientific information compared to vertebrates. Most invertebrates identified as species of greatest conservation need (IDFG 2016) are aquatic insects and are evaluated in the fisheries and aquatic ecosystems section of the Final Environmental Impact Statement. Several invertebrates were also evaluated as potential species of conservation concern. Three terrestrial insects will be analyzed here because either 1) they have been found warranted for federal listing, 2) they are currently undergoing review by the U.S. Fish and Wildlife

Service for endangered species listing, or 3) they were of interest to government agencies, the Tribe, or the public. The three terrestrial insects analyzed within this section include the monarch butterfly (*Danaus plexippus*), the Gillette's checkerspot (*Euphydryas gillettii*), and the western bumble bee (*Bombus occidentalis*). The monarch butterfly was recently identified as warranted for listing but precluded and is now a candidate species under the Endangered Species Act. The Gillette's checkerspot is a butterfly that has specialized habitat needs, because of which it has long been of conservation interest. The western bumble bee was petitioned, and the U. S. Fish and Wildlife Service found that it may be warranted for listing and is currently under review. Several pollinators have received recent conservation attention and will be analyzed as a group in the Resources Habitats section below.

To evaluate whether coarse filter ecosystem plan components would provide the ecological conditions for most species in the plan area, species were grouped into habitat groupings and subgroupings. Effects of the plan on the habitat groupings were then analyzed. To group species into habitat categories, a species profile was created for each species known to occur in the plan area. The species profiles are formatted as a spreadsheet that contains habitat needs and species characteristics. For each species, the spreadsheet included the common name, scientific name, whether the species is a game species, the type of game (big game, furbearer, upland game, etc.), food habits, a brief habitat summary, their association with broad potential vegetation types, their key ecological requirements, their primary threats, whether the species uses snags, whether the species uses downed wood, any mitigation or management measure identified, and the source relied on for the species profile. Species were grouped into broad habitat grouping and habitat subgrouping based on the description of their habitats. The spreadsheet with this information is available in the project record and some information from the spreadsheets are included in the wildlife Appendix C including habitat groups and subgroups, the species habitat descriptions. The habitat summaries and key ecological characteristics were then reviewed to construct logical groupings of habitats that would facilitate analysis of coarse filter plan components. This analysis evaluates the effects of the plan on broad habitat groupings instead of on individual species and is presented in Table 154. The habitat groupings were necessarily broad to be inclusive so the species could be assigned based upon their primary habitat preferences. The eight broad habitat groupings are shown in the following table. The number of species associated with each habitat group informs the relative contribution of these habitats to species richness. The key ecosystem characteristics of the species within each habitat group were the basis to identify the key ecosystem characteristics of the broad habitat group. Similarly, the threats identified for the species within the groups helped inform the key threats to each habitat grouping. The analysis of the effects of plan components on the broad habitat groupings are based on the effects to key ecosystem characteristics and how the plan addresses the threats to the habitat groupings.

Table 154. Habitat groups used for wildlife species

Habitat Groupings	Amphibians	Birds	Mammals	Mollusks	Reptiles	Terrestrial Insects[1]	Habitat Group Total
Aquatic, wetland, water, and riparian habitats	11	59	9	22	1	0	102
Forested habitats	0	55	12	0	0	0	67
Non-forested or early seral habitats	0	45	9	0	0	0	54
Substrate habitats: rock outcrops, soils, downed wood, cliffs, talus, or caves	0	7	20	51	10	0	88

Habitat Groupings	Amphibians	Birds	Mammals	Mollusks	Reptiles	Terrestrial Insects[1]	Habitat Group Total
Resource habitats: nectar, fruit, seeds, plant forage, host plants, or prey	0	8	5	0	0	3	16
Ecotone, forest edge, or habitat grouping combinations	0	24	9	0	0	0	33
Habitat generalist	0	1	4	0	0	0	5
Alpine, boreal, or high elevation habitats	0	4	1	0	0	0	5

1 - Insects of conservation interest

Species of Conservation Concern (SCC) were identified as part of the Land Management Plan process. Forest staff identified species to be evaluated as SCC if they met the categories outlined in Forest Service Handbook 1909.12, Chapter 10, Section 12.52 and Chapter 20, Section 21.22a for identifying species of conservation concern. Forest Service Northern Region staff, in coordination with the Nez Perce-Clearwater planning team and other experts, as needed, evaluated the best available scientific information to determine which species should be recommended to be identified as species of conservation concern and which species should not be identified as species of conservation concern. Summary rationale were provided for all recommendations, including those species found not to meet the criteria. The recommendations were then provided to the regional forester for ultimate identification as species of conservation concern. For more information about identification of species of conservation concern and rational used to determine their status, see the "Process for Identifying Species of Conservation Concern" and the "Rationale (Species Evaluations) Used to Select Animal and Plant Species as Coeur d'Alene salamander for the Nez Perce-Clearwater Draft Plan and Draft Environmental Impact Statement," which can be accessed through the U.S. Forest Service's Northern Region Species of Conservation Concern website at https://www.fs.usda.gov/detail/r1/landmanagement/planning/?cid=fseprd500402. Species evaluated for potential inclusion as SCC included 6 amphibians, 36 birds, 13 mammals, 41 terrestrial invertebrates, 23 aquatic invertebrates, 4 fish species, and 82 plant species. Of these, the regional forester identified the bighorn sheep, fisher, harlequin duck, white-headed woodpecker, and mountain quail as wildlife species of conservation concern. Effects of these species are evaluated in this document below and determinations are provided as to whether the plan would provide for their long-term persistence.

There were significant improvements in the model to evaluate the trend in riparian habitat conservation areas under the plan. This included improved delineation of riparian areas, improved vegetation data, and improved pathways to predict their growth patterns. They were also calibrated with our understanding of fire behavior from on the ground surveys in the plan area.

Affected Environment

This section describes the existing condition of significant wildlife resources in the plan area.

Habitats

The Nez Perce-Clearwater consists of approximately 4 million acres of beautiful and diverse land located in northcentral Idaho. The Nez Perce-Clearwater is located largely within two ecoregions (Bailey 1995): the Idaho batholith and the Bitterroot Mountains. Areas of the Nez Perce-Clearwater south of the southern ridge above the Lochsa River lie within the Idaho Batholith Ecoregion, while those north of the ridge above the Lochsa River lie largely within the Bitterroot Mountain Ecoregion.

The Bitterroot Mountains section is part of the Canadian Rocky Mountain Ecoregion. The Bitterroot Mountains span from 984 to 7,920 feet in elevation, with the highest peaks occurring along the Idaho–Montana border within the North Bitterroot Range. Like most of the sections in north Idaho, this section is cool and temperate with an annual precipitation of 20 to 82 inches and an average annual temperature that ranges from 36.7 to 49.5 degrees Fahrenheit. Precipitation occurs mostly as snow from November to March, while summers are dry. This section has a maritime-influenced climate that delivers moisture-laden air currents in the fall, winter, and spring in the form of heavy snowfall and warmer winter temperatures. On the other hand, summers are hot and dry, with some areas reaching temperatures of around 100 degrees Fahrenheit (Idaho Department of Fish and Game 2017a).

The habitats in the Bitterroot Mountains section are influenced by soil and topography conditions, which create variation in site conditions and the dominance types of forested habitats in the plan area. The section is composed of extensive coniferous forests with comparatively little non-forested areas. Deciduous forested habitats are uncommon in the plan area. Volcanic ash soils, coupled with higher precipitation, support productive coniferous forests. These forests contain diverse stands of mixed coniferous forest at lower elevations, such as the western redcedar, grand fir, western larch, Douglas-fir, small amounts of Ponderosa pine, and western white pine. Western white pine was once abundant in this section but has succumbed to the influences of blister rust and has been replaced largely by grand fir. In some cases, stands at lower elevations can contain all these species growing together; in other cases, stands can be dominated by single species, such as grand fir. See the Terrestrial and Aquatic Ecosystems and Watersheds section of the 2014 Assessment (U.S. Department of Agriculture 2014a) for additional information about forest vegetation.

At higher elevations, the section grows western hemlock, lodgepole pine, Engelmann spruce, whitebark pine, Douglas-fir, and subalpine fir types. Whitebark pine was once more abundant but has succumbed to blister rust like western white pine. Dominance types in the Bitterroot Mountain section can contain several species in mixed stands or be dominated by a single species, such as lodgepole pine.

Although the higher elevations of the North Bitterroot and North Clearwater ranges were carved by mountain glaciers, the lower portions of the ranges were unaffected by glaciation. This preserved the steep “V-shaped” canyons at lower elevations and provided refugia for coastal species and an environment for the evolution of endemic plants. The maritime climate of this section continues to provide the mild temperatures and heavy precipitation necessary for nearly 40 species of disjunct populations of coastal plants identified in the lower canyons of the North Fork Clearwater, Selway, and Lochsa Rivers. Examples of plants characteristic of the canyon habitats include red alder, deer fern, Sierra marsh fern, North Idaho monkeyflower, and Constance’s bittercress, which is a regional endemic. These communities support several endemic species.

Several species of beetles, snails, harvestmen, aquatic insects, and earthworms are endemic to northern Idaho. The area of the lower Salmon River canyon is a hotspot for land snail diversity. Similarly, the Coeur d’Alene salamander (*Plethodon idahoensis*) is another species endemic to the ecoregion. The Northern Rocky Mountain Refugium is a term used to describe the area where this endemism occurred (Brunsfeld et al. 2001, Stagliano et al. 2007). In simplest terms, it is the mountainous, forested area along the Montana and Idaho border that was neither covered by northern ice sheets during glaciation periods nor paved with lava from the south and west (Stagliano et al. 2007).

Wildlife habitat conditions vary widely from the dry, rugged canyons of the Salmon River to the moist cedar forests of the Selway River drainage, the rolling uplands of the Palouse, and the high-elevation mountains across the Nez Perce-Clearwater.

The southern half of the Nez Perce-Clearwater has soil conditions characteristic of the Idaho batholith with a drier climate than those to the north. These conditions are conducive to more extensive drier forest types of Ponderosa pine, Douglas-fir, and grand fir at lower elevations. At higher elevations, the Nez Perce-Clearwater is composed of vast stands of lodgepole pine, Engelmann spruce, grand fir and subalpine fir, whitebark pine, western larch, and Douglas-fir, or a combination of these species. Grand fir generally diminishes in dominance as elevation increases. The prevalence of western redcedar and western white pine diminishes as one moves southward in the plan area. Larger amounts of non-forested vegetation occur in the southern half of the Nez Perce-Clearwater, which supports grazing allotments. A more complete description of forest types and tree species can be found in the Terrestrial and Aquatic Ecosystems and Watersheds section of the 2014 Assessment (U.S. Department of Agriculture 2014a) and in the Forestlands section.

The plan area contains five large rivers that are culturally, economically, and ecologically important to the region. The northern plan area drains into the North Fork of the Clearwater River. The Lochsa and Selway Rivers converge into the main stem of the Clearwater and drain the heart of the Nez Perce-Clearwater. The South Fork of the Clearwater drains much of the southern portion of the Nez Perce-Clearwater, and the Salmon River forms the southern border of the plan area. These major drainages create topographic variation that gives variety to the composition, structures, and dominance types of the Nez Perce-Clearwater. The broad potential vegetation type groups are influenced by these river drainages. This variety provides a diversity of habitats for wildlife. The amount of precipitation creates a vast web of riparian habitats and smaller streams that drain into these larger rivers. Riparian habitats are disproportionally used by wildlife species compared with their availability. The mesic climate provides seeps, springs, and ponds throughout the plan area. Many small lakes and wetlands scattered in limited areas in the plan area also provide habitats for many terrestrial wildlife species.

Habitats in the plan area have undergone various amounts of anthropogenically derived changes through time. Prior to settlement, Native Americans were present and used the land for hunting, gathering, fishing, and other uses. As part of this management, the Native Americans sometimes managed portions of the Nez Perce-Clearwater through fire use to benefit game populations and increase or maintain food plants. After settlement times, extractive uses became more prevalent. Extractive uses included timber harvest, mining, fire suppression, road development, and construction of facilities like fire towers, ranger stations, or recreation facilities.

Timber harvest resulted in changes in landscape pattern, size class, dominance types, tree composition and a reduction in large trees. When conducted with a lack of conservation measures, timber harvest resulted in soil erosion, landslides, and impacts to aquatic habitats. Save for wilderness areas, fire suppression also resulted in nearly forestwide changes in vegetation, including changes to dominance patterns, forest density, landscape pattern, insect and disease outbreaks and, more recently, changes to the size and intensity of wildfires. The spread of blister rust severely reduced the dominance of white pine and whitebark pine. The changes are undesirable for several reasons, including the restoration and maintenance of wildlife habitats. The Land Management Plan seeks to address these changes through a variety of activities, restrictions, and conservation measures designed to maintain and restore ecological conditions.

In addition to anthropogenic impacts, invasive species have altered some lower elevation habitats to the exclusion of native vegetation. Placer mining resulted in changes to stream geomorphology. Road development implemented to move timber and facilitate forest travel has impacted habitats from their footprint, increased sediment into streams, and caused changes to stream connectivity through the installation of culverts and stream crossing structures. For some species, roads have fragmented habitats. Because roads coarse along several major rivers in the plan area, roads have removed much of the riparian areas along one side the plan's major rivers, and measures to stabilize riverbanks have altered these riverbanks. For example, roads run along the Lochsa, North Fork Clearwater, Southfork Clearwater, and portions of the Selway, and Salmon River.

These impacts have occurred in some areas on the Nez Perce-Clearwater more than others, leaving varying degrees of anthropogenic impacts. Areas closer to population centers have received greater impacts than those in remote areas. These differences are manifested through existing plans and land use allocations and are also features of the Land Management Plan.

The Land Management Plan determines which uses are suitable, which lands would be allocated for various uses, and implements conservation measures designed to enable extractive uses to continue while conserving resource values. The plan does this through plan components, such as desired conditions, goals, objectives, suitability determinations, management approaches, and restrictions on what and how the Nez Perce-Clearwater would conduct activities through plan guidelines and standards. This analysis evaluates potential effects of this plan direction on wildlife habitats including species identified as species of conservation concern.

Distinctive Roles and Contributions

Fisher

The Nez Perce-Clearwater contains much of the core habitat of the fisher in the Northern Rockies (Krohner 2020). Occupancy studies conducted by Krohner (2020) presented two core areas of fisher occupancy: a large area across the Clearwater and Nez Perce National Forests in Idaho and a smaller area in the Cabinet Mountain range crossing the border between Idaho and Montana. Some fisher in the plan area were found to have a unique genetic identity found nowhere else in the fisher range indicating they survived extirpation in the early twentieth century (U.S. Department of the Interior 2017d). Genetic research by Vinkey et al. (2006) and Schwartz (2007) established that fisher survived their minimum population numbers on the Nez Perce-Clearwater, while results from Krohner (2020) from both spatial and non-spatial analyses demonstrate that fisher currently occupy this area to a greater extent than in Montana and other parts of Idaho within the Northern Rockies. Krohner (2020) also demonstrates an absence of fisher detections in large areas across the Northern Rockies of Montana and Idaho, even within predicted fisher habitat. These studies underscore the importance of the Nez Perce-Clearwater to fisher conservation in the Northern Rockies.

Bighorn Sheep

Historically, bighorn sheep were abundant and widespread throughout the mountainous regions of Idaho, including the Salmon River Canyon (Merriam and Steineger 1891, Smith 1954, Buechner 1960, Idaho Department of Fish and Game 2010). Dramatic and swift declines in abundance occurred during the mid-1800s to mid-1900s and were attributed to overharvest, habitat loss, and competition for forage and disease transmission from domestic livestock (Hornaday 1914, Honess and Frost 1942, Couey 1950, Smith 1954, Buechner 1960, Jessup 1981, Goodson 1982, Wehausen et al. 1987). Bighorn sheep herds in the Lower Salmon River Canyon were one of the few remaining herds that were not extirpated in the State of Idaho. Although bighorn sheep were not extirpated from this area, the herd represents the last remaining native population in Idaho and current population levels remain low. Bighorn sheep within the Salmon River area represent the core of Idaho's bighorn sheep populations, and this unique native genetic stock represents a heightened conservation need across federal, state, and tribal jurisdictions. This population is one of the largest native populations of Rocky Mountain bighorn sheep.

Bighorn sheep along the breaks of the Salmon River Canyon, as elsewhere across the Nez Perce Tribe's treaty territory, are a culturally significant treaty resource (Mack et al. 2017)). Based on archeological evidence and verbal histories of tribal elders, bighorn sheep were the primary game animal that sustained the Nez Perce way of life prior to European settlement (Mack et al. 2017). Bighorn sheep were used for a large variety of purposes, including food, clothing, tools, utensils, and weapons (Mack et al. 2017). Native bighorn sheep within the Salmon River drainage are of particular importance to the Tribe as native bighorn sheep represent the last genetic stock that has sustained the Tribe's subsistence lifestyle from time immemorial. The Tribe continues to work towards bighorn sheep restoration with state, federal, and other partners. Bighorn sheep are analyzed as species of social and economic value in the Multiple Uses Wildlife section.

Elk

Elk are one of Idaho's most iconic wildlife species. Elk are one of the most highly sought-after big game animals in the state. In 2002, elk hunting was estimated to generate more than $70 million annually in direct hunter expenditures like fuel, meals, and lodging (Cooper et al. 2002) and in excess of $6.15 million in license revenue annually statewide (Idaho Department of Fish and Game 2014a). The combined economic impact of elk hunting in Idaho and Clearwater counties alone was more than $27.6 million in 2007. In 2016, hunting related expenditures in Idaho totaled $1.05 billion, the majority of which was spent on big game hunting (Institute 2018). Population declines have impacted this herd previously renowned for its abundance and trophy opportunity, which used to draw hunters from all over the country. The plan area makes up most of the Lolo zone, Selway zone, and Elk City zone; a substantial portion of the Dworshak zone; and smaller portions of the Palouse and Hells Canyon zones. Each zone is comprised of one or more game management units that roughly encompass a population. In total, the plan area contains portions of 12 game management units in the State of Idaho, which is 12.3 percent of the total game management units in Idaho. These zones make up the core of elk hunting areas in North Central Idaho. The elk herds in the plan area represent a distinctive role and contribute both economically and socially. Elk habitats are analyzed in detail in the Multiple Uses Wildlife section.

Unique, Rare, or Endemic Species—Rocky Mountain Refugium

The plan area lies at the heart of the Rocky Mountain Refugium, a term used to delineate the high endemism and biodiversity of land snails, salamanders, and plants in this area. This area is essentially comprised of areas spared from glaciation nor paved by volcanic flows, which allowed some species to survive the last glacial maxima until today (Stagliano 2007). Examples of species or groups that persist today include land snail biodiversity, the Idaho giant salamander (*Dicamptodon aterrimus*), the Coeur d'Alene salamander, and coastal disjunct plant communities. This assemblage of endemics represents a distinctive role and contribution to biodiversity. For additional information regarding land snail biodiversity see the Mollusk Assemblage section below. See the Amphibian Assemblage section for more information pertaining to the Coeur d'Alene salamander. The effects on habitats of these species are analyzed within the Abundance and Diversity of Wildlife section.

Bitterroot Grizzly Bear Recovery Zone

The Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness areas make up the core of the Bitterroot Ecosystem Recovery Area for the federally threatened grizzly bear. These two wildernesses make up the largest contiguous block of wilderness in the contiguous United States. The Bitterroot Ecosystem is currently unoccupied by grizzly bears, but this ecosystem represents one of six grizzly bear recovery zones. Reestablishment of grizzly bear in this recovery zone is currently through natural dispersal.

Wildlife Assemblages

Bird Assemblage

Per the Idaho Department of Fish and Game's Species Diversity Database, accessed in July 2020, there are 203 species of birds that have been recorded in the plan area. Birds represent the largest taxonomic class of wildlife by species count in the plan area. The bird species are diverse in their use of habitats and are associated with habitats of many groupings. The bulk of the bird species are grouped into one of three habitats, the aquatic, forested, and non-forested or early seral habitats, followed by ecotone groupings. However, at least one bird species was grouped in every grouping (see Table 154). A few species use alpine habitat, and a few others are associated with the resource group but otherwise use a wide array of habitats. Examples of species that rely on resources but are otherwise habitat generalists include the turkey vulture, which is found in many habitats but requires carrion, and hummingbirds that are widespread and need nectar resources.

Many shorebirds and aquatic birds are found in the plan area because of the presence of large rivers, lakes, and wetlands. See Appendix C for more information on habitat descriptions of bird species and habitat groupings.

Population trends are available for birds much more than for other wildlife species. This is the result of organized efforts at the national scale to count birds, such as breeding bird surveys and Christmas bird counts, and the ease at which birds are surveyed with methods such as point counts. Their visibility, diurnal habits, and distinctive songs enable easy detection. However, it should be noted that some bird species do not lend themselves well to these types of surveys and population trends are less understood. A few examples include owls whose nocturnal habits make them difficult to count; secretive aquatic species like the Virginia rail (*Rallus limicola*); species that live naturally at low densities, such as the black backed woodpecker; and species that do not readily vocalize, such as the forest grouse.

Many bird species are migratory while others are year-round residents. Most migratory species are present in the plan area only during the summer, but a few species are here only in the winter. For example, the common goldeneye (*Bucephala clangula*) and Barrow's goldeneye duck (*Bucephala islandica*) winter on large rivers in the plan area and migrate north for the summer. Some year-round residents use different habitats in winter or migrate only a short distance from their summer habitats, which represents a change in elevation. Some bird species use the same habitats year-round. The seasonal presence and habitat use of bird species were considered when assigning bird species to habitat groups and when evaluating coarse filter plan components in the Final Environmental Impact Statement.

Threats to birds can occur from within the plan area or far away in their migratory habitats. They may be affected within their group by threats to their habitats. Birds are most affected by permanent changes in habitat that result in permanent loss. They may be affected short-term by changes in vegetation conditions or disturbance. Forest species can be affected by changes in the structure, function, and composition of forested vegetation. When forests change from a mature seral condition to an early seral condition, the bird species assemblage changes from those that use mature forest habitats to those that use early seral or non-forested habitats. Through forest growth, the bird assemblage transitions over time back to species that use mature forests. This is the natural course of changes in forested ecosystems. This progression happened naturally through fire in the past but can also occur as a result of timber harvest, mechanical treatments, or prescribed fire. Naturally, changes in forest composition or dominance, density, and structure also influence bird species assemblages. When hosting variety in seral stages, density, structure, and tree species composition, the diversity of bird species can be maximized and maintained. When anthropogenic change is extensive enough that it limits any one of these conditions, changes forest conditions permanently, or removes some key ecological features required by birds, some species become less prevalent or may even disappear. Commonly, concern arises for species that are specialized to vulnerable habitats or where habitat features take a long time to develop. For example, concern for cavity nesting species arises because trees may take hundreds of years to develop the heart rot necessary to enable excavation of nesting sites in large and very large trees. Therefore, threats to forest habitats include anthropogenic changes such that any key feature or forest condition becomes rare or non-existent. This usually happens through excessive extraction or lack of conservation practices like retention of live and dead trees, protection of riparian areas, leaving coarse woody debris, or reforestation.

Similarly, aquatic birds may be affected by threats to aquatic habitats. Changes in aquatic habitats arising from sedimentation, turbidity, eutrophication, pollution, channel alteration, flow, or temperature can cause a cascade of changes to aquatic species assemblages that support aquatic birds. Some of these changes may be permanent or ephemeral.

Birds of open habitats have generally not been the subject of conservation concern and are usually abundant and their populations stable. Birds of open or early seral habitats can be affected by threats to open habitats. The most damaging threats are those that cause permanent loss, such as developments or farming. Forest Service management rarely results in these types of changes and, when they do, they are of small scale. More commonly, management results in changes that lower habitat quality or reduce the extent of open or non-forested habitats. These include fire exclusion, excessive amounts of forest succession, changes in species composition, invasion by non-native plants, or over exploitation by livestock.

Several birds use edge habitats or the interface between forested habitats and non-forested habitats and may be affected by changes in distribution and abundance of patch size or heterogeneity. Some ground dwelling birds require different seasonal habitats within accessible proximity to utilize a landscape. Changes in landscape pattern can occur from changes to disturbance processes, such as those from fire suppression or forest harvest patterns that reduce heterogeneity of landscape patterns.

Some species may be affected by threats to critical resources, such as losses of nectar resources for hummingbirds, loss of fruiting plants through succession for frugivores, or loss of prey species for predatory species. Climate change may threaten habitat by changing precipitation and temperature gradients that support vegetation, particularly in high elevation species. Their ability to fly allows most species to disperse far and wide without connectivity concerns. A few exceptions may include ground dwelling birds, such as mountain quail, where connectivity or proximity to seasonal habitats and other subpopulations may be important.

Several species of ducks, grouse, quail, and doves are species that are commonly hunted. A wide variety of bird species are used for Native American tribes for ceremonial, religious, cultural uses, and subsistence. Birds are popular for wildlife watching and photography and enhance the enjoyment of recreation. For more information about commonly used wildlife, see the Multiple Uses Wildlife section.

National and regional data sets indicate that most bird species found in the plan area are secure with stable or increasing trends. Other species are declining nationally but are stable regionally or locally. Some have declined nationally but are still relatively abundant. Some species are naturally rare locally, but surveys indicate there is no decline, a decline is undetected, or there are few threats. Examples include black-backed woodpeckers, three-toed woodpeckers, flammulated owls (*Psiloscops flammeolus*), boreal owls (*Aegolius funereus*), Lewis's woodpecker (*Melanerpes lewis*), pygmy nuthatches (*Sitta pygmaea*), and great gray owls (*Strix nebulosa*). Only a few species are thought to have declined sharply or are uncommon and are experiencing threats or habitat loss, which indicates substantial concern for their long-term persistence. These species are identified as species of conservation concern. Three bird species are identified as species of conservation concern: the white-headed woodpecker, mountain quail, and the harlequin duck. Species previously identified as Regional Forester Sensitive Species (RFSS) include the bald eagle (*Haliaeetus leucocephalus*), the black-backed woodpecker, the flammulated owl, pygmy nuthatch, the harlequin duck, mountain quail, the peregrine falcon (*Falco peregrinus*), and the white-headed woodpecker. The bald eagle and the peregrine falcon were once federally listed but have recovered. No observations have been made within the plan area for the threatened yellow-billed cuckoo (*Coccyzus americanus*). Many of these species were evaluated in detail for inclusion as a species of conversation concern but were not found to have a substantial concern for their long-term persistence based on the criteria used to evaluate them.

Mammal Assemblage

A total of 69 mammals have been observed in the plan area. Two species were added between the draft and Final Environmental Impact Statement. At least two, and perhaps three, grizzly bears were observed in the plan area while the Draft Environmental Impact Statement was being written. Prior to that time, recent grizzly bear observations were not recorded in the Idaho Species Diversity Database. In addition, during the Draft Environmental Impact Statement phase, only the American marten was included; the Pacific marten (*Martes caurina*) was not included by accident. Pacific marten until recently was considered a subspecies of American marten. However, genetic evidence established that they are distinct species and that both species are present on the Nez Perce Clearwater National Forest. Recent genetic surveys indicate that both species concurrently occupy the Nez Perce-Clearwater (Krohner 2020). The largest number of mammals are grouped into the substrate habitat because many mammals require friable soil for burrowing, rock outcrops, or steep terrain as a key ecological feature; otherwise, this grouping would occur in a wide variety of habitats. Most of the bat species were included in this group because they occur in a broad variety of habitats from low elevation deserts to high elevation forestlands and their distribution is probably more tied to their roosting or maternity features rather than vegetation. Similarly, the key ecological characteristic for the American pika (*Ochotona princeps*) is talus, and the key feature for yellow-bellied marmots (*Marmota flaviventris*) is rock outcrops or talus.

Compared to birds, proportionally fewer mammals in the plan area are specialized for aquatic habitats, though many mammals use riparian habitats in addition to other features and are grouped in other categories. The North American river otter (*Lontra canadensis*) and the beaver (*Castor canadensis*) are specialized for aquatic and riparian habitats and are grouped there. Other prominent habitat associations for mammals are forested habitats, ecotone, or forest edge, non-forested or early seral habitats, and resource associations. Most mammals are year-round residents in the plan area but may migrate to wintering grounds or hibernate during the winter. Some bat species migrate during the winter. Unlike some birds, no mammals live here only during the winter. Some of the same factors that affect bird habitats also affect mammal habitats. See Appendix C for more information on habitat descriptions and habitat groupings.

Several mammals are used as game species or furbearers. Big game include elk, white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), moose (*Alces alces*), mountain goats (*Oreamnos americanus*), bighorn sheep, black bear (*Ursus americanus*), wolves (*Canis lupus*), and cougars (*Puma concolor*). Mountain cottontail rabbits (*Sylvilagus nuttallii*) and snowshoe hares (*Lepus americanus*) are considered upland game. Beavers, muskrats (*Ondatra zibethicus*), American and Pacific martens, mink (*Neovison vison*), coyotes, bobcats (*Lynx rufus*), badgers (*Taxidea taxus*), fox (*Vulpes vulpes*), river otters, long-tailed weasel (*Mustela frenata*), raccoons (*Procyon lotor*), short-tailed weasel (*Mustela erminea*), and skunks (*Mephitis mephitis*) are all valued for their fur. A wide variety of mammals are used by Native American tribes for ceremonial, religious, and cultural uses; clothing; and subsistence. For more information about commonly used wildlife, see the Multiple Uses Wildlife section.

There are two mammal species of conservation concern: the fisher and bighorn sheep. Two other mammal species are federally listed or recognized: the federally listed threatened Canada lynx and the threatened grizzly bear which has recently been identified as "may be present" in the plan area by the U. S. Fish and Wildlife Service. The wolverine was a proposed species until recently. On October 8, 2020, the U.S. Fish and Wildlife Service announced that the best available science indicates that the factors affecting wolverine populations are not as significant as believed in 2013 when the U.S. Fish and Wildlife Service proposed to list the wolverine found in the contiguous United States as threatened (U.S. Department of the Interior 2018b). See the "Rationale (Species Evaluations) Used to Select Animal and Plant Species as Species of Conservation Concern for the Nez Perce-Clearwater Draft Plan and Draft Environmental Impact Statement"[19] for more information on why wolverines are not identified as a species of conservation concern.

Amphibian Assemblage

The Idaho Department of Fish and Game's Species Diversity Database has current or historical records for 12 amphibians: 5 frogs, 2 toads, and 5 salamanders. A couple of these species are questionable as to their occurrence in the plan area. The rough-skinned newt (*Taricha granulosa*) only has a single observation from 1996; it has not been recorded since and the plan area is outside its known range. Similarly, the Woodhouse's toad (*Anaxyrus woodhousii*) is well outside of its known range and has only been observed once. These observations may be misidentifications and are believed to not truly occupy the plan area. The American bullfrog (*Lithobates catesbeianus*) is established but is not native.

Most of these amphibians breed in aquatic habitats, save for the Coeur d'Alene salamander, which is presumed to lay eggs in underground rock crevices. That, coupled with their moist skin, ties these species to moist environments as key habitat characteristics. The extent to which amphibians reside near water as adults varies. Western toads (*Anaxyrus boreas*) and Coeur d'Alene salamanders can be found far from water while other species usually stay close to water. Long toed salamanders (*Ambystoma macrodactylum*), Idaho giant salamanders, and western tiger salamanders (*Ambystoma mavortium*) use downed wood, leaf litter, or subterranean habitats as adults.

Amphibian species are grouped in the aquatic, wetland, water, or riparian habitat groups, as these are the key ecosystem requirements for these species. However, it should be noted that substrate habitats, such as soil, rock outcrops, cutbanks, rocks, logs, or leaf litter, are also key requirements for most of these species.

Some of these species require good water quality while others tolerate a variety of aquatic settings. For example, the Rocky Mountain tailed frog (*Ascaphus montanus*) requires streams with high water quality, whereas the non-native bullfrog can use nearly any water. Thus, key ecosystem requirements are aquatic and riparian habitats functioning within the natural range of variability.

Dispersal for amphibians could be restricted to the distribution of aquatic features, although they also disperse during rain events. Thus, connectivity of aquatic habitats is a key feature of ecosystem integrity for these species. Those species that have more terrestrial habits as adults may be limited in dispersal by the distribution of features like downed wood, rocks, and leaf litter. Some amphibians are reluctant or struggle to cross roads. As a group, they all forage on invertebrates as primary foods so invertebrate populations are important to their persistence.

[19] U.S. Forest Service's Northern Region (Region 1) Species of Conservation Concern website, available online: https://www.fs.usda.gov/detail/r1/landmanagement/planning/?cid=fseprd500402

Amphibians worldwide are thought to be declining for a variety of reasons (Stuart et al. 2004, Beebee and Griffiths 2005). Causes for the decline include habitat loss, over exploitation, and invasive species. Some declines are occurring without explanation (enigmatic declines) even in well protected areas, such as national parks (Stuart et al. 2004). The enigmatic declines are hypothesized to be caused by exotic disease; contaminants, such as pesticides; changes in the amount of solar radiation; and climate change (Collins and Storfer 2003). Many of the above threats could be operating within the plan area at various scales and intensities. Habitat changes and the effects of plan components and alternatives will be analyzed as coarse filter, ecosystem integrity evaluations.

A few species are regional endemics for which the plan area makes up a substantial portion of the species global range. The Nez Perce-Clearwater makes up a substantial portion of the Idaho giant salamander and the Coeur d'Alene salamander ranges. The Idaho giant salamander is an Idaho endemic, save for very few observations just over the Idaho-Montana border. The latitudinal extent of the Idaho giant salamander's range is only approximately 222 miles north to south, extending from central Valley County to northern Shoshone County, Idaho. A total of 243 out of 403 observations in the Idaho Species Diversity Database[20] (accessed in July 2022) were observed within the Nez Perce-Clearwater boundaries. Most of the remaining observations occur within the southern portion of the Idaho Panhandle National Forest. While endemic, it is widespread and abundant within the plan area and is not considered a species of conservation concern.

Similarly, the Coeur d'Alene salamander is a regional endemic whose distribution extends from the Selway River northward into southern British Columbia, including parts of far western Montana. Observations of the species within the plan area make up approximately one quarter of the observations recorded in the Idaho Species Diversity Database. The Coeur d'Alene salamander has been observed in the plan area 105 times; throughout the State of Idaho, there have been 422 observations. While its distribution is wider, its habitat requirements are far narrower than the Idaho giant salamander. It seeks seeps, springs, waterfall spray zones, talus, and streamside habitats in association with sharply fractured rock formations used for underground refugia. The number of sites known to contain the Coeur d'Alene salamander are relatively limited, as this combination of habitat is rare in the plan area. While uncommon or rare, the habitat for these species is relatively well protected by designated wild and scenic river management along the Lochsa and Selway Rivers and by PACFISH and INFISH measures for the protection of aquatic and riparian habitats. While recent population trend information does not exist, the data suggests that the Coeur d'Alene salamander population during this period observed 95 percent of sites occupied between 1987 to 1992 (Cassirer and Groves 1994).

Reptile Assemblage

There are 11 reptile species on the Nez Perce-Clearwater: 3 lizards, 7 snakes, and 1 turtle. Most reptiles are either carnivores or invertivores, though the painted turtle (*Chrysemys picta*) is an omnivore. In terms of distribution, some reptiles are widespread in the plan area. The ring-necked snake (*Diadophis punctatus*) is a widespread species in the United States but occurs in Idaho as a disjunct population and has only been observed in limited portions of the plan area. Nevertheless, there are few threats that would affect this secretive snake. The northern alligator lizard (*Elgaria coerulea*) is limited to the northern half of the Nez Perce-Clearwater and is distributed mostly along major rivers. The western fence lizard (*Sceloporus occidentalis*) has been observed at lower elevations only along the Salmon River. The western rattlesnake (*Crotalus viridis*) has been seen mostly at lower elevations along rivers, with one observation along the Selway River. An observation of the painted turtle was included in the Idaho Species Diversity Database between the Draft and Final Environmental Impact Statement. The painted

[20] Idaho Department of Fish and Wildlife Information System, Species Diversity Database: https://idfg.idaho.gov/species/

turtle is native to Northern Idaho and may only have limited distribution in the plan area. However, they are considered common and abundant where they occur, and their conservation status is not in question. The gopher snake (*Pituophis catenifer*) has only been recorded in and around the Rapid River but likely has a wider distribution because it is common and abundant throughout much of Idaho.

Most of these species, save for painted turtles, are found in a wide variety of habitats but require hiding cover in the form of rocks, logs, debris, burrows, or talus. Thus, most are grouped into the substrate habitat grouping. Substrate habitats are comparatively less affected by Forest Service management than other habitat groupings, such as aquatic habitat or forested habitats. Perhaps the most influenced facet of their habitat from management is the amount and size of coarse woody debris left after timber harvest, quarrying of rock outcrops, and impacts from soil compaction. The painted turtle is an aquatic species and is grouped into the aquatic, wetland, water, and riparian habitats group. By and large, they face few identified threats, save for collection from the pet trade. The rattlesnake also faces human persecution. These threats are not prevalent in the plan area and do not affect habitat.

Mollusk Assemblage

Mollusks in the plan area include mussels and snails. The plan area includes observations of three species of freshwater mussels, which are dealt with in the Aquatic Ecosystems and Fisheries section. These observations include the western pearlshell mussel (*Margaritifera falcata*), the western ridged mussel (*Gonidea angulata*), and the California floater mussel (*Anodonta californiensis*).

The plan area supports high gastropods (slugs and snails) diversity. In fact, approximately 70 species of gastropods are known to occur in the plan area, which is the result of the Northern Rocky Mountain Refugium (Brunsfeld et al. 2001, Stagliano 2007). Many species of gastropods in the plan area are regional endemic species limited to northern Idaho, western Montana, southern British Columbia, and eastern Washington. Others are Idaho endemics limited in many cases to Idaho and some are local endemics with distributions limited to parts of the Nez Perce-Clearwater and some lands just outside the plan area. The Selway forestsnail (*Allogona lombardii*), the Mission Creek Oregonian (*Cryptomastix magnidentata*), and the nimapuna disc (*Anguispira nimapuna*) are some examples of local endemic gastropods. For example, 33 of 38 observations of the Selway forestsnail and 79 of 89 observations of the nimapuna disc have been made on Nez Perce-Clearwater lands (Idaho Species Diversity Database, accessed 2019).

Similarly, the Lower Salmon River Canyon has an exceptional morphologic and taxonomic land snail diversity, which has been recognized by scientists since the 1860s (Frest and Johannes 1997). Several morphologically distinct land snails are thought to be local endemics limited to only the Lower Salmon River Canyon. Some of them are only known from small or scattered rock outcrops within the Lower Salmon River Canyon. Most of them occur outside of the plan area boundaries at lower elevations but some taxa have been observed on Nez Perce-Clearwater lands. The marbled disc (*Discus marmorensis*), the costate mountainsnail (*Oreohelix idahoensis*), the Seven Devils mountainsnail (*Oreohelix hammeri*), the striate mountainsnail (*Oreohelix strigosa goniogyra*), and boulder pile mountainsnail (*Oreohelix jugalis*) are examples of Lower Salmon River endemics observed on Nez Perce-Clearwater lands. The Seven Devils mountainsnail is a distinctive taxon known from only one site north of Rapid River on the Nez Perce-Clearwater. Seven of 19 observations of all known observations of the marbled disc occur on the Nez Perce-Clearwater and all known observations are limited to Slate Creek within the plan area and John Day Creek outside the plan area, with a global range estimated at less than 40 square miles. Dozens of other mountain snails have been collected on the Nez Perce-Clearwater, whose morphology suggests species status but have not yet been described by science (Frest and Johannes 1997, Frest 1999, Frest and Johannes 2000, Frest et al. 2001). Threats to these endemic land snails are identified in Frest (1999) which discusses road building, mining, grazing, wildfire, logging, talus and rock quarrying, weed control, and development.

Mountain snails from the genus *Oreohelix* make up some, but not all, of the land snail diversity in the Lower Salmon River and are highly morphologically variable. In some cases, individuals collected from hundreds of miles apart are morphologically similar, suggesting convergent evolution, while in other cases, closely related snails from only a few miles distance can look radically different. Recent molecular techniques did not clarify the situation because testing of three different techniques for identifying species resulted in vastly different phylogenies, wherein some techniques suggested lower numbers of species than morphological studies suggested while other techniques by the same study and author suggested many more species than morphological studies suggested (Linscott et al. 2020). Linscott and Parent (2020) suggested more genetic studies of *Oreohelix* snails, combined with distributional studies, should be employed to resolve the issue. In the meantime, Linscott and Parent (2020) recommended that conservation efforts should be employed to protect calcareous rock outcrops from alteration to conserve potentially valid taxa.

Habitats used by gastropods include aquatic, riparian, forest, and non-forested habitats. About 19 gastropod species use aquatic or riparian habitats, while 51 species use substrate habitats, such as rocks, logs, leaf litter, or rock outcrops.

The habitat descriptions of nearly all the terrestrial gastropod species include moist habitats provided under rocks, downed wood, leaf litter, duff or moist sites underneath mesic vegetation, and these habitat components probably represent key ecological requirements. These habitats occur in forested habitats, riparian areas, rocky areas, and talus. The number of snails in the substrate habitat group underscores the importance of these features in a variety of settings.

Only a few gastropod species were found to use non-forested or early seral habitats. Their soft, moist bodies seem less tolerant of drier, non-forested habitats. Mountainsnails (*Oreohelix* spp.) appear to be the most tolerant of non-forested habitats. On the Nez Perce-Clearwater, several mountainsnail species are found in dry forest types. Mountainsnails are often found associated with specific lithologies, especially rocks and soils that have a calcareous make up. It is generally thought that mountainsnail species are associated with calcareous substrates (Henderson and Daniels 1916). Threats to mountainsnails may include quarrying for road base.

Both fully aquatic and some terrestrial gastropod species are grouped into the aquatic, wetland, water, and riparian habitat group. Seven species appear to associate with riparian habitats, while 12 are fully aquatic. Aquatic gastropods are highly sensitive to changes in water quality, sedimentation, temperature change, and flow. Of the aquatic species, 4 use open water or lake habitats, 5 use riverine habitats, 2 are associated with springs or groundwater, and 1 is an aquatic generalist. Aquatic gastropods are highly susceptible to habitat loss and degradation, particularly narrow endemics restricted to a limited number of spring or short stream reaches (Johnson et al. 2013). Johnson et al. (2013) estimate that aquatic freshwater gastropods are some of the most imperiled species in the United States and Canada, with approximately 74 percent of 703 species identified as imperiled. This trend holds in the plan area as NatureServe ranks 2 species as G1 critically imperiled, 4 species as G2 imperiled, and 4 species as G3 vulnerable. An analysis for aquatic gastropods might be provided best through coarse filter aquatic components that maintain water quality and aquatic habitat characteristics.

The wildlife species were grouped into habitat groupings and then the habitats were analyzed. The effects to the habitats were analyzed under the plan alternatives, as presented below. Each habitat grouping is analyzed under its own section with subgroupings nested within the groupings.

Aquatic, Wetland, Water, and Riparian Habitats

Any species whose primary habitat needs include aquatic habitats, such as wetlands, rivers, ponds, springs, or groundwater, or that primarily use riparian vegetation as their habitat were assigned to the aquatic, wetland, water, and riparian habitat group. There were 102 species whose key ecological habitat characteristics fit within this habitat group. This represents 27 percent of the total wildlife biodiversity in the plan area. Most species, 59 out of 102 the total listed, assigned to this group are aquatic avian species, such as ducks, shorebirds, and geese.

Since aquatic habitats are so diverse and used by wildlife in so many different ways, the aquatic, wetland, water, and riparian habitat group was further subdivided into the following subgrouping: open water habitats, such as lakes, large rivers, and open water within wetlands; riverine habitats; ground water habitats, such as springs and seeps; riparian vegetation habitats; and depressional wetlands, ponds, marshes, and emergent vegetation habitats; and aquatic and forested habitats or forested wetlands. Another subgrouping called aquatic generalist was created for species that use multiple aquatic habitats.

There are some species whose habitat preferences overlap in these subgroupings, which requires explanation. The open water habitat subgrouping includes open water in a variety of settings. Many species use open water habitats, whether those open waters are within lakes, large rivers, or large wetlands. If a species primary habitat description was open water, they were assigned to this group even if many of them could also logically be assigned to other subgroupings. An example is the canvasback duck (*Aythya valisineria*), whose habitat description includes use of a wide variety of aquatic features during migration, such as ponds, lakes, or slow rivers. Based on this description, the canvasback could have been grouped in either open water or the depressional wetlands subgroup.

Species were assigned to the riverine subgroup if their primary habitat is restricted to river habitats. Species were assigned to the riparian group if their primary habitat is described as riparian habitats, whether they are dependent upon the vegetation surrounding wetlands, rivers, lakes, and other wet habitats but were not necessarily aquatic. If a species used aquatic habitats but also used cavities or trees for nesting, then they were assigned to the aquatic and forested habitats or forested wetlands subgroup. Lastly, a species was assigned to the wetland subgroup if they use depression wetlands, ponds, marsh, or emergent vegetation as their primary habitat. The number of species in each sub-habitat grouping are shown in Table 155 (Source: National Hydrography Dataset, waterbodies greater than 1-acre spatial layer).

Table 155. Number of wildlife species known to use habitat subgroups under the aquatic, wetland, water, and riparian habitat group

Habitat Subgrouping	Number
Open water habitats—lakes, open water within wetlands, open water on large rivers	15
Riverine habitats	15
Ground water habitats—springs or seeps	3
Riparian habitats	23
Wetland—depressional wetlands, ponds, marshes, emergent vegetation	30
Aquatic and Forested habitats or Forested Wetlands	7
Aquatic generalist	7
Island Habitats	2

The aquatic habitats are used by nine mammals, such as muskrat, northern river otter, Beaver, raccoon, American mink, and North American water vole (*Microtus richardsoni*).

Fifteen species of gastropods were grouped into the aquatic habitats group. This group also includes a few species that are dependent upon groundwater resources, such as the pristine pyrg (*Pristinicola hemphilli*) and the Coeur d'Alene salamander, which use springs and groundwater as key ecological characteristics. These species require aquatic and forested habitats or forested wetlands.

Other wildlife species that primarily use upland habitats often use aquatic and riparian habitats in addition to their use of other habitats. Aquatic and riparian habitats make up only a small percentage of the land base. Riparian habitats are used by both aquatic species and many terrestrial species. A good number of species assigned to the broad-leaved forest subgroup also use riparian habitats because riparian areas are often where broad-leaved forests grow in the plan area. These considerations underscore the importance of aquatic and riparian habitats for wildlife in the plan area.

Key Ecological Characteristics of Aquatic and Riparian Habitats

Key ecological requirements and indicators for species within the aquatic grouping include:

- Riparian vegetation functioning within the natural range of variation.
- Open water with low turbidity, fish, and invertebrates; well oxygenated water; and variety in the bottom substrates, such as soft soil bottoms or rocky bottoms.
- Good water quality.
- Rivers functioning within the natural range of variation, including temperature; appropriate inputs of coarse woody debris and leaf fall; abundant aquatic invertebrates; robust fish populations; natural channel morphology; and functioning riparian areas with appropriate plant composition for the site with deciduous trees and shrubs. Substrates should include gravel, cobble, and boulders.
- Sediment yield functioning within the natural range of variation.
- Wetlands extent and distribution maintained, with appropriate native aquatic, emergent, or riparian vegetation surrounded by meadows or forest, as appropriate for the site.
- Springs and ground water systems functioning within the natural range of variation that are free from alteration or excessive disturbance.

If these habitats are functioning within their natural range of variation, then they should provide the habitat needs for a little less than one-third of all wildlife on the Nez Perce-Clearwater. Each species interacts within these habitats in different ways to exploit their niche. The wildlife species interact within these habitats to contribute to the ecological integrity of these systems, including structure, function, composition, and connectivity. This analysis will focus on whether the plan components and alternatives provide ecosystem integrity to provide for the diversity and abundance with respect to wildlife in the plan area.

Key ecological characteristics of open waters can be informed by the life history or dietary requirements of open water species. These species are mostly invertivores, piscivores, or omnivores, which forage by diving for fish or invertebrates for foods. This often is facilitated by clear water. Threats to these key ecological characteristics include changes to water clarity from eutrophication, sedimentation, contaminants, human waste, pollution, human disturbances, and the invasion of exotic plants and animals. Since they are secondary consumers, some of these species have been documented to have bioaccumulation from contaminants, such as mercury, pesticides, polychlorinated diphenyl, lead, and other metals. Thus, clean water is a key ecological characteristic. As many are piscivores and invertivores, abundant fish and invertebrate populations are a key ecological characteristic of this habitat. A change in the physical and chemical components of the water or the quality of water could affect several fish or aquatic invertebrates, which then affects wildlife in the open water subgroup. However, not all species of wildlife would be affected equally by these threats.

Key ecological characteristics of riparian habitats include distinct mesic and aquatic vegetation communities, including emergent vegetation, mesic shrubs, deciduous trees, reeds, grasses, and sedges. Some species require shallow waters where emergent vegetation grows while others require gallery forming trees or deciduous shrubs. In forested riparian habitats, these features are maintained periodically by disturbances like fire, flooding, or beavers. Structure, function, composition, and diversity of riparian vegetation communities provide the foundation for ecological conditions for the high wildlife diversity found in riparian habitats. Threats to riparian habitats include fire exclusion and subsequent uncharacteristic wildfire resulting from fuel build up, chronic intensive grazing, removal of beavers, exotic invasive plant species, and human alterations of aquatic conditions or riparian vegetation.

Some species specialize in forested riparian habitats, while others require herbaceous riparian areas. The wood duck (*Aix sponsa*), bufflehead (*Bucephala albeola*), common merganser (*Mergus merganser*), and tree swallow (*Tachycineta bicolor*) all nest in tree cavities in snags or mature live trees. Snags with cavities adjacent to or within riparian areas are important for tree nesting riparian and aquatic species. The osprey (*Pandion haliaetus*) and bald eagle use forested riparian habitats and often use large snags for nest sites. The great blue heron (*Ardea herodias*) nests in gallery forming trees. The red-winged blackbird (*Agelaius phoeniceus*), the sandhill crane (*Grus canadensis*), and Lincoln's sparrow (*Melospiza lincolnii*) use non-forested riparian habitats. Some shorebird species require bare shoreline for foraging or nesting. Killdeer (*Charadrius vociferus*) often nest on sandy or rocky habitats adjacent to water. Thus, the amount and diversity of riparian habitats, both in the physical and vegetative characteristics, are a key ecological characteristic of riparian habitats. Threats or stressors to these characteristics include alteration of the physical properties or geomorphology of aquatic habitats and changes to vegetation communities. Changes to physical properties of aquatic and riparian habitats generally result from human alteration of wetlands, river channels, sedimentation, and flow characteristics. Changes to riparian vegetation communities can be caused by alteration of flow; dams; vegetation management; and changes to natural disturbances, such as fire, uncharacteristic wildfire, loss of ecosystem engineers like beavers, and grazing.

Species that use riparian habitats vary in their diet, and riparian habitats provide a diverse foraging environment. The rich plant community supports abundant foraging opportunities, and each species has adapted to exploit these resources. Many riparian species are herbivories that forage on mesic or aquatic vegetation. Examples include moose, beaver, and several duck species. Fruits make up a major portion of the diet of many passerine birds in the fall, and many species of fruiting plants grow within riparian areas. The yellow-breasted chat (*Icteria virens*), yellow-rumped warbler (*Setophaga coronata*), Townsend's solitaire (*Myadestes townsendi*), bohemian waxwing (*Bombycilla garrulus*), western tanager (*Piranga ludoviciana*), Swainson's thrush (*Catharus ustulatus*), and song sparrow (*Melospiza melodia*) forage on invertebrates in the spring and fruits in the fall. Threats to fruit resources and riparian vegetation forage can be caused by vegetation management, forest succession because of fire suppression, reduction through human exploitation, grazing, uncharacteristic fires, and invasion by exotic plant species that can displace fruiting plants.

Rich invertebrate communities, both aquatic and terrestrial, provide forage for dozens of wildlife species. These include songbirds, ducks, shorebirds, most amphibians, small mammals, and bats. Foraging strategies are diverse for capturing these invertebrate foods—some species capture flying aquatic insects in the air, others forage on the ground under shrubby vegetation, others dive or wade to capture their food, and some obtain their invertebrate foods under debris and duff. Thus, healthy insect and invertebrate communities are key characteristics of riparian habitats. Insect communities can be reduced or lowered in diversity from changes to water quality; water abundance; temperature; substrates; inputs, such as detritus or coarse woody debris; and changes to the vegetation community within riparian habitats. The cause of these changes can be forest management, sedimentation from roads, channelization, dredging, water diversions, dams, invasive plants and animals, wetland alteration or draining, pollution from human waste, changes to geomorphology, removal of beavers, and possibly climate change. These activities and their effects are like those that affect fish and were analyzed in detail within the Aquatic Ecosystem and Fisheries section.

Several species are piscivores dependent upon robust fisheries for food. Species, such as the bald eagle, common merganser, northern river otter, American mink, belted kingfisher (*Megaceryle alcyon*), great blue heron, osprey, and western grebe (*Aechmophorus occidentalis*) are piscivores or omnivores where fish make up a substantial portion of their diet. Species like the harlequin duck and the common merganser consume fish eggs as a portion of their diet. Robust fish communities are a key ecological characteristic of riparian and aquatic habitats. Fish communities can be affected by changes in water quality, quantity, temperature, uncharacteristic sedimentation, changes to aquatic geomorphology, and contaminants. These factors are analyzed in depth in the aquatic and Aquatic Ecosystem and Fisheries section.

Diversity and abundance of wildlife are key benefits for carnivorous riparian species. Factors that affect the forage base of plants, fisheries, and invertebrates can reduce the abundance and diversity of wildlife used as prey. The changes to the key ecological characteristics mentioned above are key threats to these carnivorous species. Trapping within riparian areas can also affect carnivores, as many of them are furbearers.

Some population trends of birds that were grouped into aquatic habitats are available from the Intermountain Bird Observatory data accessed on March 24, 2023. From this database, the Idaho BCR10 stratum was queried. There are population trends for 21 birds assigned to the Aquatic, Wetland, Water, and Riparian Habitats group of which 10 are declining and 11 are increasing. Those declining in order from strongest decline to the weakest decline include the osprey, tree swallow, ring-billed gull, red-winged blackbird, spotted sandpiper, Canada goose (*Branta canadensis*), double crested cormorant (*Phalacrocorax auritus*), belted kingfisher, willow flycatcher (*Empidonax traillii*), and song sparrow. The declines in these species range from 52 percent to 1.2 percent annually over the 13-year dataset. Some declining trends have large variation in the data which should be viewed with discretion. Declining species that have large variations in the trends include the osprey (-52 percent decline), ring-billed gull (-39 percent decline), red-winged blackbird (-42.7 percent decline), and bank swallow (*Riparia riparia*) (-33.8 percent decline). The other species have sufficient data for reliable trend inferences. The declines occur in a variety of aquatic subgroups so cause of declines do not appear to be common among the species from a habitat standpoint.

River Habitats

Many species use river habitats in addition to other aquatic habitat. Examples of species that use river habitats include bald eagle, great blue heron, common merganser, Canada goose, harlequin duck, beaver, muskrat, mallard duck (*Anas platyrhynchos*), Columbia spotted frog (*Rana luteiventris*), Idaho giant salamander, and common garter snake (*Thamnophis sirtalis*). The harlequin duck was identified as a species of conservation concern for the plan area. Many species that use open water sources also use rivers, especially large rivers like those in the plan area. Examples of species that tend to use open water include canvasbacks, double-crested cormorants, western grebes, lesser scaups (*Aythya affinis*), and ring-necked ducks (*Aythya collaris*).

While all amphibians use aquatic habitats, the Rocky Mountain tailed frog is the only amphibian on the Nez Perce-Clearwater that specializes in riverine habitats, especially those that run through mature forest. Avian species that primarily or exclusively use river habitats are American dipper (*Cinclus mexicanus*), belted kingfisher, and harlequin duck. Five aquatic gastropods were identified specifically as riverine species and are of conservation interest. These include the ashy pebblesnail (*Fluminicola fuscus*), Nez Perce pebblesnail (*Fluminicola gustafsoni*), rustic pondsnail (*Stagnicola hinkleyi*), the shortfaced lanx (*Fisherola nuttallii*), and shortspire pondsnail (*Stagnicola idahoensis*). These species are highly susceptible to changes in water quality, temperature, and sedimentation.

The only mammal identified as primarily using river habitats is the North American river otter, which uses large rivers at lower elevations and depends on fish for food. The Terrestrial and Aquatic Ecosystems and Watersheds section of the Forest Plan Assessment (U.S. Department of Agriculture 2014a) evaluated aquatic habitats with a primary focus on river and riparian habitat. The focus of the Assessment revolved around fish, specifically the quality of habitat conditions for anadromous fish and inland salmonids. The Assessment identified threats to these systems by watershed and identified roads, mining, grazing, timber management in riparian zones, uncharacteristic wildfire or altered fire regime, landslides, loss of connectivity due to culverts, establishment of invasive non-native vegetation, streamside trails, dispersed campsites, and climate change as threats to these systems. More localized threats identified in the Assessment include campground facilities, administrative sites, dispersed recreation adjacent to streams, and trail use and construction.

Collectively, these threats have changed sediment loading, stream channel morphology, cobble embeddedness, temperature, water quality, changes to width depth ratios, inputs of woody vegetation, and loss or removal of large organic debris and caused a shift in benthic macroinvertebrate assemblages, all of which is indicative of degraded stream conditions (U.S. Department of Agriculture 2014a).

The Assessment used the watershed condition framework to evaluate river conditions within the plan area. The watershed condition framework identified watersheds as either Condition Class 1, 2, or 3, where Condition Class 1 is considered functioning in good condition, Condition Class 2 is operating at risk, and Condition Class 3 is functioning in poor condition. Watershed condition class is based upon a variety of factors, such as the condition of aquatic physical, aquatic biological, terrestrial physical, and terrestrial biological. Watershed findings are generally consistent with land management allocation where wilderness and Idaho Roadless Rule areas generally are operating in watershed Condition Class 1 while the roaded front, or Management Area 3, is generally operating in watershed Condition Class 2 or Condition Class 3. Management in the roaded front has historically been used for extractive uses, such as timber production, mining, and grazing. These findings are indicative of the landscape scale effects that can be influenced by management area direction and the effects they can have on aquatic systems, especially rivers.

PACFISH and INFISH amended forest plans in the Columbia River Basin as interim guidance to protect habitats for federally listed steelhead trout (*Oncorhynchus mykiss*) and bull trout (*Salvelinus confluentus*). The intent of PACFISH and INFISH were to protect existing quality anadromous and inland fish habitat and arrest habitat degradation, allowing restoration of aquatic and riparian ecosystems to occur at natural rates. At a minimum, PACFISH and INFISH were intended to hold the line on habitat degradation over the short-term until the long-term ecosystem-based restoration strategies could be developed to protect and restore anadromous fish-producing waters on lands within the Columbia River Basin. PACFISH and INFISH established standards and guidelines in the 1987 plans that protect river habitats and implemented the PACFISH and INFISH Biological Opinion Monitoring Program (PIBO). This direction has since helped protect and restore these habitats in the plan area. PIBO has shown that managed watersheds are generally in poorer condition than reference watersheds. It also indicated a trend in management watersheds towards improvements in some water quality metrics, while other metrics have remained degraded compared to reference watersheds (Saunders et al. 2019b). For background information regarding the amending of forest plans in the Interior Columbia River Basin with PACFISH and INFISH refer to the following website: www.fs.usda.gov/detail/r6/landmanagement/resourcemanagement/?cid=fsbdev2_027084.

Both the Nez Perce and Clearwater National Forests implemented various watershed improvement activities beginning in the mid-to-late 1980s. These activities included direct stream improvements, as well as activities designed to reduce sediment such as road decommissioning. Currently, aquatic improvement activities generally include stream crossing upgrades, road decommissioning, road drainage improvements, and direct stream channel improvements in areas that were historically dredge mined. Fencing of riparian corridors and wet meadows has also been implemented to exclude cattle from riparian areas. Collectively, these activities have improved aquatic conditions in the plan area.

The most important threats to river wildlife in the plan area include historic grazing, energy production and mining, roads and motorized trails, logging and wood harvest, human intrusion and disturbance, road decommissioning, wildfire and fire suppression, channelization and bank alteration, invasive animal or plant species, landslides, and climate change.

Riparian Habitats

Riparian ecosystem areas represent some of the most dynamic and ecologically diverse areas across the landscape. Most riparian areas are obvious because of abundant water and unique vegetation and soil characteristics. Ecological drivers, such as geology, climate, glaciations, and stream gradient, all influence the type, complexity, quantity, and distribution of these ecosystems, and there is great variability in the size and complexity of riparian areas across the Nez Perce-Clearwater. Wetlands, such as swamps, bogs, fens, marshes, and wet meadows, are also considered riparian areas. Wetlands occur in sites with seasonally or permanently high-water tables, as well as on the margins of ponds and lakes, and commonly support characteristic plant or animal communities, which require those unique conditions for survival. Although riparian ecosystems cover a relatively small proportion of the Nez Perce-Clearwater, their ecological significance within the landscape exceeds their limited distribution. Riparian ecosystems can be highly responsive to both natural and human disturbances, although they may respond to restoration activities more quickly than other habitats due to the dynamic interaction between water, vegetation, and soils.

Riparian habitats provide ecological conditions for a suite of species. They provide an interface between terrestrial and aquatic habitats and both aquatic and terrestrial species use these habitats. Riparian habitats occur along rivers, around wetlands and lakes, and near other aquatic features. Nearly all wildlife species in the plan area use riparian areas. Some use them peripherally, while others can use them as a primary habitat. All species grouped in the aquatic, wetland, water, and riparian habitat grouping use riparian habitats. Of that group, 17 species were grouped into the riparian habitat subgroup because they specialize in riparian habitats. Many more species in the ecotone or habitat combination grouping and the forested species groupings can be found in riparian habitats in addition to other upland habitats. Of the forested habitats grouping, those in the broad-leaved subgroup will readily use riparian habitat. The broad-leaved subgroup includes 11 plus species that will readily use riparian areas. On the Nez Perce-Clearwater National Forest, broadleaved deciduous forest or vegetation grows in both the uplands but particularly grows in riparian areas especially after disturbance. Like much of the upland, riparian areas have experienced a lower amount of disturbance from fire than has historically occurred because of exclusion. Because several species specialize in broadleaf or deciduous habitat and many others also use habitats with these features, the plan contains FW-DC-TE-05 which states "Riparian vegetation includes native assemblages of hardwood trees, deciduous shrubs, conifers, and, where appropriate, unique coastal disjunct species." It also includes FW-DC-GS-04 as a desired condition to include hardwood species in riparian and upland areas. The plan contains objective FW-OBJ-TE-01 which aims to treat riparian habitats to restore hardwood overstory on 3,000 to 4,200 acres every five years to provide habitat diversity within riparian habitats. Additionally, FW-OBJ-RMZ-01 seeks to restore 300 to 700 acres of riparian habitat every five years including hardwood restoration. Most other species in the forest subgroupings also use riparian areas when they provide structural or compositional ecological requirements. As mentioned in the riverine habitat analysis, riparian areas provide connectivity across the Nez Perce-Clearwater.

Species that use riparian habitats include the northern waterthrush (*Parkesia noveboracensis*), willow flycatcher, North American water vole, and northern raccoon. Examples of bird species that use both deciduous forest habitat and riparian areas include the American redstart (*Setophaga ruticilla*), red-eyed vireo (*Vireo olivaceus*), warbling vireo (*Vireo gilvus*), ruffed grouse (*Bonasa umbellus*), and Bullock's oriole (*Icterus bullockii*). All amphibians in the plan area use riparian habitats, such as the Sierran tree frog (*Pseudacris sierra*), the western toad, and the long-toed salamander. Many amphibians require aquatic habitats for breeding, yet in their adult life cycle they use primarily terrestrial habitats under rocks, logs, litter, and leaves. These features are present in properly functioning riparian habitats. Thus, dead and downed wood are an important component of the structure and composition of riparian habitats.

Species that are currently identified as Regional Forester Sensitive Species (RFSS) and that rely on aquatic, wetland, or riparian habitats for at least part of their life include the bald eagle, the harlequin duck, the Coeur d'Alene salamander, mountain quail, and the western toad. Bald eagles forage and nest near rivers and lakes; harlequin ducks breed on fast-moving, low-gradient mountain streams. RFSS that are known to sometimes use riparian areas also include the fisher, the long-eared myotis (*Myotis evotis*), the long-legged myotis (*Myotis volans*), and the Townsend's big-eared bat (*Corynorhinus townsendii*).

Wetland—Depressional Wetlands, Ponds, Marshes, Emergent Vegetation

The suite of species that use riparian habitats around still water marshes, lakes, and wetlands are different than those that use riparian areas around moving water. Shore birds, wading birds, many ducks, and some passerine bird species may be more suited to riparian areas around standing water than along rivers. These habitats are often composed of wet meadows, emergent vegetation, submerged vegetation, wading habitats, and shoreline habitats. Examples of species that use these habitats on the Nez Perce-Clearwater include American avocet (*Recurvirostra americana*), greater yellowlegs (*Tringa melanoleuca*), red-winged blackbird, yellow-headed blackbird (*Xanthocephalus xanthocephalus*), swamp sparrow (*Melospiza georgiana*), Virginia rail, Wilson's snipe (*Gallinago delicata*), American coot (*Fulica americana*), and the solitary sandpiper (*Tringa solitaria*). Ducks associated with these types of habitats include northern shoveler (*Spatula clypeata*), northern pintail (*Anas acuta*), gadwall (*Mareca strepera*), green-winged teal (*Anas creccca*), blue winged teal (*Anas discors*), American wigeon (*Mareca americana*), and cinnamon teal (*Spatula cyanoptera*). Many amphibians use standing water riparian habitat, and some species appear to use wetland and pond habitat more than others. Those that tend to use more wetland habitats include the northern leopard frog (*Lithobates pipiens*), the Sierran tree frog, the western toad, and the Columbian spotted frog. These species can also sometimes be found along riverine riparian habitats. The non-native American bullfrog could be considered a stressor in these habitats because of its predatory nature. Wetland areas are lost through draining, development, and changes to hydrology.

Open Water Habitats and Wetlands

Several species use open water as their primary habitat. Open waters include lakes, large wetlands, and large rivers. The amount of these habitats is comparatively small (Table 156), and their distribution is uneven on the Nez Perce-Clearwater. Table 156 below shows the number of water bodies larger than one acre which includes the lakes in the plan area.

Table 156. Number, percent, and acres of lakes (water bodies larger than one acre) within designated wilderness, Idaho Roadless Rule areas, and general forest areas (Source: National Hydrography Dataset water bodies greater than one-acre spatial layer overlaid on Management Area spatial layer)

Area	Count	Percent of Count by Management Area	Acres	Percent of Acres by Management Area
Wilderness	371	54	3003	18
Idaho Roadless Rule Areas	151	22	1828	11
General Forest	163	24	12,211	72
Total	**685**	**-**	**17,042**	**-**

Large rivers make up the bulk of open water habitats in the plan area. Lake and wetland habitats are much less common and unevenly distributed in the plan area. In terms of numbers, most of them occur at higher elevations in glacier formations in wilderness areas. However, because of Dworshak Reservoir, the acres of open water habitats are larger than in general forest management areas.

Species were included into this grouping if open water is their primary habitat requirement resulting in 15 species in the open water habitat grouping. They are composed largely of aquatic birds and some fully aquatic gastropods that typically occur in either lentic water or large rivers. The western grebe, mallard, greater scaup (*Aythya marila*), common loon (*Gavia immer*), red-breasted merganser (*Mergus serrator*), and eared grebe (*Podiceps nigricollis*) are representatives of avian species that use open waters. The Artemesian ramshorn (*Vorticifex effusa*), twisted physa (*Physella lordi*), and rotund physa (*Physella columbiana*) are gastropods that use open waters or large rivers. Like other aquatic and riparian habitats, several other species also use open waters; however, they were placed in different groups based on other key ecological features or their habitat description. Examples of species in other habitat groupings which may also use open waters could include those in the depression wetland group and those in the aquatic generalist group. Most ducks use open waters for some portion of their life cycle. Many of these species can be found on open waters at various times of the year, particularly during migration. Some of the species were grouped in open water habitats because they only occur during migration and their migratory habitats are open waters. Breeding habitats outside of the plan area may be different. Some of the open water species may prefer to use still water only, while others may prefer to use large rivers. Some readily use both and are more generalist. For example, the Canada goose uses just about any water.

Ground Water, Spring, and Seep Habitats

Springs and seeps provide habitat for fewer species than other types of aquatic or riparian areas. However, the species that use these habitats are often specialized to exist within the narrow and consistent temperature and physical characteristics of groundwater habitats or spring habitats. Species that use spring habitats are uniquely adapted to these habitats and often live within a very limited or scattered distribution with few populations. Changes to spring habitats can wipe out the populations of these types of organisms and result in the loss of distribution or even extinction. Key ecological features of springs, ground water, and seeps include water quality, cold temperatures, and a stable environment.

There are only three species grouped into the springs, seeps, and ground water habitat group. They include the pristine pyrg, the Green River pebblesnail (*Fluminicola coloradoensis*), and the Coeur d'Alene salamander. The pristine pyrg was analyzed in the Aquatic Ecosystem and Fisheries section. The Coeur d'Alene salamander is associated with springs, seeps, and waterfall spray zones and seems to be associated with specific rock formations. Thus, they are not wholly reliant on ground water habitats. The Coeur d'Alene salamander is a species of public interest because it is a regional endemic with a limited range and specific habitat requirements.

The largest threats to springs, seeps, and groundwater habitats are those that change water flow, temperature, or water quality of springs. Diversions for livestock water developments and livestock use of springs is probably the most widespread impact to these habitats. Under the No Action Alternative, springs are managed as riparian habitat conservation areas which is similar to riparian management zone (RMZ) delineations in the action alternatives. Additionally, aquatics plan components for springs in the action alternatives include several components addressing protection of springs, seeps, and groundwater. Since springs and seeps are considered Category 4 RMZs, their width is 100 feet and all RMZ components would apply. These plan components are focused on restricting activities within RMZs that are known to have impacts to aquatic resources. Examples of these activities are timber harvest, aquatic and riparian habitat alteration, application of fire retardant in aquatic habitats and more.

Plan components that directly address springs include FW-DC-WTR-08, FW-GDL-WTR-05, FW-DC-TT-04 and FW-GDL-ARGRZ-03. These plan components provide guidance to maintain quality and quantity of water flows, and persist in size, seasonal and annual timing, exhibit water table elevations within the natural range of variability and sustain the function of surface and subsurface aquatic ecosystems.

Since the primary source of management effects to spring dependent species is probably livestock grazing, aquatics and riparian livestock grazing plan components include measures designed to protect aquatic habitats. Plan components that address impacts from livestock grazing to include those in the Livestock Grazing (Aquatics and Riparian) and Livestock Grazing sections of the plan. These plan components address many impacts livestock grazing has on aquatic resources. For example, these plan components require conservation measures to protect aquatic resources be included in reauthorizations for grazing permits, impose stubble height minimums, locate actions like trailing or salting outside of riparian areas, and prevent redd trampling. However, they do not prohibit spring development like spring boxes or water developments. Such activities would be evaluated and decided in site specific project analysis.

Collectively plan components are expected to result in few differences in effects to spring and groundwater associated species when compared to the No Action Alternative. The plan components should be adequate to provide for spring and groundwater associated species, except when water developments like spring boxes or spring diversions, cause changes in the ecological conditions that support spring- and groundwater-dependent species.

Aquatic, wetland, and riparian habitats are inherently limited in the plan area. Estimates vary depending on the data source used. To estimate the area of riparian habitats, the National Hydrography Dataset (NHD) was used to delineate and estimate riparian habitats in the plan area. These estimates include the riparian management zone outlined in FW-STD-RMZ-01, FW-STD-RMZ-02, FW-STD-RMZ-04, FW-STD-RMZ-06, and FW-STD-RMZ-07. The acres of riparian habitat found around rivers in the plan area are difficult to estimate but make up only a fraction of the plan area. The NHD-named streams layer and the water bodies greater than 1-acre layers were buffered by the RMZ distances in ArcGIS to estimate the area protected by the RMZ plan components. In total, these areas are estimated at about 548,284 acres, or about 13.9 percent, of the plan area, including those around rivers, lakes, and wetlands using this method. To get a more concise estimate of actual riparian area, we delineated riparian areas based on the floodplain surrounding NHDs and found the area to be approximately 295,000 acres. The miles of rivers that occur within different land allocations within the national forest were calculated by overlaying the NHD-named streams layer with the Nez Perce-Clearwater's management areas layer. It is estimated that about 66.6 percent of river miles in the plan area flow through designated wilderness and Idaho Roadless Rule areas so more than half of the riparian areas around these rivers receive some level of protection through management area allocation and their associated suitability plan components. Management area direction in the plan reduces or eliminates many of the threats described below because some activities that could impact riparian habitats are not suitable in roadless and wilderness.

The National Hydrography Dataset (NHD) waterbodies greater than 1 acre were buffered by 150 feet to estimate the amount of riparian areas around wetlands. The area around the NHD waterbodies greater than 1 acre is about 9,181 acres, which is less than 1 percent of the total land base of the Nez Perce-Clearwater. Thus, riparian habitats around water bodies like wetlands and lakes make up about 1 percent of the plan area, which underscores the importance of their contribution to biodiversity. The implication is that less than 14 percent of the plan area is required for approximately 27 percent of diversity for all species in the plan area. Most riparian habitats occur surrounding river habitats, while those from standing water are much less abundant. These numbers likely underestimate the number of riparian habitats because small scale wet areas would be considered riparian habitats but are too small to show up on those datasets.

Threats and Stressors to Aquatic and Riparian Habitats

Threats and stressors to riparian habitats come from sediment from roads, road construction, grazing animals, invasive species, vegetation management, climate change, drought, mining, draining, channelization, changes to flow patterns, contaminants, and uncharacteristic wildfire. Stressors to these systems that can be influenced by Forest Service management actions include livestock grazing, non-native invasive plant and animal species, pattern, and timing of motor vehicle use, draining or diversion, administrative or recreational facility development, and harvest of adjacent timber outside of riparian areas. Not all these processes or actions are stressors to all species using these habitats. Threats to these systems that are not under control of Forest Service management include drought, climate change, alterations to hydrology occurring on adjoining non-National Forest System lands, and alterations to water chemistry resulting from pollution, sedimentation, beaver removal, or other inputs originating outside of Forest Service control.

Climate change could affect aquatic habitats. Most of the effects of climate change would not be within Forest Service control, though some actions by the Forest Service may help these systems be more resilient to effects. Scientists and land managers from the Forest Service authored the *Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains in 2018* (Halofsky, Peterson, et al. 2018a, b).

In that assessment, predicted effects to aquatic resources were evaluated and found the following:

Decreasing snowpack and declining summer flows will alter timing and availability of water supply, affecting agricultural, municipal, and public uses in and downstream from national forests and affecting other forest uses, such as livestock, wildlife, recreation, firefighting, road maintenance, and instream fishery flows. Declining summer low flows will affect water availability during late summer, the period of peak demand (e.g., for irrigation and power supply). Increased magnitude of peak stream flows will damage roads near perennial streams, ranging from minor erosion to extensive damage, thus affecting public safety, access for resource management, water quality, and aquatic habitat (ii).

Primary strategies that were recommended included changing hydrology in the Northern Rockies to restore the function of watersheds, connect floodplains, reduce drainage efficiency, maximize valley storage, and reduce hazardous fuels. Tactics include adding wood to streams, restoring beaver populations, modifying livestock management, and reducing surface fuels and forest stand densities. Primary strategies for infrastructure include increasing the resilience of stream crossings, culverts, and bridges to higher peak flows and facilitating response to higher peak flows by reducing the road system and disconnecting roads from streams. Tactics include completing geospatial databases of infrastructure and drainage components, installing higher capacity culverts, and decommissioning roads or converting them to alternative uses. It will be important to map aquifers and alluvial deposits, improve monitoring to provide feedback on water dynamics, and understand the physical and legal availability of water for aquifer recharge. Erosion potential to protect water quality can be addressed by reducing hazardous fuels in dry forests, reducing non-fire disturbances, and using road management practices that prevent erosion (Halofsky, Peterson, et al. 2018a, b). Plan direction and alternatives do not directly address climate change. However, aquatics and terrestrial ecosystems plan components would implement many of the strategies recommended in Halofsky et al. (2018a, b).

Modeling Riparian Vegetation

Riparian areas were modeled in SIMPPLLE to generate a natural range of variation for these areas, to identify where the Nez Perce-Clearwater riparian habitat conservation areas (RHCAs) are in relation to the natural range of variation (NRV), and to project future outcomes of the Land Management Plan under the alternatives. RHCAs typically represent a small percentage of forest acres.

Models of the NRV suggest that today's conditions have less of the RHCA in an early seral condition than under natural disturbance. The effects of this condition are that fewer acres potentially support hardwood vegetation and are more encroached by conifer dominated conditions than they were under natural disturbance. This could affect some species, such as those in the riparian and broad-leaved forest groups, that prefer deciduous forest and shrubs as habitats. These include beavers and several migratory songbirds. It should be noted that not all early seral habitats in the RHCAs result in a deciduous vegetation response. In some cases, these habitats regenerate as conifer naturally.

In the mountainous West, riparian shrub and deciduous tree communities are disturbance dependent. On wide, low gradient drainages, periodic flooding maintains a very highly convoluted pattern of meanders, sloughs, and oxbow lakes. Because this pattern is changing constantly due to periodic flooding, cottonwoods and shrubs are the predominant vegetation, whereas conifers are patchier and somewhat episodic since they only become established in the intervals between flooding events. Beaver activity also helps to maintain cottonwood and shrub communities and compliments the effects of flooding.

Unlike low gradient streams, moderate and high gradient streams (that is, tributaries to the Salmon and Selway rivers) tend to be bedrock controlled. Flooding generally has little effect on the amount of sinuosity. Conversely, wildfires, insect outbreaks, or disease reduce conifer cover and allow dense communities of riparian shrubs to occupy riparian zones. Beavers occur within moderate and steep gradient streams, however, their influence upon the shrub community is much less than within low gradient streams. In the absence of disturbance, conifers will quickly re-occupy upland riparian zones and to varying degrees will shade out riparian shrubs.

Two human activities affecting natural disturbances in moderate and steep gradient streams include fire suppression and riparian management zone (RMZ) protective measures. Wildfire history data suggests wildfire-burned acreages in the 20th century declined during the mid-1900s until the 1980s, when fuel accumulations and warmer and drier weather began a trend of increasing acreage and severity of wildfires.

Because most streams in the Planning Unit are moderate and high gradient streams, the query is designed to model those riparian deciduous communities that are maintained by disturbances such as wildfires, insects, and disease. The query is designed to assess the availability of habitats that provide shrubs and deciduous trees within RMZ. For time step zero, a GIS layer including the locations of all VMap polygons with cover types dominated by shrubs and deciduous trees was used, including VMap DOM mid-40 shrub, aspen dominated (MX-POTR5), and cottonwood dominated (MX-POPUL). For purposes of modeling future vegetation treatments, there were minimal treatments in landscape areas mapped as RMZ because these areas are not suitable for timber production. Transitional forests resulting from moderate or high severity wildfires and insect or disease within 20 years following disturbance were used to model future forest openings containing riparian shrubs and hardwood trees. Since the VMap cover class 0–14.9 percent may be lacking in trees but contain dense shrubs, it was included in the model. On the Planning Unit, once mixed conifer stands in upland riparian areas reach an average of 5 inches diameter at breast height (DBH), the presence of deciduous trees and shrubs has often been greatly reduced or eliminated due to conifer competition and shading, so these forests were not included for purposes of future modelling of highly suitable habitat for species associated with riparian shrubs and deciduous trees.

The U.S. Fish and Wildlife Service's National Wetlands Inventory dataset (NWI) was used to identify vegetation characteristics associated with "riparian" sites on the Nez Perce-Clearwater. Spatial extent was reviewed both for coverage across the State of Idaho, and in relation to stream features mapped by the National Hydrography Dataset (NHD).

After validating the availability and full coverage of the Nez Perce-Clearwater study area, an assessment was conducted to determine that NHD and NWI were in good agreement and generally represented the presence and composition of wetland and riparian sites. Considering the NWI as best available suitable for the detection of wetland and riparian conditions, it was used in a spatial intersection to select associated polygons in the spatially explicit VMap.

Since the NWI ID_Wetlands theme is considered the authoritative source for wetland and riparian delineation, and matches the extent of NHD features, it was used to define "riparian" sites and was intersected with the Nez Perce-Clearwater VMap database polygons. The output from this operation selected all VMap that were interested (touched to any extent) by NWI features, and yielded summaries of the total acres and relative distributions of vegetation types occurring at the intersection of wetland and riverine features, referred to as riparian sites, and vegetation polygons across the Nez Perce-Clearwater National Forest.

Focusing on the DOM_MID_40 attribute, the total acres and relative abundance of vegetation types was quantified for all polygons that were intersected by the NWI dataset across the Nez Perce-Clearwater. At nearly 37 percent, grand fir dominated stands is by far the most abundant stand type. It is followed in decreasing order of abundance by Douglas-fir and Engelmann spruce, with 8.7 percent and 8.4 percent, respectively. Ponderosa and lodgepole pine represent 7.7 percent and 7.4 percent abundance. Cedar and hemlock together represent around 5 percent, and deciduous stands represent less than half of one percent of all vegetation types intersected by NWI across the Nez Perce-Clearwater, as described by the VMap database.

The foundation for vegetation data is the VMap. The attributes of this dataset were translated to attributes that are used in the SIMPPLLE model, which includes information about potential vegetation types

(PVT), habitat type groups (HT_GRP), and species composition (SPECIES) of stands. The SIMPPLLE dataset represents vegetation across the landscape as a network of points. Riparian sites were defined by the NWI dataset, which represents wetland and riverine features as a network of polygons.

To gain an understanding of the distribution of vegetation types found within proximities that resemble riparian management zones (150 ft and 300 ft) across the Nez Perce-Clearwater, data from the SIMPPLLE dataset that were within 164 and 328 ft of NWI features were spatially selected and their attributes were summarized individually and in combination. Each of these sets of points were analyzed for PVT, HT_GRP, and SPECIES composition and abundance.

- The potential vegetation type (PVT) attribute was summarized for SIMPPLLE vegetation points within 164 and 328 ft from NWI wetland and riverine features.
    - ♦ Both sets of points have nearly identical distribution patterns and suggest similar vegetation is mapped within 164 and 328 ft of riparian sites. In both cases, “abgr3”, “thpl2”, and “abgr2” are the three most abundant potential vegetation types.
- The habitat type group (HT_GRP) attribute was summarized for SIMPPLLE vegetation points within 164 and 328 ft from NWI wetland and riverine features.
    - ♦ Both sets of points have nearly identical distribution patterns, and suggests similar vegetation is mapped within 164 and 328 ft of riparian sites. In both cases “D1”, “C2”, and “C1B” are the three most abundant habitat type groups.
- The VMap-SIMPPLLE translated species composition attribute was summarized for SIMPPLLE vegetation points within 164 and 328 ft from NWI wetland and riverine features.
    - ♦ Both sets of points have nearly identical distribution patterns, and suggests similar vegetation is mapped within 164 and 328 ft of riparian sites. In both cases “GF”, “GF-C-L”, “PP-DF”, and “LP” are the four most abundant species combinations.

The PVT, HT_GRP, and SPECIES attributes were combined and assessed. The combination of these attributes is referred to as the COMBO attribute. There are 291 unique combinations of PVT | HT_GRP | SPECIES labels. Of those, only 32 have a relative abundance greater than 1 percent. The riparian habitat query will use this hybrid data layer for analysis.

The query design for riparian species associated with shrubs and deciduous (hardwood) tree communities that are not maintained by flooding includes the following layers:

- Cell containing perennial water from NWI/NHD dataset.
- Habitat groups:
    - ♦ All that occur within the NWI/NHD layer
- Tree size class less than 5-inch DBH including:
    - ♦ 0–4.9-inch DBH
    - ♦ 5–9.9-inch DBH
    - ♦ 10–14.9-inch DBH
- Stands all canopy cover including:
    - ♦ 0–14.9 percent
    - ♦ 15–39.9 percent

- 40–69.9 percent
- 70–100 percent

The amount of acreage in seedling sapling-dominated riparian zones doubles during the five decades (Figure 56). Because the model limited mechanical treatments within riparian management zones, most of the disturbance is from wildfire or prescribed fires in the model. The change can be attributed to more wildfire on the landscape under all alternatives. Following wildfires, eco-burns, which are common to all alternatives at differing magnitudes, also likely provide habitat improvement since human-ignited fires are allowed to creep into riparian zones. It is anticipated that the riparian habitats trend towards the natural range of variation for disturbance within riparian areas. Disturbance in these habitats is anticipated to result in an increase in deciduous shrubs and hardwood tree species in many riparian areas and a reduction in conifer cover. The projected increase in early seral conditions in riparian habitats is expected to benefit riparian associated wildlife species that use hardwood or deciduous vegetation.

The outcomes of the alternatives are all relatively similar with differences of less than 5,000 acres in the fifth decade. The No Action Alternative has the lowest acres of disturbance while Alternative Y has the most. The Preferred Alternative is intermediate to these two alternatives.

While the amount of disturbance increases over time the total amount of disturbance remains modest compared to the amount of riparian habitat forestwide. For example, the amount of early seral conditions in riparian habitat increases from just over 10,000 acres to around 26,000 acres which represents about 8 percent of the riparian habitat forestwide. From that perspective, even though riparian habitat trends towards the desired condition, there will probably not be enough disturbance within riparian areas to restore hardwood and deciduous shrub communities to the level they were under natural disturbances. However, the modeling suggests that these disturbances would provide diversity in riparian habitat conditions and reduce conifer dominance to provide for a wide range of wildlife that use riparian habitats. Some of the future disturbances from wildfire within the riparian areas could potentially be uncharacteristically more intense than they were in the past because of a buildup of fuels and warmer drier conditions under climate change. Active management of these habitats would allow for more controlled disturbance intensity with fewer impacts than wildfire disturbance. Note that the vegetation desired condition is the same for all alternatives including the No Action Alternative, so the trend or response of the riparian habitats have a similar outcome. Also note that most of the disturbance in riparian areas is a result of natural disturbances like wildfire.

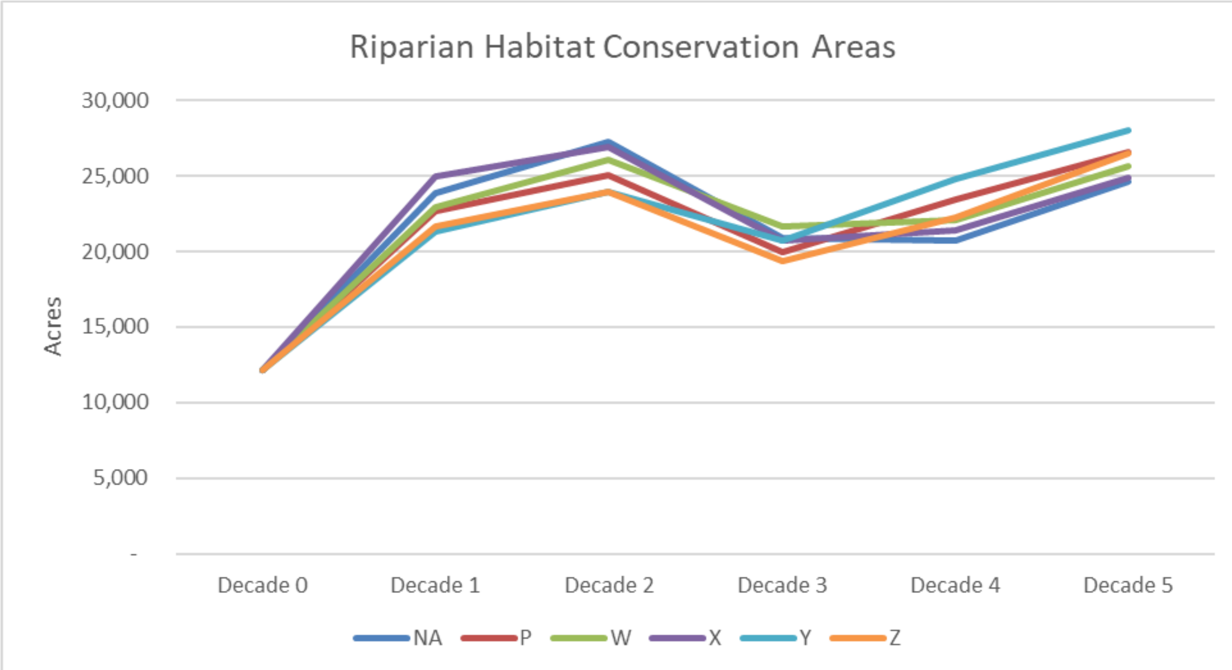


Figure 56. Trend in seedling and sapling stand conditions in riparian habitat conservation areas due to disturbance

Consequences to Open Water Habitats

Under the plan alternatives, the number and acres of open water habitats within recommended wilderness varies. Similarly, the amount of river miles that are considered for wild and scenic river suitability varies by alternative. The amount of designated wilderness or designated wild and scenic rivers does not change by alternative. Alternative W has the most open water habitats proposed within recommended wilderness, while Alternative X has the least.

Alternative Z has the most river habitats proposed as suitable wild and scenic rivers, while Alternative X has none. While most of the open water species were not selected as outstandingly remarkable values for wild and scenic rivers, many of these species would have their key ecological characteristics maintained if these rivers were found suitable. Designated wilderness and designated wild and scenic rivers currently protect many open water habitats in the plan area and do not change under the alternatives. Most smaller lakes and wetlands would be protected under any of the alternatives. While the plan components do not change under the alternatives, objectives to enhance or restore aquatic habitats do vary by alternative.

Plan Direction for the Protection and Enhancement of Aquatic, Riparian, and Wetland Habitats

Plan direction for the protection of aquatic and riparian wildlife habitats is robust and comprehensive. It can be found in the Aquatic Ecosystems section of the Land Management Plan. Aquatics plan components address threats or prevent or mitigate activities that could impact aquatic and riparian wildlife habitats. They contribute to the ecological integrity of river systems in the plan area because they mitigate or prevent activities that can adversely affect aquatic wildlife habitats. Under all action alternatives, plan components describing specific desired conditions for aquatic, wetland, and riparian habitats would improve the likelihood of maintaining their integrity, resiliency, and connectivity of river habitats. These apply forestwide and do not vary by alternatives. Plan components for water, conservation watersheds, riparian management zones, infrastructure, energy and minerals, livestock grazing, recreation, and forestlands will provide for aquatic habitats in the plan area. These components address threats in the plan area and greatly reduce the impacts from extractive uses that have adversely affected these habitats in the past.

Aquatics plan components contain measures to reduce or prevent sedimentation, decrease, or prevent many contaminants, and protect riparian areas that contribute to forage species. These plan components apply forestwide and do not vary by alternative. In addition, aquatics plan components restrict pesticide use in riparian areas, prevent fire retardants from entering waterways, implement measures to reduce contamination from dust abatement on roads, incorporate guidelines to prevent contaminants from mining, guide placement of sanitary facilities, and offer direction on human recreation sites. Not all threats to these habitats affect open water wildlife or affect them equally.

All action alternatives include direction to establish riparian management zones intended to protect the integrity and function of those areas. Impacts to riparian areas can have adverse effects on aquatic and riparian habitats and the species that use them.

Although vegetation management, livestock grazing, or other activities could occur within riparian habitats, these activities would be constrained by plan components designed to protect watershed integrity, riparian vegetation, and hydrologic function. Management direction for riparian management zones would contribute to connectivity for riparian species and protection of plant species and animal communities associated with rivers. Refer to the Aquatic Ecosystems section of the Final Environmental Impact Statement for a more detailed discussion of specific plan components. Livestock grazing is permitted only in a portion of the Nez Perce-Clearwater where there are active allotments. Active allotments are distributed mostly in Management Area 3. They occur on the Island along the western portion of the Nez Perce-Clearwater from the Clearwater River south to the Salmon River, on the Palouse district, in a few areas westward in the Nez Perce-Clearwater around Lolo Creek and the Musselshell area. These range allotments make up 612,766 acres in the plan area. Thus, impacts to grazing will only occur within these active allotments. Plan components that direct grazing in riparian areas will help lessen the impacts from grazing. See Appendix A for a distribution map of the active allotments on the Nez Perce-Clearwater.

Some riparian habitats suffer from forest succession. Plan components in the desired vegetation conditions include measures to restore forests back to their historic structure, function, composition, and connectivity under the natural range of variability. This will require restoring these systems back towards the conditions under natural fire regimes. There are limited allowable activities found in the plan to restore successional conditions, which may enhance deciduous vegetation important to many wildlife species. These actions will reduce uncharacteristic wildfire and address that threat to riparian habitats as well.

Aquatics plan components include objectives for riparian and river habitat restoration. These objectives vary by alternative and are based upon the duration that it would take to restore degraded riparian habitats in the plan area. These objectives range from restoring between 200 and 750 miles of river riparian habitats every five years, improving between 2,000 and 8,800 acres of soil restoration, stormproofing roads to prevent sedimentation, decommissioning roads, and monitoring miles of roads for their condition. Detailed descriptions of these alternatives, including the amounts and rate at which they will be achieved, can be found in the Aquatic Ecosystems and Fisheries plan components. These will serve to restore degraded conditions in riparian and river habitats and move them towards desired conditions. These objectives focus on restoring habitats in rivers and riparian areas.

There are currently no measures to reduce human disturbance to wildlife that use river habitats on the Nez Perce-Clearwater's popular large rivers. Some river species, including the Species of Conservation

Concern harlequin duck, are potentially sensitive to disturbance from recreation. Wild and scenic river plan components guide towards protection of the outstandingly remarkable values. A crosswalk of aquatic, wetland, water, and riparian habitats, including key habitat attributes with plan direction that protects or enhances these habitats, is included in Appendix C of the Final Environmental Impact Statement.

While the plan components do not change under the alternatives, objectives to enhance or restore aquatic habitats do vary by alternative. Aquatics plan components for infrastructure vary with respect to how many miles of roads would be maintained or restored. The alternatives also vary how much aquatic restoration would be conducted. Alternatives that have more of these activities would benefit aquatic wildlife more than those with less. These include objectives to improve conservation watersheds and improvements to soil and watershed conditions. These will serve to restore degraded conditions in riparian and river habitats and move them towards desired conditions. This direction towards restoration could have short-term consequences at the project scale but would benefit the ecological integrity of rivers long-term. Refer to Section 2.2.4 of the Land Management Plan for additional information.

Some aquatic habitats in Idaho have been affected by changes in aquatic vegetation due to aquatic invasive species. The State of Idaho currently identifies 16 aquatic plants as invasive species. If introduced, these aquatic invasive species generate ecological impacts that propagate along the food web. Invasive plants can substantially change the hydrology, sedimentation, clarity, and nutrient state of lakes, reducing the habitat available for other species positioned higher in the trophic web, such as invertebrates and fish (Gallardo et al. 2016). Based upon a meta-analysis of 151 publications, Gallardo (2016) found that invasive species cause a strong decrease in the overall diversity of aquatic communities and generally cause a decrease in the diversity and abundance of resident species.

Invasive plant species known to occur in riparian areas are shown in Table 157. Aquatic invasive plants can be capable of changing the environmental conditions of their surroundings through the production of detritus and sediment capture. Fierke and Kauffman (2006) studied the effects of invasive plants, in particular reed canary grass and Himalayan blackberry, on riparian habitats in Oregon. They found that invasive plant species are affecting plant composition, species richness, understory, and structural diversity of these riparian stands to the point that this influence may be greater than that of stand age. It also appears that presence and abundance of these invasive plant species are causing changes in successional patterns that may be irreversible at a riverscape level.

Table 157. Invasive plant species occurring within the plan's riparian areas

Scientific name	Common name
Iris pseudacorus	Yellow flag iris
Polygonum cuspidatum	Japanese knotweed
Phalaris arundinacea	reed canary grass
Polygonum sachalinense	Giant knotweed
Lepidium latifolium	Perennial pepperweed
Polygonum bohemicum	bohemian knotweed

These invasive species have the capability of forming dense homogenous cover, inhibiting germination, and establishment of native plant species, and possibly initiating an alternate successional pathway, which could replace historical pioneer trees species with late-successional tree species (Fierke and Kauffman 2006). These types of effects could trickle down to wildlife using riparian areas. Invasive plants often exploit disturbance to become established. Plan components reducing impacts to riparian habitat should result in less disturbances that could leave these habitats vulnerable to disturbances.

Aquatics plan components provide several desired conditions, standards, and guidelines that will provide for wildlife that use riparian habitats. Plan components for riparian management zones provide specific desired conditions to allow riparian habitats to function within their natural range of variability and to be protected by standards and guidelines that reduce threats to these systems. Aquatics plan components targeted at recreation would prevent or reduce threats from changes to water quality through pollution, disturbance, and degradation of riparian habitat. Approximately 67 percent of riparian areas are protected from many threats by designated wilderness and Idaho Roadless Rule area direction. See Sections 2.2 of the Land Management Plan for plan components that pertain to aquatics and riparian areas.

Aquatic, Wetland, Water and Riparian Habitats

Factors that vary by alternative include those for recommended wilderness, suitability of uses within recommended wilderness, suitable wild and scenic rivers, the recreation opportunity spectrum, fire and fuels treatments, access, acres of vegetation restoration, acres of timber harvest, and the maximum size of regeneration harvest units.

This analysis assumes that the river habitat in Management Areas 1 and 2 will function in their natural range of variability while those in Management Area 3 will operate in a degraded state that should improve over time under the aquatics plan components. Management area direction has the most widespread influence on the conservation of aquatic habitats because they dictate how broad areas of the Nez Perce-Clearwater are used and which activities would be allowed. Many of the factors that can adversely affect aquatic habitats are influenced by management area restrictions or allowances. Many activities and threats that have impacted rivers are not allowed, are restricted, or are allowed only under specific conditions or circumstances within Management Areas 1 and 2. Thus, about 66.6 percent of the river habitats are relatively well protected from many threats. Specifically, activities such as road building and timber production would be restricted, controlled, or disallowed in Management Areas 1 and 2. Management Area 1 prohibits new mining claims and limits current mineral extraction. After land allocations, plan direction for aquatic and riparian habitat provide direction to govern the management of a variety of activities to ensure that aquatic and riparian habitat continue to provide the structure, function, composition, and connectivity to provide for ecosystem integrity. They essentially provide a buffer of protection around aquatic resources, and address and guide many activities such that they protect these habitats.

Fire suppression activities are reduced in Management Area 1, which should prevent an uncharacteristic buildup of fuels and reduce uncharacteristic wildfires. In the past, management area direction in Management Area 3 has reduced the effects to aquatic wildlife habitats through PACFISH and INFISH measures. An analysis of PIBO monitoring suggests these measures are largely effective or are trending in a positive direction (Saunders et al. 2019b). Most of the plan area, and the amount of aquatic wildlife habitat, falls within Management Areas 1 and 2 and is protected from many threats. Essentially, under all alternatives, approximately 66.6 percent of the rivers in the plan area fall within Management Areas 1 and 2 and approximately 31 percent of the rivers fall within Management Area 3. Therefore, the majority of river habitat will be protected by Management Area 1 and 2 direction and the aquatics plan components. Aquatics plan components should help maintain or restore river habitats in Management Area 3 over time.

The amount and distribution of recommended wilderness areas varies by alternative. Recommended wilderness is managed to prevent degradation of wilderness character. Management for recommended wilderness is very similar to management for designated wilderness. Many threats to rivers from management activities are not allowed in recommended wilderness. From a wildlife perspective, there are virtually no differences in effects to river habitats when comparing recommended wilderness to designated wilderness. Plan components for recommended wilderness vary by alternative. Differences in plan components by alternative have virtually no differences in the effects on aquatic wildlife habitats because recommended wilderness management is very similar to Idaho Roadless Rule management. All recommended wilderness areas are derived from Idaho Roadless Rule areas. Alternative W has the most river miles by alternative and about 21.5 percent of all rivers in the plan area would fall within recommended wilderness under this alternative. About 7 percent of river miles would fall within recommended wilderness in Alternative Y and about 11.4 percent of rivers would fall within recommended wilderness under Alternative Z. No miles of river would fall within recommended wilderness under Alternative X. The Preferred Alternative is most similar to Alternative Y but has modified boundaries for the Mallard Larkin, Hoodoo, and Meadow Creek areas.

Similar proportions of other aquatic habitats are protected by these alternatives. Alternative W has the most open water habitats proposed under recommended wilderness, while Alternative X has the least. Most smaller lakes and wetlands would be protected under any of the alternatives.

The amount of Idaho Roadless Rule area does not change by alternative. Management in recommended wilderness would most resemble management under the wildland recreation theme under the Idaho Roadless Rule. The Idaho Roadless Rule restricts building new roads, prohibits timber production, and limits timber harvest to only be conducted under certain circumstances. The purposes for which vegetation management may be implemented varies by roadless rule theme, with backcountry restoration being the most permissive and backcountry recreation the most restrictive. In backcountry restoration areas, vegetation may be managed in the wildland urban interface for restoring structure, function, composition, and connectivity of forest vegetation. Vegetation management would be allowed only as far as it is allowed under the Idaho Roadless Rule. The roadless rule allows motorized trails to be constructed, whereas recommended wilderness does not. Mining and new mineral leases are restricted in both areas. In terms of impacts to aquatic wildlife habitats, these differences are minor or negligible. Perhaps the biggest difference for rivers is that motorized trails are allowed within Idaho Roadless Rule areas, which may impact river habitats at crossings and may result in some degradation of riparian and river habitats and increased sedimentation.

Some activities that can have minor consequences to aquatic wildlife habitats are generally allowed within recommended wilderness and Idaho Roadless Rule areas. Grazing, hiking trails, dispersed recreation, dams, and planned ignitions are activities allowed within wilderness, generally with restrictions. Some environmental factors can occur within wilderness areas. For example, climate change, the spread of invasive or non-native plant or animal species, natural landslides, wildfires, drought, habitat shifting, extreme temperatures, insect infestations, disease, and atmospheric depositions can all occur and are generally beyond Forest Service control. Management towards forestwide desired conditions address many of these threats. For example, aquatic plan components require stubble heights for vegetation that helps lessen the effects that livestock have on riparian areas. Desired conditions for vegetation would direct management towards a more resilient condition to address some factors like climate change.

Management Direction in Designated Wild and Scenic Rivers

The amount of designated wild and scenic rivers does not change by alternative. Designated wilderness and designated wild and scenic rivers currently protect many open water habitats in the plan area, and do not change under the alternatives.

Wild and Scenic River Eligibility and Suitability

The amount of river miles and acres that are considered for either wild and scenic river suitability or eligibility varies by alternative (Table 158 and Table 159). The tables below show the miles of rivers and acres of river corridor of eligible and suitable wild and scenic rivers.

Table 158. Miles of rivers eligible or suitable for inclusion into the Wild and Scenic River system by alternative

	Recreational Miles	Scenic Miles	Wild Miles	Total
No Action Eligible	241	32	329	602
No Action Suitable	0	0	0	0
Preferred Alternative Suitable	15	89	106	210
Preferred Alternative Eligible	23	4	0	27
Alternative W Suitable	37	81	115	233
Alternative W Eligible	0	0	0	0
Alternative Y Suitable	143	80	123	346
Alternative Y Eligible	0	0	0	0
Alternative Z Suitable	61	107	356	524
Alternative Z Eligible	0	0	0	0

Table 159. Acres within eligible or suitable river corridors by alternative

	Eligible Acres	Suitable Acres	Total
No Action Alternative	155,477	0	155,477
Preferred Alternative	3,899	61,849	65,748
Alternative W	0	64,587	64,587
Alternative Y	0	99,120	99,120
Alternative Z	0	145,984	145,984
Alternative X	0	0	0

Wildlife outstandingly remarkable values were identified following direction in the Final Directives and the process for identifying rivers that had wildlife outstandingly remarkable values can be found in Appendix F. They are summarized in Table 159. These rivers were selected as having outstandingly remarkable values for wildlife if they had populations of river dependent wildlife that are either rare, unique, or regionally or nationally significant or they are Species of Conservation Concern (SCC) or federally listed species. Only a few wildlife species were found to fit both criteria, and rivers were identified as eligible if they had observations of these species. These river segments were selected because they provide habitat for populations of river dependent wildlife species that are unique or rare or regionally or nationally significant. Species identified include the harlequin duck, which is an SCC, and several rare or endemic river dependent snails. Plan direction for wild and scenic rivers will protect many other river dependent wildlife and species not identified as outstandingly remarkable values that use riparian areas. Several rivers identified as eligible for wild and scenic river consideration include outstandingly remarkable values for wildlife. While most of the aquatic wildlife species were not selected as outstandingly remarkable values for wild and scenic river eligibility, many of these species would have their key ecological characteristics maintained if these rivers were found suitable.

Table 160. Species included as outstanding remarkable values for wild and scenic suitability

Species Found Eligible	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Ashy Pebblesnail (*Fluminicola fucus*)	Yes	No	Yes	Yes	Yes
Boulder Pile Mountainsnail (*Oreohelix jugalis*)	Yes	No	Yes	Yes	Yes
Harlequin Duck (*Histrionicus histrionicus*)	Yes	No	Yes	Yes	Yes
Marbled Disc (*Discus marmorensis*)	No	No	No	No	No
Nez Perce Pebblesnail (*Fluminicola gustafsoni*)	No	No	No	No	No
Rotund Physa (*Physella columbiana*)	Yes	No	Yes	Yes	Yes
Selway Forestsnail (*Allogona lombardii*)	Yes	No	Yes	Yes	Yes
Short-Faced Lanx (*Fisherola nuttallii*)	Yes	No	Yes	Yes	Yes

Plan direction for suitable wild and scenic rivers requires protection or enhancement of the outstandingly remarkable values of suitable rivers, which include outstandingly remarkable values for wildlife. Desired conditions for suitable rivers would direct management to prevent changes in free flow characteristics, degradation of water quality, and development and protect outstandingly remarkable values. Outstandingly remarkable values for many rivers in the plan area include those for fish and wildlife. Suitable rivers are a subset of rivers eligible. Generally, rivers and their outstandingly remarkable values would be more protected if they are managed as suitable or eligible as wild and scenic rivers in the plan. The No Action Alternative only had eligible rivers and not suitable rivers. Some eligible rivers would not be identified as suitable in the Preferred Alternative. In these cases, management would no longer need to follow wild and scenic interim direction of eligible rivers for the protection of outstandingly remarkable values. However, all rivers are protected by aquatic ecosystem plan components.

Wild and scenic rivers are designated as either wild or scenic. Whether a suitable river is recreational, scenic, or wild is determined by criteria under the Directives. Direction under these different classes vary in how they provide ecological conditions because they vary in direction on which activities or infrastructure they allow. Wild rivers are the most restrictive and recreational rivers are the least restrictive. Land Management Plan standards for wild rivers do not allow new road construction and govern the way trails are built to protect remarkable values. Plan guidelines for scenic and recreational rivers allow roads and trails so long as free flowing characteristics and remarkable values are protected. Land Management Plan guidelines protect wild rivers from vegetation management and developed recreation. Scenic river vegetation management can protect or enhance the outstandingly remarkable values and free flow characteristics. Land Management Plan guidelines also restrict recreational development and guide livestock grazing to protect outstandingly remarkable values. Land Management Plan guidelines require mining on suitable wild scenic rivers and recreational rivers be conducted in a manner so as not to impact free flowing characteristics, water quality, and outstandingly remarkable values. Furthermore, the Wild and Scenic Rivers Act restricts the building of dams and changes to free flow characteristics. Any eligible wildlife and scenic rivers identified as suitable would not allow dam building, diversions, and development of hydropower facilities. These protections apply to the river itself and the river corridor within a quarter mile of the river. While plan direction for wild rivers provides better protection than scenic or recreational rivers, all types of wild and scenic river designations greatly protect the wildlife that use rivers. See the suitability table in the Eligible and Suitable Wild and Scenic Rivers section of the Land Management Plan for information on actions that are suitable within various suitable wild and scenic river types.

Under the action alternatives, Alternative Z provides the most total miles of suitable rivers, with 160 more miles protected. Alternative Z also provides the most protection for suitable wild rivers, providing 265 more miles. Alternative Z proposes 38 more miles as wild compared to the No Action Alternative. Wild rivers, because of their unaltered characteristics, probably provide the highest amount of ecological integrity to river habitats out of the eligible rivers when compared to recreational and scenic. Alternative X selects no rivers as suitable wild and scenic rivers. The Preferred Alternative identified Cayuse Creek, Fish Creek, Hungery Creek, Weitas Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Colt Killed Creek, and Meadow Creek. The Preferred Alternative maintains two rivers as eligible for wild and scenic river designation and includes the Little North Fork and the Salmon River. A detailed analysis of the effects to all outstandingly remarkable values is provided in Appendix F.

Under the No Action Alternative, all rivers that had outstandingly remarkable values would be managed as eligible, and management would protect the outstandingly remarkable values. There were many rivers found eligible because they had a variety of outstandingly remarkable values. Management to maintain or improve outstandingly remarkable values on eligible rivers, even when they were found eligible based on non-wildlife outstandingly remarkable values, would help ensure that rivers continue to provide ecological conditions to provide for river and riparian wildlife. For example, rivers eligible for fisheries, scenery, recreation, cultural resources, and water quality would also provide ecological conditions for many wildlife species. Thus, the most river miles that would receive management to protect or enhance outstandingly remarkable values would be under the No Action Alternative.

The amount of river miles proposed as suitable by alternative differs for each wildlife outstandingly remarkable value. Alternative Y protects the most miles of rivers that had wildlife outstandingly remarkable values, which would protect 41.8 more miles than Alternative Z, the next lower alternative. Alternative Z would protect 59 more miles of river with wildlife outstandingly remarkable values than Alternative W.

No rivers that contain populations of the marbled disc and the Nez Perce pebblesnail were found suitable in any alternative. Populations of marbled disc are only known from Slate Creek in the plan area. The global distribution of this species is less than about 40 square miles, which includes Slate Creek and Johns Creek. The Nez Perce pebblesnail is a newly described species of aquatic snail that has been found in only a few reaches so far. It has only been reported to occur within the Clearwater River, Salmon River, and South Fork Clearwater but may have wider distribution as more areas are surveyed. While wild and scenic suitability would enhance protections for aquatic wildlife, forestwide plan components for protection of rivers would continue to provide for wildlife that use rivers.

Land Suitability

Decisions on suitability can have consequences for river habitats. Suitability is determined for the summer and winter recreation opportunity spectrum (ROS), timber suitability, grazing, and other uses. Suitability sets the conditions where these activities could occur. Determinations for suitability vary by alternative. Those that vary by alternative directly are the summer and winter ROS and activities that would be found suitable under the plan alternatives in various management area types. For example, suitability of uses varies by alternative within recommended wilderness. Consequences for such decisions vary depending upon the resource and type of use.

Timber suitability does not vary by alternative. There are three types of timber suitability: suitable for timber production, suitable for timber harvest for resource reason other than timber production, and areas not suitable for timber harvest nor timber production. Forestwide, river and riparian habitats are not suitable for timber production. This is particularly important in Management Area 3 where timber production is generally allowed. Timber harvest within riparian habitats is restricted unless it is needed to restore riparian habitats by aquatics plan components. Similarly, landslide prone areas are not suitable for timber production. Timber production in landslide prone areas can leave them susceptible to landslides, which affect river integrity.

The alternatives vary where motorized uses are suitable via ROS settings. Suitability of motorized uses could have impacts on aquatic wildlife habitats. Suitability of motorized uses is determined by the summer and winter ROS. The most impactful is summer motorized uses. Suitability does not make travel management decisions; instead, it identifies areas that are suitable for those uses in the future where travel management decisions could be made. There are three motorized settings and two non-motorized settings. Table 161 shows the acres of riparian habitats suitable for summer motorized uses by alternative. Maps of the alternatives for the summer ROS can be found in Appendix A. Increased amounts of riparian areas suitable for motorized uses could potentially lead to increased impacts to aquatic wildlife habitats in the future. These actions would undergo site specific analysis of the effects prior to authorizing any new travel management decisions. New motorized developments would be prevented altogether in areas not suitable for motorized uses. Therefore, alternatives with less motorized suitability would protect aquatic habitats better than those with more motorized suitability. Effects of motorized routes and route maintenance on aquatic and riparian habitats include changes in sediment delivery, delivery of contaminants, stream bank stabilization measures such rip rap, pesticide use, and some culverts can block aquatic connectivity. However, even where motorized uses are suitable, aquatic ecosystem plan components would be effective in reducing or minimizing consequences of motorized suitability. Specifically, FW-DC-WTR-06, FW-DC-WTR-02, FW-DC-WTR-05, FW-STD-WTR-04, FW-STD-WTR-06, FW-STD-RMZ-02, FW-STD-RMZ-03, FW-GDL-RMZ-02, FW-DC-CWN-03, FW-OBJ-CWN-01, FW-OBJ-CWN-02, FW-STD-CWN-01, FW-DC-ARINF-01, FW-STD-ARINF-01, FW-STD-ARINF-02, FW- STD-ARINF-03, FW-STD-ARINF-04, FW-STD-ARINF-05, FW-STD-ARINF-06, FW-STD-ARINF-07, FW-GDL-ARINF-01, FW-GDL-ARINF-02, FW-GDL-ARINF-03, FW-GDL-ARINF-04, FW-GDL-ARINF-05, FW-GDL-ARINF-06, FW-GDL-ARINF-07, FW-GDL-ARINF-08, FW-GDL-ARINF-09, FW-GDL-ARINF-10, and FW-GDL-ARINF-11. Each of these plan components addresses one or more of the threats or consequences of motorized uses and motorized suitability.

Table 161. Acres and percent of riparian, wetland, and aquatic wildlife habitats with summer recreation opportunity spectrum (ROS) by alternative

Recreation Opportunity Spectrum Settings	Primitive	%	Simi-Primitive Non-Motorized	%	Semi-Primitive Motorized	%	Roaded Natural	%	Rural	%
No Action Alternative	105,555	19.3	191,605	34.9	120,468	22.0	129,236	23.6	1,421	0.3
Alternative W	142,720	26.0	141,195	25.8	125,877	23.0	117,889	21.5	20,603	3.8
Alternative X	142,720	26.0	73,882	13.5	180,540	32.9	130,539	23.8	20,603	3.8
Alternative Y	144,741	26.4	153,101	27.9	104,108	19.0	125,731	22.9	20,603	3.8
Alternative Z	144,741	26.4	161,747	29.5	98,326	17.9	122,866	22.4	20,603	3.8
Preferred Alternative	139,361	25.4	93,840	17.1	137,219	25.0	161,066	29.4	16,799	3.1

Table 162 shows the amount of aquatic and riparian areas that would be motorized or non-motorized by alternative. The Preferred Alternative has more motorized uses than all action alternatives except Alternative X. Plan direction in the Aquatic Ecosystem's Infrastructure (aquatics and riparian) section in the Land Management Plan would help prevent impacts from new authorized travel decisions in the future.

Table 162. Acres of aquatic, riparian, or wetland habitat within motorized and non-motorized settings by alternative

	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Motorized Settings	251,125	264,369	331,682	250,442	241,796	315,083
Non-Motorized Settings	297,159	283,915	216,602	297,842	306,488	233,201

Activities vary by alternative within recommended wilderness areas. See the Recommended Wilderness section of the Land Management Plan for details. None of the activities that vary would have much effect on aquatic and riparian habitats. Livestock grazing is allowed and could have some impacts to aquatic wildlife habitat, but plan direction reduces these impacts. Timber harvest and mining activities are suitable within recommended wilderness only as allowed in the Idaho Roadless Rule.

Management Area Direction

Management area direction and aquatics plan components provide for the protection of open water habitats in the plan area. Threats that affect water clarity and sedimentation are restricted by management within wilderness or Idaho Roadless Rule areas. The largest percent of lakes and open water occurs in wilderness, followed by Idaho Roadless Rule areas. Like the effects in many sections of the document, this analysis finds that lakes and open waters are more protected under designated wilderness, recommended wilderness, and Idaho Roadless Rule areas than those in the general forest areas. Most smaller lakes and wetlands would be protected under any of the alternatives because most of them fall within protected lands. The threat of human waste is not addressed in the plan and these effects could still be caused in wilderness areas.

Exotic trout were planted in the past by the Idaho Department of Fish and Game. Species strains, such as brook trout (*Salvelinus fontinalis*) and non-native rainbow trout (*Oncorhynchus mykiss*), continue to occupy these habitats and may affect some native species. Stocking of non-native fish is no longer conducted by the Idaho Department of Fish and Game. Other exotic species that may be inadvertently introduced include species such as zebra mussels (*Dreissena polymorpha*) but have a low probability in lakes since this species is spread by motorboats and most of the lakes are remote without road access.

Effects to Aquatic, Riparian, and Wetland Habitats from Other Resources

Research Natural Areas

Plan components for research natural areas provide direction to manage these areas to provide ecological sustainability and are managed through natural processes. Despite their small scope, they provide protection for rivers because of this direction. Plan component direction for research natural areas include maintaining a representation of natural systems as a baseline for research, monitoring, and education by the agency. These areas are small relative to the plan area. This direction would have no consequences or beneficial consequences to aquatic habitats for wildlife.

Carbon Storage and Sequestration

There would be no effects from plan direction related to carbon storage.

Cultural or Heritage

Plan components and alternatives for cultural and heritage would either not affect or provide, maintain, or improve ecological conditions for aquatic wildlife resources.

Designated Wild and Scenic River Management

Effects from direction under wild and scenic management maintain and enhance the outstandingly remarkable values of rivers. Usually, management of wild and scenic rivers provides beneficial outcomes for wildlife. The primary exception is that wild and scenic designation often draws attention and increased recreation to these resources, which can have some effects on some wildlife species. Of note would be the effects of recreation disturbance on harlequin ducks that could displace them from preferred areas.

Eligible Wild and Scenic River Management

Effects from direction under eligible and suitable wild and scenic rivers is to maintain and enhance the outstandingly remarkable values of rivers until they are designated. Usually, management of wild and scenic rivers provides beneficial outcomes for wildlife. Wild and scenic rivers would provide few or no benefits to other aquatic habitats except when they fall within a river corridor.

Minerals

Plan direction for minerals is composed of desired conditions that generally state that minerals and energy development are available. Mineral exploration and extraction have adversely affected aquatic habitats in the past. Aquatics plan direction for minerals would help reduce or minimize impacts allowable under the law from mineral exploration, extraction, and energy development. See Section 2.2.5 of the Land Management Plan for plan components that pertain to aquatics and riparian areas.

The Forest Service cannot recommend, authorize, or consent to road construction, road reconstruction, or surface occupancy associated with mineral leases in Idaho Roadless Areas designated as Wild Land Recreation, Special Areas of Historic or Tribal Significance, or Primitive themes. For mineral leases, contracts, permits, and other associated activities authorized after the effective date of the Idaho Roadless Rule, the Forest Service will not recommend, authorize, or consent to road construction or road reconstruction associated with mineral leases in Idaho Roadless Areas designated as Backcountry/Restoration. Surface use or occupancy without road construction or reconstruction is permissible for all mineral leasing unless prohibited in the applicable land management plan.

After October 16, 2008, the Forest Service was able to authorize the use or sale of common variety mineral materials and associated road construction or reconstruction to access these mineral materials in Idaho Roadless Rule areas designated as Backcountry/Restoration only if the use of these mineral materials was incidental to an activity otherwise permissible in Backcountry/Restoration. Collectively these restrictions would help minimize the environmental consequences of mining, mineral extraction, and energy extraction in some areas.

The Aquatics Ecosystem and Fisheries section contains plan direction for Aquatic and Riparian Energy and Minerals that will help minimize the impact to aquatic wildlife habitats from mining and energy activities. However, these activities are allowable by law without much discretion by the Forest Service and may still have some impacts.

At-Risk Plants

Management direction for at-risk plants would have no consequences to aquatic habitats nor would it have beneficial consequences to these resources because they would not adversely impact these habitats or would prevent some activities that could have consequences from occurring where present.

Recommended Wilderness

Direction in the Recommended Wilderness section of the Land Management Plan would have beneficial consequences for aquatic and riparian wildlife habitats. This direction would prevent or restrict many known threats to these habitats from occurring. This direction would apply to those habitats already located within Idaho Roadless Rule areas and would be similar or slightly more protective of these resources than Idaho Roadless Rule direction.

Roadless Areas

Idaho Roadless Rule areas guide management on large areas of the Nez Perce-Clearwater, including many aquatic habitats. Direction under the Roadless Rule would restrict or prevent many of the threats to aquatic resources. Restoring the natural ecological process, natural disturbances, and wildland fire are the primary forces affecting the composition, structure, and pattern of vegetation. These activities have fewer consequences for aquatic resources than activities like timber harvest. Road construction or reconstruction is limited to specific circumstances allowed under the Idaho Roadless Rule. These restrictions would largely prevent or have beneficial consequences for aquatic habitats.

Timber cutting is prohibited in wildland recreation and is restricted in special areas of historic or tribal significance as follows:

- To improve threatened, endangered, proposed, or sensitive species habitat;
- To maintain or restore the characteristics of ecosystem composition, structure, and processes;
- To reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply system;
- For personal or administrative use, as provided for in 36 CFR part 223; or
- Where such cutting, sale, or removal is incidental to the implementation of a management activity not otherwise prohibited by this subpart.

The cutting, sale, or removal of timber is permissible in Idaho Roadless Areas designated as Backcountry/Restoration only:

- To reduce hazardous fuel conditions within the community protection zone if, in the responsible official’s judgment, the project generally retains large trees as appropriate for the Nez Perce-

Clearwater type and is consistent with land management plan components as provided for in §294. 28(d).

- To reduce hazardous fuel conditions outside the community protection zone where there is significant risk that a wildland fire disturbance event could adversely affect an at-risk community or municipal water supply system. A significant risk exists where the history of fire occurrence and fire hazard and risk indicate a serious likelihood that a wildland fire disturbance event would present a high risk of threat to an at-risk community or municipal water supply system.
- To improve threatened, endangered, proposed, or sensitive species habitat.
- To maintain or restore the characteristics of ecosystem composition, structure, and processes.
- To reduce the risk of uncharacteristic wildland fire effects.
- For personal or administrative use, as provided for in 36 CFR part 223: Where incidental to the implementation of a management activity not otherwise prohibited by this subpart; or…in a portion of an Idaho Roadless Area designated as Backcountry/Restoration that has been substantially altered due to the construction of a forest road and subsequent timber cutting. Both the road construction and subsequent timber cutting must have occurred prior to October 16, 2008.

Any action authorized pursuant to paragraphs §294. 24(c)(1)(ii) through (v) shall be approved by the regional forester and limited to situations that, in the regional forester's judgment, (i) Maintains or improves one or more of the roadless characteristics over the long-term; (ii) Maximizes the retention of large trees as appropriate for the forest type to the extent the trees promote fire-resilient stands; and (iii) Is consistent with land management plan components as provided for in §294.28(d). The activities in paragraph §294.24(c)(1) may use any forest roads or temporary roads, including those authorized under §294.23(b)(2 and 3) until decommissioned.

The Idaho Roadless Rule restricts mining activities as described in the mineral's evaluation of this document. These restrictions, as stated above, provide protection from these activities to many aquatic wildlife habitats in Idaho Roadless Rule areas. This includes effects from erosion, sedimentation, and stream channel alterations from roads.

Scenery

Scenery management would have no consequences or would have beneficial consequences on aquatic and riparian wildlife habitats.

Range management

The No Action Alternative would continue management of the grazing program under direction in the 1987 Forest Plans, as amended by PACFISH and INFISH. Current direction in PACFISH specific to grazing includes four standards and guidelines, three of which are relevant to the Nez Perce-Clearwater. They require modification of grazing practices that retard or prevent attainment of riparian management objectives or are likely to adversely affect listed anadromous fish. They also require that new livestock handling facilities be located outside of riparian habitat conservation areas and that livestock trailing, bedding, watering, salting, loading, and other handling efforts be limited to areas and times where they will not retard or prevent attainment of riparian management objectives. See Sections 2.2.6 and 5.3 of the Land Management Plan for plan components.

When assessed at broad scales, PIBO data has suggested that similar measures found in PACFISH have maintained conditions within rivers, which has shown that stream bank stabilization has not declined since PACFISH was implemented.

The action alternatives do not vary in terms of the level of grazing activity in each alternative or the aquatic components that address their potential effects. The outcome of grazing, as proposed in these alternatives, is expected to be the same or similar as the No Action Alternative with better clarified direction to address any site-specific adverse effects to riparian condition or where grazing is preventing attainment of aquatic desired conditions. Plan direction in the livestock grazing and the aquatic and riparian livestock grazing sections of the Land Management Plan would provide adequate measure to reduce impacts from grazing to acceptable levels.

Soils

Plan direction for soil management would have few consequences or would have beneficial consequences on aquatic and riparian wildlife habitats. Objectives for restoration of soils may have some short-term consequences for soil erosion in limited circumstances.

Sustainable Recreation

Dispersed recreation can have effects on aquatic habitat if sites are located close to aquatic resources. Many dispersed and developed recreation sites are located within riparian areas and are adjacent to streams. Effects could include trampling riparian vegetation, compaction of soils, pollution from litter, waste and spilled contaminants, and human waste. These impacts are localized to specific areas where dispersed recreation has been ongoing. Plan direction in the sustainable recreation and aquatic and riparian recreation sections of the Land Management Plan is adequate to provide protection for aquatic wildlife habitats.

Recreation can also displace wildlife through disturbance. Correlative evidence suggests that disturbance from recreation has reduced reproductive success of harlequin ducks (Wiggins 2005). Wiggins (2005) suggested that harlequin ducks are likely to abandon sites that receive heavy human disturbance based upon a variety of anecdotal observations of harlequin ducks being affected by disturbances. The plan has no specific plan component for disturbances to harlequin ducks.

Recreation and Access Management

The 2012 Planning Rule requires plans to develop components for multiple uses for sustainable recreation, including recreation settings, opportunities, and access. The Land Management Plan will set the summer and winter recreation opportunity spectrum (ROS) for both the Nez Perce and Clearwater National Forests. The ROS was developed following guidance from the Final Directives for the 2012 Planning Rule (FSH 1902. 12_20, section 23. 23a). While the ROS will not make decisions about recreation development levels, it will provide the framework under which recreational opportunities, such as winter and summer motorized recreation activities, could be allowed during future travel or recreation planning. The ROS categorizes recreational settings into six distinct classes as the recreational settings. Each setting provides opportunities to engage in activities, such as motorized, non-motorized, developed, or dispersed, on land, water, and in the air. The ROS sets where activities, such as over the snow motor vehicle use and motorized recreation, are allowed and include urban, rural, roaded natural, and semi-primitive motorized settings.

Under the 1987 Plans, the recreation opportunity spectrum allows winter motorized travel in all settings except wilderness and recommended wilderness. Motorized summer recreation is generally not allowed in the primitive and semi-primitive non-motorized settings. Summer ROS settings have the most potential for consequences to aquatic and riparian wildlife habitats because motorized travel can cause sedimentation, spread invasive species seeds, and impact river and stream turbidity and morphology in limited areas. Stream crossings result in localized changes to riparian areas at the crossing structure itself, as well as the approaches. Winter ROS settings probably have little to no consequences for aquatic and riparian wildlife habitats. Winter motorized recreation does not typically cause any of the threats identified above to these habitats.

The most widespread alteration of riparian conditions, as well as stream process and function, across the Nez Perce-Clearwater includes road development, particularly construction of streamside roads and roads with multiple stream crossings (Ecovista 2003). Road development has been correlated to instream conditions, including substrate composition, low numbers of large wood in the stream channel, and number and quality of pools on both the Clearwater and Nez Perce National Forests (Huntington 1995). System roads cover an estimated 2,400 acres, or 600 road miles, within riparian management zones on the Nez Perce National Forest and an estimated 4,000 acres, or 1,000 road miles, within riparian management zones on the Clearwater National Forest. Recovery potential is limited if the road prism continues to exist on the landscape, although site specific improvements can be made to reduce effects, particularly those associated with streamside roads and stream crossings.

Infrastructure components described in the aquatics plan components provide additional clarification and specificity when compared to those in PACFISH and INFISH. All standards and guidelines are intended to direct achievement of this desired condition. They are similar or the same as some standards in PACFISH and INFISH but contain additional clarification and specificity for many road activities. As for the No Action Alternative, motorized travel on roads and trails would continue consistent with current travel plan direction. See Section 2.2.4 of the Land Management Plan for plan components.

Further, while PACFISH and INFISH and their biological opinions referred to "Key" and "Priority" watersheds and contained direction specific to them, the aquatics plan components further expanded this concept by establishing the Conservation Watershed Network and included components to address potential effects, particularly from roads and infrastructure. The Conservation Watershed Network on the Nez Perce-Clearwater is extensive and includes many subwatersheds within designated wilderness and roadless areas, as well as a large percent of Management Area 3. See Section 2.2 of the Land Management Plan for plan components that pertain to aquatics and riparian areas.

When comparing alternatives, it is important to note that, as the level of anticipated timber harvest varies among the action alternatives when compared to the No Action Alternative and each other, the transportation system needed to access and support these changes may increase similarly, depending on the specific project and its location. It is expected that the aquatic components, particularly those in the Conservation Watershed Network, will influence the type and management of any additional infrastructure needed for access and that they will reduce or minimize effects to riparian and aquatic wildlife habitats. Thus, the conclusion that the action alternatives will result in outcomes to riparian resources that are indistinguishable from the No Action Alternative is based on this assumption.

Timber and Silviculture Management

Timber management will occur most intensively within the general forest areas of the Nez Perce-Clearwater, typically referred to as Management Area 3. While timber management is technically allowed in Idaho Roadless Rule areas, it is identified as low suitability and only allowed under limited circumstances. Aquatics plan direction would largely provide ecological conditions for aquatic and riparian wildlife habitats. Components intended to address potential effects from harvest activities in riparian management zones are included, particularly increases in sediment delivery from soil disturbance. See Sections 2.2 of the Land Management Plan for plan components that pertain to aquatics and riparian areas.

Aquatics plan component measures would help reduce or eliminate most or all of the primary impacts to aquatic and riparian wildlife habitats, though there would likely still be some impacts from these activities in the short term. Some of the impacts could be intensified based upon how quickly objectives in forested habitats are accomplished. The rate at which desired conditions for forest restoration are achieved vary by alternative. In Alternative Z, desired conditions are achieved at the slowest rate. Forest desired conditions are restored at the fastest rate under Alternative X. Objectives also vary under the alternatives by management area and potential vegetation type group. See the Forestlands plan components for the proposed acres under the alternatives. Naturally, alternatives with the highest objectives could see the most widespread impacts from these objectives in aquatic habitats. The Preferred Alternative seeks to use timber harvest and prescribed burning such that attainment of desired conditions in Management Area 2 and Management Area 3 are designed to take between 35 and 40 years to achieve desired vegetation conditions and is less than Alternative X but more than alternatives Z, Y, and W. Alternatives with quicker pace to meeting desired conditions results in earlier seral habitat more quickly.

Watershed

A suite of plan components directed at the management of watersheds would provide the ecological conditions beneficial to aquatic wildlife and their habitats. They are extensive and protective of all aquatic habitats. These plan components would direct management towards the conservation of aquatic and riparian wildlife habitats.

Tribal Trust

Plan components guiding tribal trust have no adverse consequences or beneficial consequences to aquatic and riparian wildlife habitats.

Wildlife

Plan components directed towards at-risk species would have no adverse consequences for aquatic and riparian wildlife habitat. These plan components do not vary by alternative. Management for elk would direct the location of some of the treatments from vegetation and timber management towards areas predicted to have higher nutrition for elk. These vary by alternative because the amounts of treatments for vegetation vary by alternative. These activities could be achieved through vegetation management or prescribed fire and could have some adverse consequences on aquatic and riparian resources. The consequences are not different than those under timber and silvicultural management, as described above, when timber management is used as a tool to complete these objectives. Plan direction for elk would require travel management decisions to provide, in some cases, guidance to strategically reduce open roads at broad scales to improve predicted elk fat accumulation. This direction would be beneficial to aquatic and riparian habitats because it would reduce motorized use in many areas to provide forage for elk away from motorized travel.

Conclusion

Under all alternatives, plan direction protects aquatic and riparian habitats from many activities and threats that could adversely affect ecological conditions for aquatic wildlife. Some alternatives provide more protection than others because they offer larger amounts of suitable wild and scenic rivers, less motorized suitability, and more recommended wilderness. Differing amounts of recommended wilderness would provide slightly more protection than if they were in Idaho Roadless Rule areas.

Alternative Z has the most miles of suitable wild and scenic rivers and would protect more miles of rivers, followed by Alternative Y, then Alternative W. Alternative X has no rivers identified as suitable as wild and scenic rivers. The No Action Alternative would manage rivers with outstandingly remarkable values as eligible. The amount managed as eligible would be more miles than any of the action alternatives. Each alternative for wild and scenic rivers will protect these rivers from dam building and changes to free-flowing character. Although the chances of dam building in the plan area is slim in the future, these would still represent substantial protections for these rivers.

The Preferred Alternative strikes a balance in the amounts of recommended wilderness, summer recreation opportunity spectrum (ROS) and motorized suitability, winter ROS and motorized suitability, eligible and suitable wild and scenic rivers, and timber suitability. The Preferred Alternative takes a relatively rapid pace towards achieving desired vegetation conditions. However, the pace is within the modeled range of disturbance the land experienced from natural disturbances during warmer-dryer periods in the SIMPPLLE model and so should be within the natural range of variability.

While land allocations differ, the outcomes or potential effects from future actions to aquatic and riparian habitat are mostly controlled by the aquatic ecosystem plan components. Aquatics plan components would greatly protect and restore habitats for aquatic and riparian wildlife in the plan area. Objectives for restoring river habitats would restore many degraded rivers, particularly in Management Area 3. These activities would restore the structure, function, composition, and connectivity of aquatic and riparian habitats. These restoration practices and protections would provide for species in the plan area that use aquatic and riparian habitats.

Terrestrial Habitats

Terrestrial wildlife habitat was grouped into habitat groupings that were based upon the habitat descriptions of wildlife species in the plan area. A description of each species' preferred habitat and the habitat groups each species is associated with can be found in Appendix C. Terrestrial wildlife broad habitat groupings and sub-groupings include the following:

- Alpine, boreal, or high elevation habitats
  - Alpine or high elevation, remote areas, or persistent snow
  - Boreal, subalpine, or high elevation forest; cold or cool moist potential vegetation type
- Ecotone, forest edge, or habitat combinations
  - Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
- Forested habitats
  - Broad-leaved deciduous, mixed conifer and broad-leaved deciduous forest, and deciduous riparian habitats
  - Burned forest
  - Closed forest—higher density late seral or old forest or large tree habitat with closed canopy
  - Open forest—low density, late seral or old forest, or large tree habitat with open canopy
- Habitat Generalists
  - Species found in a wide variety of habitat conditions
- Non-forested and early seral habitats
  - Meadow, grassland, forbland, and shrubland
  - Shrubland, thickets, woodlands, and early seral forests
  - Sparse, barren, or bare ground habitats
- Resource habitats
  - Carrion or prey populations

    - ♦ Flowering plants
    - ♦ Fruit resources
    - ♦ Seeds, mast, and grain resources
- Substrate habitats—Rock outcrop, soil, downed wood, cliffs, talus, or cave habitats
    - ♦ Habitats under rocks, logs, downed wood, or leaf litter
    - ♦ Roosting habitats—rock outcrops, caves, crevices, sloughing bark, talus, cavities in trees
    - ♦ Soil or burrowing habitat
    - ♦ Steep terrain

The broad categories and subcategories were analyzed to determine if the Land Management Plan has ecosystem integrity for wildlife species and whether the plan will provide for most native species.

Forested Habitats

Several species found on the Nez Perce-Clearwater primarily use forested habitats. Forest species, whether conifer or broadleaf forests, were assigned to the forested habitats group. Sixty-seven species were assigned to this group, including 55 birds and 11 mammals. An additional 31 species require forested habitats in combination with non-forested or early seral habitat forest edges. Forest birds include songbirds (passerines), forest grouse, woodpeckers, owls, and a few corvids (crows, ravens, and jays). Forest mammals are represented by species like the red squirrel (*Tamiasciurus hudsonicus*), flying squirrel, fisher, Pacific and American marten, black bear, snowshoe hare, and southern red-backed vole (*Myodes gapperi*).

Forested habitats were further subdivided into subgroups that are based on wildlife habitat descriptions:

- Broad-leaved forest—mixed conifer and broad-leaved deciduous forest and deciduous riparian habitats
- Closed forest—higher density late seral, old forest, or large tree habitat with closed canopy
- Open forest—low density, mid-to-late seral, old forest, or large tree habitat with open canopy
- Forest habitat generalists—use multiple habitats like forested, riparian, and non-forested

The number of species identified into the forested habitat subgroup are shown in Table 163.

Table 163. Number of wildlife species recorded by forested habitat subgroup

Habitat Subgroup	Number of Species
Broad-leaved forest	11
Closed Mature forest	31
Open Mature forest	23
Burned forest	2

An additional 147 species can also be found in forested habitats but were grouped into other habitat groupings and subgroupings, as shown in Table 164. In total, about 230 species can be found in forested habitats. However, many of the species depend on key characteristics or habitat types that better fit into other habitat categories analyzed in other sections of the document. They are noted here to recognize the importance of forested habitat to the diversity and abundance of wildlife.

Table 164. Number of species reported by habitat group, with habitat subgroups, and section of the Final Environmental Impact Statement containing their analyses

Habitat Group	Habitat Subgroup	Number	Section with Analysis
Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland	33	Ecotone, Forest Edge, or Forest Mosaic
Aquatic, wetland, water, and riparian habitats	Riparian habitats	23	Aquatic, Wetland, Water, and Riparian Habitats
Aquatic, wetland, water, and riparian habitats	Aquatic and forested habitats or forested wetlands	7	Aquatic, Wetland, Water, and Riparian Habitats
Substrate habitats—rock outcrop, soil, downed wood, cliffs, talus, or cave habitats	Rock outcrops, talus, cliffs, or cutbanks	26	Substrate Habitats
Substrate habitats—rock outcrop, soil, downed wood, cliffs, talus, or cave habitats	Roosting habitats—rock outcrops, caves, crevices, sloughing bark, talus, cavities in trees, etc.	8	Substrate Habitats
Substrate habitats—rock outcrop, soil, downed wood, cliffs, talus, or cave habitats	Habitats under rocks, logs, downed wood, or leaf litter	49	Substrate Habitats
Substrate habitats—rock outcrop, soil, downed wood, cliffs, talus, or cave habitats	Soil or burrowing habitats	3	Substrate Habitats
Substrate habitats—rock outcrop, soil, downed wood, cliffs, talus, or cave habitats	Steep terrain	2	Substrate Habitats
Resource habitats—nectar, fruit, seeds, plant forage, or prey	Flowering plants or nectar resources	4	Resource Habitats
Resource habitats—nectar, fruit, seeds, plant forage, or prey	Fruit resources	1	Resource Habitats
Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations	6	Resource Habitats
Resource habitats—nectar, fruit, seeds, plant forage, or prey	Seeds or mast	3	Forested Habitats
Non-forested or early seral habitats	Shrubland, thickets, woodlands, and early seral forest	22	Non-Forested or Early Seral Terrestrial Habitats
Non-forested or early seral habitats	Meadow, grassland, forbland, and shrubland	29	Non-Forested or Early Seral Terrestrial Habitats
Non-forested or early seral habitats	Sparse, barren, or bare ground habitats	3	Non-Forested or Early Seral Terrestrial Habitats

Habitat Group	Habitat Subgroup	Number	Section with Analysis
Habitat generalist	None	5	Not Analyzed

Some key ecological attributes of forested habitat were not captured well in the habitat groupings. Large and very large trees, as well as snags and downed wood, are key ecological attributes of forested habitats that were analyzed after the habitat groupings were analyzed. Appendix C contains a list of the species and a brief description of their habitat preferences, the habitat groupings that species associate with, and a crosswalk of plan direction that provides for these habitat groupings.

Some population trends of birds that were grouped into forested habitats are available from the Intermountain Bird Observatory data accessed on March 23, 2023. The stratum queried was the Idaho BCR10 stratum. There are population trends for 51 birds assigned to Forested habitats group, of which 16 are declining and 35 are increasing. Some declining trends have large variation in the data which should be viewed with discretion. Two declining species have large variations in the data such that the trends are less reliable and include the barred owl (*Strix varia*) and sharp-shinned hawk (*Accipiter striatus*). All other species have sufficient data for reliable trend inferences. The national forest habitat subgroups with the highest proportion of species declining and the subgroups with the biggest declines are those that are created or maintained by disturbance such as burned forest and broad-leaved forests (Table 165).

Table 165. Number of species and number of species declining in each habitat subgroup on the Nez Perce-Clearwater

Habitat Subgroup	Number of Species in Subgroup	Number of Species Declining within the habitat subgroup
Burned Forest	2	2
Broad-leaved forest	9	4
Closed Mature forest	20	4
Open Mature Forest	20	6

Forest Density and Structure

Wildlife species are adapted to a variety of stand ages and densities. Collectively, biodiversity depends on species adapted to a wide variety of habitat conditions, including understory vegetation, size classes, or seral stages, and differences in tree density. Scientific studies evaluating biodiversity and forest settings often use species richness and species evenness to describe biodiversity. Species richness is the number of species present, and species evenness is the relative abundance of species. The health of ecosystems is described as the combination of species richness and evenness, a term referred to as biodiversity. Studies that evaluate the effects of forest condition on wildlife communities describe changes in both species' evenness and species' richness because of changes in forest density and age class. These types of studies evaluate guilds of species grouped by their life history or characteristics and habitat use.

Wildlife species were characterized by their use of age class and density where possible. Of the species identified as using mature to old forest age classes, there were some identified as open forest and closed forest species. If the habitat description for species identified open forest, the species was grouped into that habitat subgroup. Conversely, if a species habitat description was mature or old growth forest with high canopy cover, it was grouped into closed forest habitat group.

Several structural characteristics of forest stands correlate with the composition of breeding bird communities in grand fir forests in the Blue Mountains (Sallabanks et al. 2006). Sallabanks et al. (2006) showed that bird communities in grand fir respond more strongly to within stand structure, but some metrics of landscape configuration influenced the presence of some birds like the Townsend's warbler (*Setophaga townsendii*) and Swainson's thrush. Habitat factors influencing bird species richness ranged from a gradient of closed canopy forests with little understory and large trees to a gradient with low canopy cover and a well-developed understory. Several species selected for higher canopy cover gradients while other species selected for low canopy and developed understory (Sallabanks et al. 2006). Within stand characteristics that determined abundance included canopy cover, shrub understory, and the volume of large downed wood. Understory was composed of herbaceous ground cover, regenerating conifers, and shrub cover. The presence of a large tree component 200 years old versus younger managed stands 70 to 100 years old in the Blue Mountains was important for the golden-crowned kinglet (*Regulus satrapa*). However, Sallabanks (2006) found the kinglet to be relatively abundant in several structural classes of non-old growth forest given the presence of larger trees. Ground-nesting species, such as the orange-crowned warbler (*Vermivora celata*) and the dark-eyed junco (*Junco hyemalis*), were more abundant where herbaceous ground cover was substantial.

Key Ecological Attributes of Forested Habitats

Large and Very large Trees

A key component of forests for many species includes the presence of large and very large trees. The plan alternatives all include desired conditions for increased numbers of large trees and the distribution of large forest size classes, plus old growth forest, that is maintained or increased relative to existing conditions. Associated guidelines limit the types of management actions allowed in old growth forests; specify the number, size, and conditions for snags to be retained within treatment areas; and stipulate how vegetation management should retain and promote the recruitment of large size class trees. Additional guidelines specify the amount of coarse woody debris that should be left as ground cover after vegetation management projects. Further, the revised plan alternatives contain desired conditions for coniferous forest habitats to be managed within the natural range of variation for tree species' composition, structure, size class, density, and landscape pattern. These components would provide specific habitat elements required by each species associated with mature and old growth forest structure, as well as a wide range of conditions to support the variety of habitat needs for more the generalist species.

The availability of old growth forests and very large trees varies greatly over time and across the landscape. Unlike some of the forests on the Northwest Coast, very little of the coniferous forests in the northern Rocky Mountains go for hundreds of years without wildfire. Tree species in the northern Rocky Mountains have adaptations to survive and persist in areas where natural disturbance regimes are characterized by periodic stand-replacing wildfire or old growth is maintained by periodic low intensity-non-stand replacing wildfire in some dominance types. As a result, many of the northern Rocky Mountain wildlife species associated with old growth forest are also associated with mature forest as well as individual components of old or large trees within all forest size classes, such as very large live, decayed, dead, and large fallen trees, occurring in forest stands that have predominantly younger age classes. Very large trees have wildlife value even when the surrounding area has been burned or logged (Henjum 1996) and can serve as reservoirs of genetic diversity. Very large remnant trees enrich the subsequent forest stand structure by providing a source of large snags and coarse woody debris and improving the connectivity of the forest landscape for many wildlife species. In western forests, where fire is a dominant disturbance process, maintaining a large and very large diameter cohort of trees in perpetuity may be an appropriate method to achieve the objectives for wildlife and fire resiliency (Habeck 1990, Franklin et al. 1997). The plan includes specific plan components to provide not only stands of large and very large trees, but also for the inclusion of desired conditions for live legacy trees to be provided in stands of all ages (for example, for warm dry potential vegetation type [PVT], plan desired conditions include FW-DC-FOR-04, FW-DC-FOR-05, MA3-DC-FOR-02. Similar plan components are included for Warm moist, cool moist, and cold PVTs).

Snags and Downed Wood

Snags, decayed living trees, and hollow trees are key characteristic for several wildlife species. Species that use snags span many other terrestrial habitat groupings. A snag is defined as a standing dead tree in some stage of decay that may have biological and structural attributes usable by wildlife. Many wildlife species depend upon dead or dying trees as key ecological characteristics. Dead and dying trees provide a range of features used by different species. Natural processes that produce snags include within stand competition, a variety of tree diseases, insect infestations, cracks in sapwood, fire, and senescence (growing old). Factors that determine their use by wildlife include size; the presence of invertebrate prey; decay stage; the presence of sloughing bark, tree type, broken tops, cavities, hollow limbs, or trunks; and the presence of heart rot. Wildlife use snags for cavity nesting or denning, nesting on broken tops, finding shelter in sloughing bark, foraging for invertebrates, and as thermal refuge. Decayed trees and snags function similarly as habitat for wildlife. Decayed trees are living trees with some of these same attributes, and hollow trees form as a result of fungi, especially those that cause heart rot (Bull et al. 1997). A dead tree, from the time it dies until it is fully decomposed, contributes to many ecological processes as a standing snag and fallen woody material lying on, and in, the soil (Brown et al. 2003). Downed wood or coarse woody debris are snags or live trees that have fallen or have been retained following timber management.

Some tree species that develop heart rot are particularly useful to wildlife because heart rot hollows out the center of susceptible tree species. Heart rot facilitates excavation and cavitation inside the tree, which then serves as dens and nest sites for wildlife. Tree species susceptible to heart rot include grand fir, western redcedar, Ponderosa pine, hemlock, Engelmann spruce, subalpine fir, and hardwoods like aspen and cottonwood. Snags of these species have more relative value to wildlife. Heart rot is less common at higher elevations than in lower elevations. Species resistant to heart rot include larch, western white pine, and lodgepole pine.

Based upon an analysis of the habitat requirements of wildlife species that occur in the plan area, 70 wildlife species use snags or decayed or hollow trees for denning or nesting as a key habitat requirement. A total of 92 species use downed wood as a key requirement, and 17 species use both snags and downed wood. Combined, 145 wildlife species rely upon either snags or downed wood, or both, which accounts for about 39.1 percent of the wildlife species diversity within the plan area. Snags, decayed trees, or hollow trees are used by 46 bird species, 21 mammal species, and 3 reptiles. Downed wood is used by 8 amphibian species, 6 bird species, 42 gastropod species, 26 mammal species, and 10 reptiles. Most species that use downed wood usually use the space under or in the downed wood itself. These numbers do not count the ants, bees, wasps, spiders, beetles, flies, crickets, isopods, decapods, worms, and other invertebrates that use snags or downed wood. This also does not count the species that eat these invertebrates or eat the fungi that grows on snags and downed trees. These numbers underscore the importance of snags and downed wood habitat to the diversity and abundance of wildlife species in the plan area.

Wildlife within several habitat groupings rely on the use of snags and downed wood (Table 166). This suggests that dead or dying tree habitats, both snags and downed wood, are an important resource within a wide variety of habitats, whether in forested habitats, aquatic or riparian habitats, ecotone or edge habitats, or non-forested habitats. For some species, such as those in the substrate habitats grouping, downed tree habitat can be the primary key ecological requirement for these species. Dead and dying trees are important habitat features for wildlife that use open forest, closed forest, and ecotones between forested and non-forested habitats and both deciduous and coniferous forest. The two habitat groupings that have the most species using snags or downed wood are the substrate habitat group, the forested habitat group, and the aquatic group.

Table 166. Number of species that use snags, downed wood, or both, by habitat group

Habitat group	Number Requiring Decayed Trees and Snags	Number Requiring Downed Wood	Number that Uses Both Downed Wood and Snags	Total by Habitat Group
Aquatic, wetland, water, and riparian habitats	11	17	1	29
Ecotone, forest edge, or habitat combinations	7	5	0	12
Substrate habitats—rock outcrop, soil, downed wood, cliffs, talus, or cave habitats	7	48	4	59
Forested habitats	25	3	9	37
Non-forested or early seral habitats	3	1	0	4
Resource habitats—nectar, fruit, seeds, plant forage, or prey	0	1	2	3
Habitat Generalists	0	0	1	1
Total By type of snag or downed wood	53	75	17	145

Snags and Wildlife

Alternatives vary whether plan components require retention of snags +10-inch or snags 15-inch or larger. Woodpeckers are primary excavators and the cavities excavated by woodpeckers serve as habitat for a variety of other species. Species that excavate snags or decayed trees include woodpeckers, cavity nesting ducks, songbirds, several owls, many migratory songbird species, arboreal mammals, and bat species. Woodpeckers include the northern flicker (*Colaptes auratus*), pileated woodpecker (*Dryocopus pileatus*), black-backed woodpecker, three-toed woodpecker, downy woodpecker (*Dryobates pubescens*), hairy woodpecker (*Leuconotopicus villosus*), Lewis's woodpecker, Williamson's sapsucker (*Sphyrapicus thyroideus*), red-naped sapsucker (*Sphyrapicus nuchalis*), and white-headed woodpecker. The white-headed woodpecker is a species of conservation concern and a Regional Forester Sensitive Species (RFSS). Nuthatches, such as the white-breasted nuthatch (*Sitta carolinensis*), red-breasted nuthatch (*Sitta canadensis*), pygmy nuthatch, and brown creeper (*Certhia americana*), also use snags both for foraging and nesting.

Individual species of primary excavators select different tree sizes to excavate, while others prefer various stages of decay. Primary excavators hollow out nest and roost sites for themselves that are then used by close to 60 other species on the Nez Perce-Clearwater, some of which are incapable of excavating their own cavity. For example, brown creepers are known to nest in cavities made by pileated woodpeckers or northern flickers or beneath the bark of decaying live trees (Hillis et al. 2002). Migratory songbirds and arboreal mammals often rely upon primary excavators to provide denning or nesting tree cavities. RFSS that use dead and decayed trees include the flammulated owl, black-backed woodpecker, long-legged myotis, long-eared myotis, fringed myotis (*Myotis thysanodes*), fisher, pygmy nuthatch, and bald eagle.

Cavity nesting ducks include the common merganser, wood duck, and hooded merganser (*Lophodytes cucullatus*). Some owl species use cavities, including the western screech owl (*Megascops kennicottii*), boreal owl, northern saw-whet owl (*Aegolius acadicus*), barred owl, and northern pygmy owl (*Glaucidium californicum*). Nearly every species of bat present in the plan area uses snags or decayed trees in some way. Small mammals that rely on snags and decayed trees include the northern flying squirrel (*Glaucomys sabrinus*), Douglas squirrel (*Tamiasciurus douglasii*), short-tailed weasel, Pacific marten, and American marten.

Hollow trees are used by black bears for dens and for hibernation. Bats use hollow trees and sloughing bark for roosting, rearing of young, and, in some cases, hibernation. White pine snags often have sloughing bark.

Birds that nest in snags prefer various tree species, minimum diameters, minimum snag heights, and a variety in types of snag decay (Thomas 1979). Thomas (1979) evaluated snag dependent wildlife species in the Blue Mountains of Washington and Oregon for the minimum diameter of nesting trees. Black-capped chickadees (*Poecile atricapillus*) and mountain chickadees (*Poecile gambeli*) were reported using snags as small as 4 inches diameter at breast height (DBH). Downy woodpeckers used snags as small as 6 inches DBH. Yellow-bellied sapsuckers (*Sphyrapicus varius*), hairy woodpeckers, and yellow pine chipmunks (*Tamias amoenus*) used snags as small as 10 inches DBH. American kestrels (*Falco sparverius*) and western screech owls used snags as small as 12 inches DBH. Additional studies concur with these findings and, furthermore, suggest that there may be a preferred diameter, as not all species use or select larger snags. For example, sites selected by hairy woodpeckers average 10 inches DBH (Conner et al. 1975); downy woodpecker nest trees average 12.5 inches DBH (Conner et al. 1975); red-naped sapsuckers prefer snags between 10 and 13 inches DBH in British Columbia (Harestad and Keisker 1989); red-breasted nuthatches selected snags between 8 and 14 inches and averaged 10.23 inches DBH (Harestad and Keisker 1989); western bluebirds (*Sialia mexicana*), in Idaho, averaged 13.7 inches DBH (Saab et al. 2002); black-capped chickadee nest in trees averaging 10.4 inches DBH (Hill and Lein 1989); and western screech owls select snags starting at larger than 10 inches (Cannings et al. 2017).

Some species select the very largest snags for nesting. For example, the white-headed woodpecker selected snags 25.5 inches DBH in the Sierra Nevada and central Oregon (Raphael and White 1984, Dixon 1995a) and 31.5 inches DBH in southcentral Oregon (Dixon 1995b). Thomas (1979) reported minimum sizes of bufflehead ducks and common mergansers as 15 inches DBH and wood duck and common goldeneye at 20 inches DBH. The study by Thomas (1979) listed wildlife species also known to occur on the Nez Perce-Clearwater as requiring snags and broken-topped live trees with a minimum DBH of 20 inches for nesting or denning. These wildlife species include the pileated woodpecker, barred owl, fisher, and Vaux's swift (*Chaetura vauxi*). Of the species requiring trees greater than 20 inches DBH, only one, the pileated woodpecker, is a primary excavator. Bate (1995) studied the effects of forest vegetation characteristics on woodpeckers in the warm-dry forests of central Oregon. Bate (1995) found that woodpecker density increased as the density of large, live trees greater than 20 inches DBH and hard snags greater than 10 inches DBH increased, excluding lodgepole pine; however, Bate (1995) was not able to detect a threshold where woodpecker abundance dramatically changed. As a result, Bate (1995) did not recommend a minimum number of live trees or snags per acre to support woodpeckers. Although minimum snag diameters are known for many species, there may be a high level of uncertainty with respect to minimum snag densities.

There appears to be a selection towards preferred tree species, which differs by wildlife species. Heartwood decay was the most important factor in nest tree selection by primary cavity-nesting birds in the Interior Douglas-fir Biogeoclimatic Zone of British Columbia. Therefore, a variety of species, sizes, densities, and conditions of snags is needed to provide for the needs of the wide variety of wildlife species that use them.

Tree decay is an important ecological process affecting wildlife habitat. Once begun, the decay process can take hundreds of years as a tree dies, falls to the ground, and decomposes into the forest floor. As it decays, the tree supports many different wildlife groups that use it for foraging substrate, for nesting, and for shelter (Bull et al. 1997). Bull (1997) identified qualitative and quantitative information on five distinct structures—living trees with decay, such as internal decay; hollow trees; trees with brooms, or misshapen branches; dead trees, referred to as snags; and downed wood, or logs. Living trees with an internal core or pockets of decay, top dieback, broken tops, or wounds all can serve as wildlife habitat.

With a few exceptions, studies of cavity nesting birds have shown that the abundance of snags correlates with the abundance and presence of these birds (Thomas 1979, Tobalske et al. 1991, Newton 1994, Hagar et al. 1996, Hitchcox 1996, Saab 1996). Tree cavities have been demonstrated to be the limiting factor for many cavity nesting birds, particularly in secondary cavity nesters (Newton 1994). Similarly, several studies show that use by cavity nesting birds diminishes or ceases when snags are not retained during timber management; however, use is maintained when snags are retained during timber harvest activities.

Downed Wood

Downed wood is derived from snags, as well as from live trees or parts of trees that fall to the ground. This material provides habitat structures for a variety of wildlife species, plant species, and invertebrates. Downed wood also contributes to important ecosystem functions, such as nutrient cycling, moisture retention, microsites for tree regeneration, and substrate for soil microorganisms. Long, larger diameter pieces of downed wood are more valuable because they can be used by a greater range of species, provide a stable and persistent structure, and provide better protection from weather extremes. Downed wood is highly variable in the amount, size, species, and stages of decay, due in part to the irregular distribution of disturbances which create snags and add dead wood to the landscape. Recent fires and the mountain pine beetle have increased the number of snags in many areas. As these snags fall, there will be a period when downed wood is elevated in these areas. Decomposition will reduce this component over time. In some cases, wildfire reburns previously burned areas, which reduces the presence of snags.

Snags and dead wood play an important role in protecting the soil, enhancing soil development, and maintaining soil productivity over the long-term. Although all dead wood has value, large downed wood, or “coarse woody debris,” is of particular importance. Downed wood provides hiding cover, forage, refuge from desiccation, and shelter. For many of the species in the substrate species group, it is the primary habitat feature these species require. Larger sized coarse woody debris is more persistent and of greater value to these species. Downed trees with heart rot provide denning habitats for some of these species.

Benefits to People

Some snags provide a direct economic benefit to people when they are removed and used. This may occur with commercial timber sales and salvage projects or when dead trees are removed as wood for fuel under firewood permits. Snags and downed wood retained on the landscape are not specifically listed as key ecosystem services. However, these components also indirectly provide benefits to people. Snags and downed wood provide both terrestrial and aquatic wildlife habitat and create opportunities for wildlife interactions that people value, including, but not limited to, bird viewing and fishing. Dead wood contributes to watershed function and helps contribute to other key ecosystem services, such as clean air and water. Dead wood contributes to site productivity, which in turn supports desired vegetation that may be used for products, such as timber, as well as contribute to the intrinsic enjoyment of the natural landscape. In addition, plan components that describe the appropriate levels of dead wood are important to potential impacts of fires to at-risk values, which include private property, as well as other values that people possess, such as a desire to recreate in green forests.

Threats and Stressors to Snag Habitats

Studies in the Pacific Northwest show snag abundances are lower in areas of timber management and areas with more human access than areas with less or no timber harvest (Wisdom and Bate 2008). Wisdom and Bate (2008) showed stands with no history of timber harvest had three times the density of snags as stands selectively harvested and 19 times the density as stands having undergone complete harvest. Stands not adjacent to roads had almost three times the density of snags as stands adjacent to roads.

Permitted firewood harvest is responsible for the lower amounts of snags adjacent to roads. The preference for firewood differs by tree species, as those with higher British thermal units (Btu) are preferred over those with lower Btu. Desired species with higher Btu include, in descending order, larch, Douglas-fir, lodgepole pine, and Ponderosa pine. Other species are less desirable as firewood. Firewood harvest is also more acute on the uphill side of roads than on the downhill side as most people avoid moving firewood uphill. Firewood gathering is facilitated by road access and firewood collection usually does not occur very far from road access. Therefore, snags may not be as available for wildlife near roads. The desired condition FW-DC-SFP-02 addresses this service to the public. Higher snag densities are expected farther from roads as a result.

Existing Condition and Trends

The source of data for existing snags and woody debris are statistically based measurements collected on spatially balanced Forest Inventory and Analysis (FIA) plots. The work of Bollenbacher et al. (2009) is the best available science for describing the conditions of snags in the Forest Service Northern Region. This work provides snag quantity and distribution estimates for all national forests in northern Idaho by snag analysis groups and size classes. The data used for analysis represents the latest available. The effects of more recent disturbances, including the fires of 2017, are not portrayed by this data.

Bollenbacher et al. (2009) provided an estimate of the number of snags currently existing throughout the forested portion of the Nez Perce-Clearwater from FIA data. The analysis compared the number of snags presently occurring in wilderness and roadless areas versus outside wilderness and roadless areas. Bollenbacher (2009) found that there was no statistical difference between the numbers of snags in designated wilderness and managed forests in northern Idaho. In other words, the number of snags outside of wilderness and roadless areas, which represents natural snag abundance, is not very different than the number of snags outside of wilderness and roadless areas. The snag densities within wilderness and roadless areas provide insight into natural snag abundance and distribution, and this can be compared to areas outside of wilderness and roadless areas (Bollenbacher et al. 2009a).

Snags are usually irregularly distributed and often occur in clumps or patches (Bollenbacher et al. 2009a). They can be ephemeral or persist for long periods of time depending upon the tree species, cause of death, decay stage, and site conditions. Snags created because of fire are ephemeral. Bollenbacher et al. (2009) found that, in north Idaho, many FIA plots do not have snags present. However, some trends were apparent. As seral stage increased, the percent of plots and number of snags increased. Dry forests had fewer snags, while low and mid moist elevation and subalpine systems had a higher percentage with snags. Larger snags were less common than smaller snags (Bollenbacher et al. 2009a). Large snags tend to occur in the cool moist broad potential vegetation group. While snags are often reported with statistics, such as average number of snags per acre, it should be recognized that, because many areas do not have snags, areas with snags can have much higher numbers than the average.

The analysis area for snags is forestwide by snag analysis group. Snag analysis groups are consistent with Forest Service Northern Region broad potential vegetation type (PVT) groups, except that areas dominated by lodgepole pine are addressed separately. This is important for the snag analysis because lodgepole pine is relatively short lived, generally smaller in diameter than other species, and subject to stand replacing disturbances, which result in unique snag conditions and dynamics. Downed woody debris is analyzed using broad PVT groups to be consistent with the best available information to inform the desired condition.

In areas dominated by lodgepole pine, early seral stands have the most snags due to a greater proportion of stand-replacing fires and species intolerance to fire. The warm dry broad PVT group has fewer snags with a more even distribution into later seral stages because of a more frequent, low severity fire regime. All broad PVT groups show fewer mid-seral stage snags as snags transition to downed wood. Snags occur in a clumpy manner. The larger the snag, the less common it is in all groups. This is due to: 1) fewer trees living to an old age; 2) as trees age, they grow slower, never reaching large diameters; and 3) the inability of systems to contain large old trees and snags due to various types of disturbances (Bollenbacher et al. 2009a).

The creation and persistence of snags applies at a temporal scale, as well. Snag recruitment is dependent on the pattern and frequency of fire, disease, insects, and other disturbances, including human activities, as well as variation in forest composition and size classes. High snag densities, or "pulses," are often the result of high severity wildfires or insect outbreaks, which vary widely in time and space. Low densities of snags also occur under natural disturbance regimes, such as where low severity fires occur frequently, where fire has been excluded, and in areas with greater human access where snags can be removed through activities such as firewood cutting.

The trends and distribution of snags in the plan area is probably departed from historic conditions in a few important ways. First, snag abundance in some areas was probably reduced through intensive timber management through the 1980s and snag retention guidelines were incorporated into the 1987 plans. Timber management since that time has retained some snags during harvest according to plan direction. Through a combination of fire exclusion and timber management practices, Nez Perce-Clearwater tree species composition and dominance types were converted from fire tolerant species to fire intolerant species, as reported in the 2014 Forest Plan Assessment (U.S. Department of Agriculture 2014k). With that change, there was a proportionate change in the way snags are formed and which species provide snags. Naturally higher abundances of dominance types result in more snags from those species. In the plan area, increases in grand fir and redcedar have also likely increased the proportion of those snag species. Large white pine snags have virtually disappeared from the landscape because of blister rust. At higher elevations, there are probably more Engelmann spruce and subalpine fir snags because these species have dominated some former lodgepole pine dominance types. Larch, hardwood species, and Ponderosa pine dominance types have decreased and resulted in fewer snags of those species.

Shifts in species composition comes with differences in disease susceptibility. For example, root rot affects grand fir and Douglas-fir forest more than other species, resulting in potentially more snags of these types than occurred historically. Across the west, large outbreaks of insects have produced abundant snags. Bark beetles have attacked pine and spruce budworm has attacked Engelmann spruce. These outbreaks have resulted in abundant snags in some forest types. These snags may not have the heart rot sought by many species. There has been a recent uptick in fire activity in the plan area with more fires creating large areas of dead trees (U.S. Department of Agriculture 2014a), however the amount and intensity is consistent with historical observations of amount and intensity (see fire management section above). Overall, more snags are present in older age classes (Bollenbacher et al. 2009a) and the large amounts of mid seral size classes likely result in more abundant medium sized snags than historically available.

The Forest Inventory and Analysis data query results are presented in Table 167. Numbers of each size class are similar when compared across management areas by size class.

Table 167. Number of snags by size class and management area (MA)

Broad Potential Vegetation Type (PVT)	MA 1 Snags >10"	MA 1 Snags >15"	MA 1 Snags >20"	MA 2 Snags >10"	MA 2 Snags >15"	MA 2 Snags >20"	MA 3 Snags >10"	MA 3 Snags >15"	MA 3 Snags >20"
Cold PVT	16	4	1	16	4	1	19	1	0
Cool Moist PVT	20	7	1	16	5	2	16	4	2
Warm Moist PVT	22	7	2	13	8	5	11	5	2
Warm Dry PVT	9	5	2	15	5	1	17	6	3

Since the implementation of PACFISH and INFISH, riparian zones have been protected from disturbance including snag removal so there has likely been a maintained or increasing trend in snags within riparian areas. More information is needed to understand the implications of these departures for wildlife.

Snag and Downed Wood by Alternative

Alternative Z would provide more snags and coarse woody debris when conducting vegetation management. Some species, especially those that select smaller snags, would benefit more from this direction. Alternative Z would maintain these species' presence better after vegetation management. This would better promote the diversity and abundance of wildlife after timber management by ensuring that snags and downed wood are present. Snags and downed wood are particularly important for 145 species, or approximately 39 percent, of all species present on the Nez Perce-Clearwater. This alternative would better provide for those species that select or require smaller snags after timber harvest. This includes a broad variety of smaller species, such as red-breasted nuthatches, black-capped chickadees, mountain chickadees, red-naped sapsuckers, hairy woodpeckers, yellow-bellied sapsuckers, American kestrels, western screech owls, yellow pine chipmunks, and many more, especially for the species that select for smaller snags. Downed wood greater than 10 inches diameter at breast height (DBH) is sufficient for many species that use downed wood as a key habitat feature. All alternatives have coarse woody debris retention guidelines that require retention of 3 inches DBH or greater. While larger coarse woody debris would be better for wildlife, this would provide some features for species that use substrate habitats under rocks, downed wood, or debris. While the minimum is 3 inches DBH, nothing in the plan would prevent retention of larger diameter coarse woody debris.

Plan Direction

The scale of the analysis and plan components related to snags and coarse woody debris is forestwide by broad potential vegetation type. The key indicators used in this analysis include:

- Snags per acre by size class—medium 10 to 14.9 inch, large 15 to 19.9 inch, and very large 20 inch plus
- Snag distribution—percent of area that has snags by size class
- Tons per acre coarse woody debris greater than 3-inch diameter

All alternatives contain plan components that require retention of snags during vegetation treatments. The action alternatives address this through a guideline that expresses minimum snag numbers or replacement trees to be left across the project areas with values that are based on the best available science relevant to the plan area (Bollenbacher et al. 2009a). The No Action Alternative also provides snag retention standards. Snags currently present in wilderness and roadless areas provide the basis for the desired condition because they reflect a more natural condition because human management is limited, although fire suppression has occurred. At least 50 years of active wildfire management has been contributing to these more natural conditions in Management Areas 7, 10, 12 through 15, 17, and 19 through 23.

Desired conditions for snags are shown in the Forestlands section and are designed to reflect the conditions that occur as averages reported by Bollenbacher et al. (2009). Desired conditions for each broad potential vegetation type (PVT) group contain a description that snags and living remnant trees are present in all age classes for wildlife habitat and future snag retention. The plan also has desired conditions about the distribution of snags. Management direction in the Idaho Roadless Rule restricts timber production, and timber harvest is allowed for restoration only. Wildland fire might be the most prevalent tool to achieve restoration in Management Area 2, which should retain snags naturally.

In addition to guidelines specific to snags, guidelines for broad PVTs that describe within stand conditions define a desired condition to have live legacy trees persist into the next generation, even in smaller age classes. This condition would recruit more large snags and coarse woody debris over time because some of these legacy trees would die and become snags and then later fall to provide coarse woody debris. Similarly, desired conditions and associated guidelines for old growth would provide habitat conditions in some areas of the Nez Perce-Clearwater to promote larger snags. See Sections 2.1.3.4 and 2.1.6 of the Land Management Plan for plan components that pertain to snags.

Plan guidelines require minimum snag densities under all alternatives but differ by the size of snags required to retain. Alternatives W, X, and Y would require snags be retained from 15 inches with some proportion of those snags being greater than 20 inches diameter at breast height (DBH) and larger. Alternative Z, in addition to requirements in other alternatives, requires retention of snags 10 inches DBH and larger, with some proportion of those snags required to be 15 inches and larger and some 20 inches and larger. Under Alternative Z, the number of snags would be from between 2.5 to 14, depending upon PVT. The preferred is the same as Alternatives W, X, and Y. See MA2 and MA3-GDL-FOR-05 for snag guidelines, depending upon PVT. All alternatives require these snags be retained at the project scale but not necessarily within harvest units. The numbers for snags in the guideline are based upon the average number of snags reported by broad PVT in northern Idaho per Bollenbacher et al. (2009). These numbers are scaled up from Bollenbacher et al. (2009) so that they are represented as number of snags per 100 acres to give flexibility in distribution and grouping at the project level.

The desired condition for downed wood is to maintain the amounts that contribute to forest structural diversity, soil ecological function, and habitat, focusing on coarse woody debris because larger downed wood is more valuable to ecosystem function than smaller debris. Coarse woody debris is defined as pieces that are 3 inches in diameter and greater based on the best available information to describe natural and desired conditions (Brown et al. 2003). The plan contains guidelines for the amounts of coarse woody debris to be retained during timber harvest. See Section 2.1.3.4 of the Land Management Plan for coarse woody debris plan components.

Modeling Results

Snags and downed wood were modeled to estimate the trend in snag abundances under the Land Management Plan (Ecosystem Research Group 2021). The presence of large (15-inch DBH) and very large (greater than 20-inch DBH) trees largely predict the current and future potential availability of large snags and coarse, woody debris. The effects of canopy cover classes greater than 15 percent were not modeled for the following reason: high canopy cover (that is, greater than 70 percent) in combination with large or very large trees suggests that given stands will potentially produce higher future levels of snags or coarse, woody debris than low canopy cover classes (that is, 15 to 40 percent). Existing high levels of snags or coarse, woody debris, however, are more likely to occur in stands that have experienced disturbances and as a result have low canopy closure. To avoid confusion between future and existing levels of snags and coarse, woody debris potential, the query is limited to future potential based on the presence of large and very large trees:

- A2, warm and dry
- B1, warm and dry
- B2, warm and dry
- C1A, warm and dry
- C1B, warm and dry
- C2, warm and moist
- C3, warm and moist
- D1, warm and moist
- E1, warm and moist
- D3, cool and moist
- E2, cool and moist
- F1, cool and moist
- F2, cool and moist
- G1, cold
- G2, cold
- Tree size class
- Greater than 15-inch DBH
    - ♦ 15–19.9-inch DBH
    - ♦ greater than or equal to 20-inch DBH
    - ♦ Canopy cover
- Greater than 15 percent:
    - ♦ 15-39.9 percent
    - ♦ 40–69.9 percent
    - ♦ 70–100 percent

Analyses were based on the following assumptions: The SIMPPLLE model is dependent upon stand-level data (Northern Region VMap) and thus is unable to incorporate snag densities. The query design uses Forest Inventory and Analysis (FIA) data to identify the range of large snags per acre in the greater than 15-inch DBH size class within stands greater than15-inch DBH. The query also uses FIA data to identify the range of coarse woody debris tonnage per acre within stands greater than15-inch DBH.

The following snag summary tables were generated from the Northern Region Hybrid 2015 FIA data set. Table 168 shows the number of snags per acre by diameter class for each broad potential vegetation type (PVT) group. Table 169 lists the snags per acre by broad PVT group within each management area.

Table 168. Trees per acre (TPA) by diameter class and broad potential vegetation type (PVT) group

Northern Region Broad PVT Group	TPA Snags ≥ 10" DBH	TPA Snags ≥ 15" DBH	TPA Snags ≥ 20" DBH
Cold	24	4	1
Cool Moist	23	7	2
Warm Dry	15	5	2
Warm Moist	16	9	4

Table 169. Snags per acre by diameter class and broad potential vegetation type (PVT) group within each management area (MA)

Northern Region Broad PVT group	MA 1 Snags ≥10"	MA 1 Snags ≥15"	MA 1 Snags ≥20"	MA 2 Snags ≥10"	MA 2 Snags ≥15"	MA 2 Snags ≥20"	MA 3 Snags ≥10"	MA 3 Snags ≥15"	MA 3 Snags ≥20"
Cold	21	4	1	29	5	1	27	1	0
Cool Moist	22	8	2	24	7	2	21	6	2
Warm Dry	11	6	3	15	5	2	17	5	2

Northern Region Broad PVT group	MA 1 Snags ≥10”	MA 1 Snags ≥15”	MA 1 Snags ≥20”	MA 2 Snags ≥10”	MA 2 Snags ≥15”	MA 2 Snags ≥20”	MA 3 Snags ≥10”	MA 3 Snags ≥15”	MA 3 Snags ≥20”
Warm Moist	19	6	1	19	11	6	13	8	4

Table 170 and Table 171 were developed from the Northern Region Hybrid 2015 FIA data set and provide a comparison of existing quantities of coarse woody debris with desired conditions.

Table 170. Forestwide coarse woody debris estimates by broad potential vegetation type group

Potential Vegetation Type	Forestwide Existing Condition (tons/acre)	Forestwide Desired Condition (tons/acre)
Warm Dry	10	7–15
Warm Moist	17	17–33
Cool Moist	13	9–18
Cold	9	7–24

Table 171. Coarse woody debris estimates for Management Area 2 and Management Area 3 by broad potential vegetation type group

Management Area 2 Potential Vegetation Type	Management Area 2 Forestwide Existing Condition (tons/acre)	Management Area 2 Forestwide Desired Condition (tons/acre)
Warm Dry	8	7-15
Warm Moist	14	17-33
Cool Moist	11	9-18
Cold	10	7-24

Management Area 3 Potential Vegetation Type	Management Area 3 Forestwide Existing Condition (tons/acre)	Management Area 3 Forestwide Desired Condition (tons/acre)
Warm Dry	13	7-15
Warm Moist	19	17-33
Cool Moist	17	9-18
Cold	13	7-24

Habitat for snag dependent species is available at both ends of stand succession, including late succession mature forest and early succession grass and forb and shrub and seedling communities. The vegetation data for this analysis is based on Northern Region VMap data, which cannot detect snag densities. Forest Inventory and Analysis data indicates late seral forests typically contain high densities of snags. Therefore, this analysis compares late succession forest acres by alternative, management area, and timestep as a surrogate for snag habitat. Because of this, the analysis ignores snags in early seral forest habitat, including snags left after high severity wildfires and insect outbreaks or snags and reserve trees retained following logging operations.

The following three figures (Figure 57, Figure 58, and Figure 59) compare percentages of snag dependent habitat by management area, alternative, and timestep. Only large and very large trees are considered for this query. According to the SIMPPLLE model, snag densities decline in Management Area 3 below natural range of variation (NRV) in the Preferred Alternative, and alternatives W, X, and Y. They remain above NRV in the No Action Alternative and Alternative Z. The Preferred Alternative shows snags decline from approximately 50 percent down to approximately 28 percent. Snag levels remain relatively stable within Management Area 2 and remain within NRV ranges. Snags increase in Management Area 1 over the five-decade period but remain below NRV.

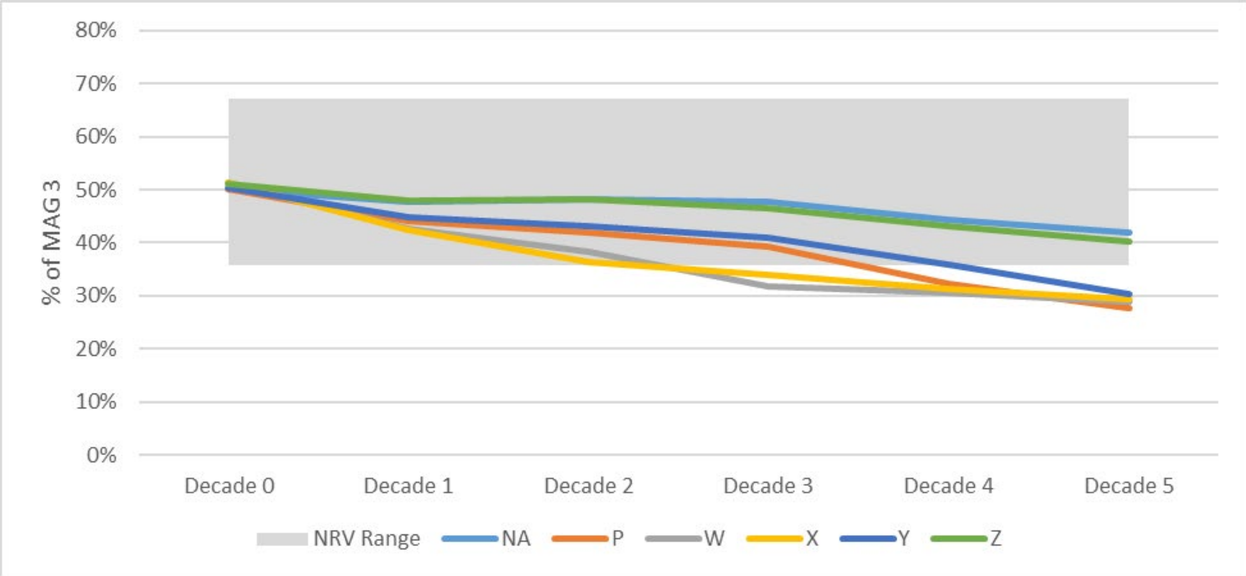


Figure 57. Snag dependent habitat by alternative and decade for Management Area 3

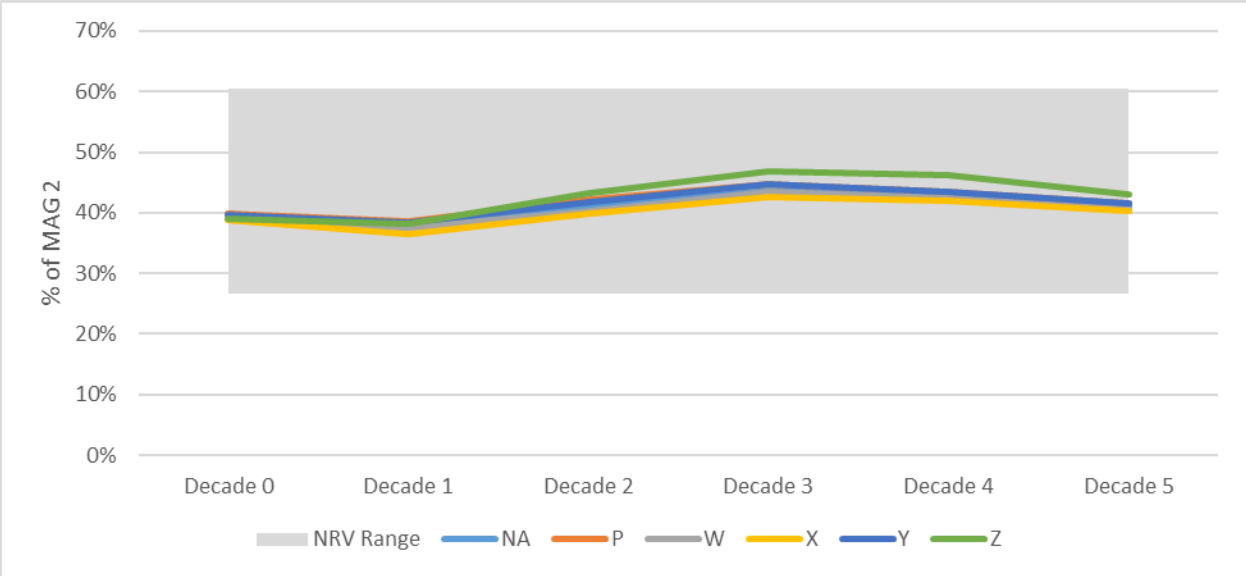


Figure 58. Snag dependent habitat by alternative and decade for Inventory Roadless areas

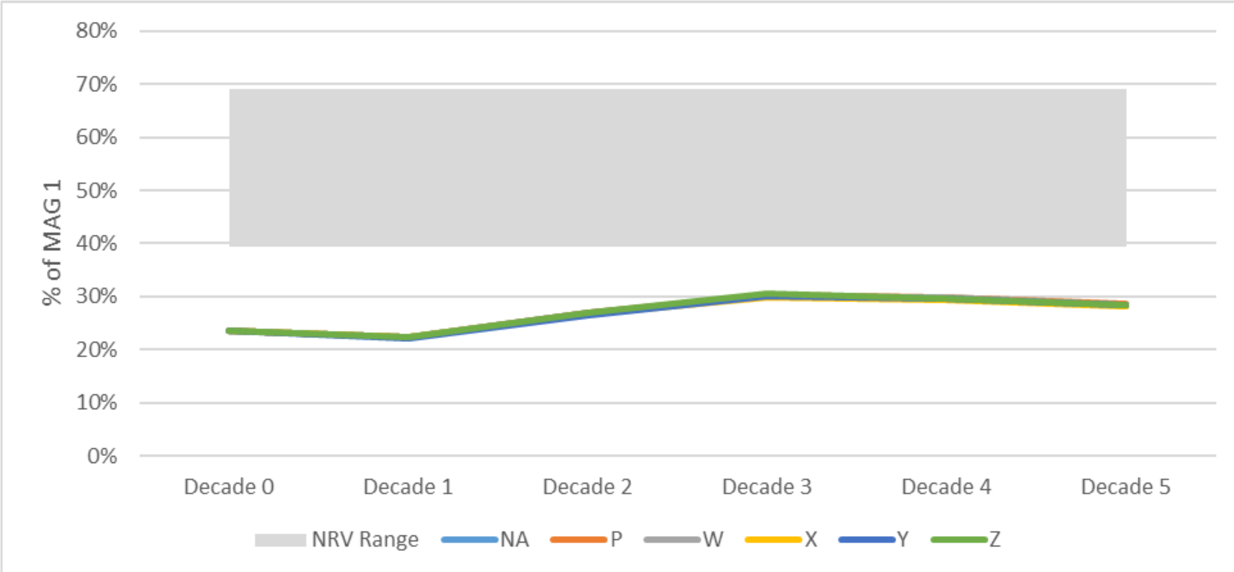


Figure 59. Snag dependent habitat by alternative and decade for wilderness areas

The Forest Inventory and Analysis (FIA) data suggests the SIMPPLLE-modeled outputs are conservative. As Table 172 suggests, snag densities based on the FIA summary data are relatively high. This result is not surprising, given the recent increase in insect outbreaks, wildfires, and root disease on the Nez Perce-Clearwater, which has resulted in tree mortality. The SIMPPLLE model concludes that the availability of medium, large, and very large size classes across all potential vegetation types (PVTs) will remain relatively stable over five decades. Snag densities in medium, large, and very large sized stands should persist at relatively high levels, based on the FIA data. Snags available following high severity wildfires and prescribed fire, and snags retained following logging operations via Forest Plan components are ignored in this analysis. The distribution of large and very large tree size classes remains substantial over five decades. FIA data show conclusively that snags are abundant within those size classes. In addition, increasing levels of wildfire and ecosystem management burns will recruit snags forestwide.

Table 172. Percent snags per acre in Forest Inventory and Analysis plots in stands greater than 15-inch diameter at breast heigh (Source: Forest Inventory and Analysis Data)

Snags per Acre	% Snags >10"	% Snags >15"	% Snags >20"
0	23.65%	35.27%	54.77%
1-11	30.29%	38.17%	34.02%
11-21	24.07%	16.18%	9.96%
21-31	14.11%	8.30%	1.24%
31-41	3.32%	1.24%	-
41-51	2.90%	0.83%	-
52+	1.66%	-	-

Effects Common to All Alternatives

Snags and downed wood are dependent on the pattern of natural and human disturbances. Under all alternatives, snag and downed wood conditions would be dynamic, highly variable, and unevenly distributed across time and space. Dead wood would be created by fire, insect, disease, and successional processes. Decomposition and fire are the primary ecological processes that remove dead wood from the ecosystem in Idaho Roadless Rule areas and wilderness areas, which make up the majority of the Nez

Perce-Clearwater. In all alternatives, most National Forest System lands are in areas where human management is limited, and natural ecological processes and disturbances would be the primary ecosystem drivers affecting snag and downed wood.

Natural disturbances, such as wildfire, are projected to occur at a similar degree in all alternatives and are the predominant disturbance, as indicated by the SIMPPLLE modeling. These disturbances influence the abundance, distribution, and condition of snags and coarse woody debris. The highest amounts of dead wood would be present where fire or insect and disease outbreaks occur or in stands of larger size classes. Snags would fall to the ground to become part of the downed wood component where they decompose and eventually become part of the soil. Wildfires can have a wide range of effects by creating snags, especially of smaller size classes, and causing some snags to fall and be consumed. Similarly, the effects to coarse woody debris can be variable, as fires may consume material on the forest floor and create snags and future downed wood. Meanwhile, insect infestations create snags, often of large size classes, and contribute to future large woody debris.

Recent fire, root rot, and insect outbreaks on the Nez Perce-Clearwater have created snag pulses which are converted to downed woody material. Regardless of the selected alternative, snags would be abundant in the short-term. In the long-term, this pulse of snags will be lost to natural attrition and the material will accumulate on the forest floor as woody debris. The timing of when dead trees fall varies by species, the cause of mortality, and site conditions. Studies suggest that the range of when most trees fall is usually between 3 and 15 years after death (Lyon 1977, Mitchell and Preisler 1998, Graham and Jain 2007, Wisdom and Bate 2008, Bollenbacher et al. 2009a). Any factor that increases tree mortality will also increase snags. This includes the effects of a changing climate on tree stress, wildfires, and insects.

To some degree, fire exclusion would continue to affect the landscape under all alternatives, due in part to continued fire suppression activities. Fire exclusion can limit snag creation in areas that would otherwise have burned. Conversely, over the long-term, fire exclusion can increase fuel loadings and stand densities that predispose areas to large stand-replacing events that create snag pulses. The creation of large and very large snags is dependent upon the development of large live trees. Large snags are not abundant because tree growth is often disease limited on the Nez Perce-Clearwater. Further, high stand densities that may develop due to fire suppression or other factors limit the potential for individual large tree growth. Homogenous landscapes yield snag pulses followed by periods with few snags. Because of pulse events, snags may not always be well-distributed spatially or temporally. Nevertheless, the snags and downed woody debris within the Nez Perce-Clearwater should be sufficient to provide for wildlife under all alternatives, though Alternative Z would provide more snags and coarse woody debris when conducting vegetation management. Some species, especially those that select smaller snags, would benefit more from this direction. Alternative Z would maintain the presence of these species better after vegetation management.

Lands where active vegetation management would occur, such as lands suitable for timber production, cover the same amount of the Nez Perce-Clearwater under all alternatives. The amount of land within Management Area 3 varies only a little under the alternatives. Many of the forests in areas suitable for timber production and within wildland urban interface areas would be managed to maintain vigorous trees and limit losses due to insects, disease, and fire where possible. This would tend to result in less tree mortality and a potentially lower density of snags and downed wood over time, as compared to areas less influenced by human actions. On the other hand, active vegetation management provides the opportunity to manage for species and larger size classes that would contribute to larger snags and downed wood. Lower amounts of snags and downed wood would tend to occur in developed sites, in areas where concern for fire hazard is elevated, and in areas closer to communities and accessible to firewood cutting.

All alternatives have standards and guidelines that direct management of snags and downed wood in timber project areas. These are designed to address the unequal distribution of snags and downed wood across the Nez Perce-Clearwater that may be the result of timber management and supports the active role that is more likely to be needed to achieve desired conditions within actively managed landscapes. Plan components for all alternatives require a normalized average of snags per acre that applies to the amounts of snags greater than 15 inches and greater than 20 inches DBH. These are required to be retained in the project area but not necessarily within the harvest units. If managers choose not to retain snags in the harvest units, some treated areas will not have snags after treatment. Plan components for Alternative Z require an additional number of snags greater than 10 inches DBH.

All management areas and broad potential vegetation type groups (PVTs) currently meet the desired conditions for the minimum number of snags per acre except the cold PVT group in Management Area 3. This is likely due to the combination of species composition and growth rates associated with the cold potential vegetation type group.

Broad-leaved Habitats

Broad-leaved forests, also called deciduous forests, are important contributors of wildlife diversity. Within the plan area, 11 species are grouped into species that seek or require broad-leaved forests as a key characteristic of their habitat. Numerous bird species use riparian and deciduous forests even though these habitats make up a very small percent of all land area in the Northern Region (Hutto and Young 1999). Species specializing in or requiring deciduous forests include the American redstart, Bullock's oriole, red-eyed vireo, downy woodpecker, western screech owl, and ruffed grouse. Some of these species are only found in deciduous forests and riparian areas. Many other wildlife species can be found in broad-leaved or deciduous forests, as well as coniferous forests. For example, many of the riparian species and those in the open and closed forest grouping can be found in deciduous forests. Habitat descriptions for 12 forest generalists, 10 open forest species, and 12 closed forest species specifically mention deciduous or mixed forests as used habitats; however, these species are more tied to the density or structure of forests rather than forest type. In addition, several bat species preferentially roost in hardwood trees, including the little brown bat (*Myotis lucifugus*) and the silver-haired bat (*Lasionycteris noctivagans*). Mammals, such as the fisher, black bear, flying squirrel, and red squirrel, are known to nest, den, or rest in very large cottonwood trees where available (Bunnell et al. 2002).

Although deciduous trees usually make up less than 10 percent of forest cover in western forests, they are highly preferred as nesting and foraging sites for birds, insectivorous mammals, and amphibians and as a preferred substrate for many invertebrates (Bunnell et al. 2002). In seven of nine Pacific Northwest studies compiled by Bunnell et al. (2002), upland hardwood communities had significantly greater bird species' richness than upland conifer communities, especially those forest communities containing quaking aspen or cottonwood trees.

Deciduous forests are uncommon to rare in the plan area because the landscape is so dominated by coniferous forests. From the Forests Vegetation geospatial layer of the VMap data, the amount of deciduous vegetation dominance types identified as hardwood mix occur on about 2,180 acres, which is less than 1 percent of the Nez Perce-Clearwater. The average size of the stands dominated by hardwood mix types are about 3.8 acres and the largest stand is about 16 acres. These stands are distributed along the Lochsa, Selway, and Salmon rivers and tributaries; Rapid River and other tributaries in the Island portion of the Nez Perce-Clearwater; the Lower Southfork of the Clearwater; and limited areas of the Potlatch Ranger District. Species of broad-leaved or hardwood forests include aspen, paper birch, red alder, and black cottonwood.

The Forest Inventory and Analysis (FIA) data suggests deciduous trees occur in riparian as well as upland areas. Deciduous trees rarely dominate on the Nez Perce-Clearwater. According to the FIA data, the hardwood tree dominance type covers a low percent of the Nez Perce-Clearwater. These are areas where aspen, cottonwood, red alder, or paper birch are the dominant species, though there may be conifer trees present as well. More commonly, they do not dominate but are present as components of coniferous forest types, usually as a minor component of conifer-dominated forests. Aspen is estimated at less than 1 percent, paper birch is present on an estimated 1 percent, and black cottonwood is present on an estimated 2 percent of the Nez Perce-Clearwater, according to the FIA data. Paper birch is estimated to be present on between 1 to 5 percent of the Nez Perce-Clearwater. To sustain hardwood tree communities, Bunnell et al. (2002) recommend encouraging upland patches of hardwoods, avoiding the conversion of riparian areas to conifer communities, and controlling domestic grazing in riparian areas.

Given their rarity on the Nez Perce-Clearwater and the fact that they support higher biodiversity among the vegetation types, deciduous forests contribute disproportionately to wildlife species diversity. Examples of key ecosystem characteristics for many species associated with this habitat include soft, decayed, or hollow trunks with heart rot, fruit production, and branching structure that provides nesting sites. Paper birch is known for loose bark that provides shelter, as well as sap and catkins that provide food. For some species, the key ecological attribute identified is deciduous vegetation itself.

In the mountainous west, hardwood tree communities are disturbance dependent. The 2014 Forest Plan Assessment did not evaluate deciduous forests or evaluate departures for these species. However, since they are dependent upon disturbance, it could reasonably be assumed that they probably occurred over a larger extent and were more commonly components of stands during pre-Columbian times than they are presently due to fire suppression and lack of disturbance. Some forestry practices probably give competitive advantages to conifer species. Planting coniferous species and spraying herbicide after timber harvest might provide an advantage for coniferous species over deciduous species. More impactful are factors such as fire suppression and lack of disturbance in riparian areas.

Aspen historically relies on fire or disease to remove the overstory, kill encroaching conifers, and stimulate suckers from the existing clone root system (Shepperd 1990a). Without periodic self-regeneration, aspen stands become decadent and deteriorate as root systems decline; mature clones can also decline due to repeated animal herbivory (Shepperd 1990a). Aspen may coexist with conifers for decades after a disturbance, but aspen gradually declines as conifers become more numerous and denser and are replaced by conifer forest.

On the Nez Perce-Clearwater, cottonwood is confined to riparian areas with fluctuating water tables and is more common on private lands outside of the national forest boundary. While present in limited areas, it is poorly represented by available data. It is desirable to maintain and promote this species where it exists, but no quantitative desired condition was developed because it is absent from available data sources in all management areas.

Forestwide, the natural range of variation (NRV) analysis indicates that the aspen and hardwood cover type is generally within its natural range for abundance, although it is at the low end or slightly below its natural range in all management areas. The modeling also indicated that aspen species distribution is below its natural abundance at the forestwide scale and in the warm dry and cool moist broad potential vegetation groups. Aspen is below the desired condition in all management areas. The desired condition ranges reflect a desired trend of maintaining and increasing aspen. The highest levels of aspen correlated with past warm and dry climate periods.

Between Draft and Final Environmental Impact Statements, the plan components for riparian areas and broad-leaved habitats in FW-DC-TE-05 and FW-OBJ-TE-01 were adjusted to restore hardwood species within riparian areas as found in the Terrestrial Ecosystems section of the Land Management Plan. The plan also includes FW-OBJ-RMZ-01 in the riparian management zones section of the plan, which also seeks to restore hardwoods within riparian areas. Additionally, FW-DC-GS-04 is a desired condition that describes riparian and hardwood habitats. These plan components are designed to provide for these habitat features. The plan also contains a desired condition and objectives to increase aspen forest types in the plan area. The objectives in the plan area for aspen vary by alternative with Alternative W restoring 925 acres, Alternative X restoring 1400 acres, Alternative Y restoring 550 acres, and Alternative Z restoring 275 acres annually. The Preferred Alternative seeks to restore 680 acres of aspen annually. Some have questioned whether these acres could be reasonably achieved given the low amounts of riparian and hardwood vegetation in the plan area. However, it should be realized that this could be achieved by restoring hardwood components as a component of stands in addition to increasing the dominance of these types. Additional disturbance, including increased wildland fire use, prescribed fire and timber harvest would promote hardwood presence in upland forest habitats.

Modeling Results

The Land Management Plan interdisciplinary team requested that the Ecosystem Research Group query the SIMPPLLE model for predictions on how deciduous forest would respond to the plan and alternatives. This was a challenge for the Ecosystem Research Group to accomplish because there are so few stands that are dominated by deciduous vegetation and most of these are smaller than the 5-acre pixel size that SIMPPLLE uses in simulations. The second challenge was that pathways for the responses of deciduous forest succession were not well developed in SIMPPLLE. Between the Draft and Final Environmental Impact Statements, the query was adjusted to better estimate the trends and outcomes of deciduous hardwoods. Since many deciduous shrublands and hardwood vegetation frequents riparian areas and are limited in the uplands, modeling to represent broad-leaved forests were combined in the riparian vegetation query in SIMPPLLE. Figure 56 shows the predicted outcome of riparian and hardwood vegetation.

Modeling did not identify a natural range of variation for these habitats, but it is assumed that they are at the low end of the NRV. Acres of riparian habitat in an early-successional condition would increase from wildfire disturbance and prescribed fires that is allowed to back into riparian areas in the model. The results under the alternatives are all similar in magnitude and trend with broad-leaved vegetation and early seral riparian vegetation increasing positively over time. These positive trends are positive for broad-leaved and riparian associated species. Some species that depend upon more mature forest conditions in riparian areas or forested wetlands will likely be adversely affected by disturbance in riparian habitats locally when these disturbances occur. However, mature riparian habitat appears to be abundant.

Closed Mature Forest Habitats

A total of 22 wildlife species were identified as being associated with mature closed canopy habitats and several other species also use mature closed forests. Examples of species that use closed mature forests include the brown creeper, Southern red-backed vole (*Myodes californicus*), fisher, Vaux's swift, white-breasted nuthatch, American marten, boreal owl, golden-crowned kinglet, varied thrush (*Ixoreus naevius*), pileated woodpecker, Swainson's thrush, blue-headed vireo (*Vireo solitarius*), and Cordilleran flycatcher (*Empidonax difficilis*). Few wildlife species in this group are thought to require old growth, but most are found to use a range from mid-seral and late seral to old forest. The species in this group can sometimes be found to use other habitats, but these species were grouped here because this is the best fit for their habitat description. This section is to address species that use closed mid seral to old forests. Like other habitat groups, other species are often found in closed mature and old forests as well. These include the species grouped as forest generalists, forest understory species, habitat generalists, broad-leaved or deciduous forests group, riparian habitat subgroup, and ecotone habitat groups.

Many of these species use multiple dominance forest types, while others are associated with dominance types typically found within certain broad potential vegetation types. Townsend's warbler and red-breasted nuthatch, for example, use many mature forest dominance types. Golden-crowned warbler (*Basileuterus culicivorus*) and boreal owls typically reside in cool moist and cold potential vegetation types (PVTs) in mature forests. Vaux's swift, varied thrush, and fishers typically occurs in warm moist or warm dry PVTs.

Key characteristics of mature closed canopy forests for wildlife include large live trees with periodic very large trees, increased amounts of snags, higher amounts downed wood, closed or connected canopies, higher amounts of fungi, a mix of tree species present, and a variety in vertical structure. Mast production from mast producing tree species is important for some species and larger mature trees produce more mast than younger trees. A disproportionate number of species in this habitat grouping use snags or downed wood as key habitat features. Of the species that were grouped into the closed mature forest type, 64 percent use or require snags, downed wood, or both. Of the total species in this group, 58 percent rely on snags and 32.2 percent rely on downed wood, while 25.8 percent rely on both snags and downed wood. Therefore, snags and downed wood are key habitat features of mature closed canopy forests. The southern red-backed vole is prey for several species and is highly dependent on higher amounts of coarse woody debris. While understory often declines with canopy closures, understory vegetation is important to some species. Mature forests that lack the features mentioned above may not function to provide for some of these species. A table showing the habitat groupings and a description of their habitats are found in Appendix C of this Final Environmental Impact Statement.

Many species in this group are insectivores, some are carnivores, and fewer are omnivores and herbivories. Thus, insect populations are important features of these habitats and are assumed to be present in these forest types. Properly functioning mature forest with the key characteristics mentioned above are assumed to provide these resources. Carnivores dependent upon prey species and properly functioning mature forest with the key characteristics mentioned above are assumed to provide prey populations. Key indicators for closed canopy mature forests include the amount and trend of closed canopy mature forests and the proportion of size classes. These were modeled in PRISM and SIMPPLLE models.

Existing Condition

Habitat conditions in the plan area are a result of changes in the disturbance patterns compared to pre-Columbian times and forestry practices since European settlement. Additional changes were made because of forest diseases that impacted white pine and whitebark pine. These changes have resulted in an increase in fire intolerant species and increases in density and older age class. Past timber practices that preferentially cut fire tolerant species and old growth and the susceptibility of fire intolerant tree species to diseases have resulted in less old forests. Therefore, while there is an overabundance of mature closed forest, the amount of old forest is lower than occurred under natural disturbance regimes.

Fire exclusion has resulted in higher canopy densities across all potential vegetation type (PVT) groups, which would otherwise have been maintained at more open densities by frequent low and mixed severity fire. Many forests on the cool moist sites also had low to medium density, which were likely forests in their early and mid-successional stages or older forests where disturbances removed trees and opened the canopy. In all types, the shift toward higher densities reflects the impacts of fire exclusion and the increased abundance of shade tolerant species. Low to medium density forests were at the higher end of their natural ranges during warm and dry periods, whereas medium-high and high-density forests were at the lowest end.

Fire acted like a thinning agent in some broad PVTs. Thinning would allow young trees to grow among larger trees, creating a multistory structure. Single-storied forests are more common than they were historically while multi-storied forests are less common, especially in the warm dry and cold broad PVTs. The medium to high tree canopy cover class represents a more fully stocked forest, a condition which is common in more moist forests of shade tolerant species often found on the cool moist and warm moist broad potential vegetation groups. Examples of forests with this density could include mature single-storied lodgepole pine or spruce and fir multi-storied stands. Dry forests may also be in this density class, particularly where fire has been excluded and understory layers have developed.

The high canopy cover class includes forests with a relatively closed canopy, most often on productive sites on the cool moist broad PVT. This density class is common in stands with a spruce and fir component in a multi-storied condition. This condition also arises in single-storied lodgepole pine and sometimes Douglas-fir that regenerate to extremely high densities after fire. High tree density can limit tree growth, as well as sunlight to the understory, limiting vegetation in the understory. This condition may also occur in dry forests that have missed natural fire entries and developed layers in the understory. Evaluating canopy cover classes predicted by modeled natural range of variation (NRV) suggests that higher density forest conditions are much higher in extent than they were under natural disturbance regimes. Additional information about these habitat conditions can be found in the Forestlands section.

Most of the wildlife species in the mature closed forest habitat group can use a variety of dominance types and it is unclear what effects the change in dominance types has had on wildlife distribution and abundance. There is a lack of studies providing information on the wildlife communities supported by western white pine dominated forests and the effects that the loss of this forest type had. The loss of whitebark pine and probably western white pine is thought to affect many wildlife species that rely on mast. Stands dominated by white pine likely provide a distinct structure that some wildlife species probably preferred. The effects of blister rust go far beyond the loss of individual trees. There is a cascading effect on associated plant and animal communities throughout affected ecosystems. Natural regeneration and intermediate age classes have been rapidly killed by blister rust, resulting in dramatic changes to normal successional pathways (Samman et al. 2003). Western white pine has been replaced by grand fir, Douglas-fir, and hemlock species that are more susceptible to diseases, such as root rot, that can prevent these species from achieving old growth conditions as defined in Green et al. (2008). Actions to restore to mature closed canopy forest would potentially take centuries, which is complicated by blister rust susceptibility. Restoration efforts would require regeneration followed by planting to properly restore these forest stands.

Given the trend and existing conditions of mature closed forest, habitats for species that use mature closed forest are overrepresented compared to forests operating within the NRV in terms of extent, density, and dominance types. Closed mature forests should decline to return to the NRV. A decline in mature closed forests is an expected and desired outcome of the revised plan. The decline should not be considered a concern if the amount and distribution of closed mature forest drops below the NRV that occurred under past disturbance regimes. It should be noted that not all wildlife species use mature closed canopy forests. Many species in the early seral or non-forested vegetation habitat grouping avoid mature closed canopy forests. Similarly, some species that use open mature forests avoid or select against dense forests. Some species may use mature closed canopy forest for resting, nesting, hiding, or thermal cover but require open habitats for foraging. Some species may use mature forest but are more abundant in other habitats.

Thus, the appropriate mix of different size classes and densities should also be provided for the diversity and abundance of wildlife.

An important characteristic of mature forests for some species is whether these conditions occur in a contiguous and connected condition across landscape scales. Fisher, for example, exhibit a preference at the landscape scale for large areas of mature closed canopy forest conditions in a contiguous and connected pattern (Sauder and Rachlow 2014). The landscape pattern of mature forests was modeled in SIMPPLLE and PRISM to determine the NRV of these patterns in mature and closed canopy forests. If model simulations estimate past conditions as believed, these conditions occur naturally within the forest types in the plan area. However, these conditions over long time periods were dynamic across space and time under natural disturbance. They tended to ebb and flow with moisture and temperature conditions across time. During moist periods, they increased in extent and distribution, while in drier periods they were reduced through wildfire disturbance. While present consistently through time somewhere in the plan area, the stochastic nature of fire moved where these conditions occurred across decades or even centuries, creating a dynamic patchwork of mature forests that changed locations as stands were regenerated by wildfire and again regrew to mature conditions. These conditions operate at scales larger than the management areas under the Land Management Plan.

Threats and Stressors to Mature Closed Canopy Forests

Modeling results from SIMPPLLE suggest that this habitat condition declines as a result of fire and management under the plan. This habitat condition is prone to burning and insects and disease and is of interest for timber harvest. The effects from each of these disturbances differ from each other and can be variable depending upon dominance type. Fire under a warmer and drier climate, and with a buildup of fuels, may burn more often and more intensively than under past climate. Fire is more unpredictable than timber harvest in that it is a stochastic process and will be operative more in Management Areas 1 and 2 than in Management Area 3. While it is less predictable, it also operates with greater variability, which is beneficial to wildlife species. Susceptibility to insect and disease develops because of stand age and distribution of this condition. Timber harvest would affect mature closed forests in Management Area 3 more than other management areas, but the modeling indicates that these habitats should continue to persist in the plan area and not fall below the natural range of variation (NRV) for these systems as long as forests are managed towards desired conditions and follow appropriate standards and guidelines. In most broad potential vegetation types (PVTs), medium, large, and very large size classes remain within the NRV but not in others. Changes to fire behavior or improper harvest patterns can affect the dynamics of the landscape pattern of the contiguous mature forests required for some species, such as fisher. Improper harvest patterns are defined as those that do not replicate natural disturbance patterns at the landscape scale. Departure in landscape patterns for mature closed canopy forests arises because of fire suppression, followed by uncharacteristic wildfire. Departure in patch size also arises due to restrictions in the size of timber harvest units that do not allow a pattern more representative of the natural disturbance. They also could arise by changes in fire start patterns due to human interference, improper timber rotations, and over exploitation of timber resources. The plan has direction to address these stressors, which can be found in the Forestlands section of the Land Management Plan.

Plan Direction

The plan includes extensive direction for the management of forested habitats. The plan direction for forested lands was designed to provide for ecosystem integrity by including desired conditions, objectives, standards, and guidelines to provide the structure, function, composition, and connectivity to meet requirements of the 2012 Planning Rule and were designed to provide the key ecosystem characteristics needed by most wildlife in the plan area (U.S. Department of Agriculture 2012c). In most cases the plan component parameters were aligned with the estimated natural range of variability (NRV).

The plan direction for forestlands is organized by broad potential vegetation types (PVT) and within each broad PVT, they differ slightly within the three primary management areas. The plan provides direction for each broad PVT on the composition of forest dominance types, within stand conditions, stand density, stand size class distribution, and landscape pattern. Each of the desired condition above differ slightly within the three different management areas. Plan components for composition include desired conditions for the distribution of these forests also provide direction as to their pattern on the landscape (for example, MA1 and MA2-DC-FOR-06, MA3-DC-FOR-02, MA1 and MA2-DC-FOR-07, MA3-DC-FOR-04, MA1 and MA2-DC-FOR-08, MA3-DC-FOR-06, MA1 and MA2-DC-FOR-05, and MA3-DC-FOR-09). Even after harvest, desired conditions, standards, and guidelines provide measures for green tree retention and retention of snags and downed wood, to allow some of these species to continue using these areas after harvest. The plan also has a more flexible framework for dealing with wildfire that encourages the use of fire to achieve land management plan objectives more than the No Action Alternative has. While these changes will impact some of the species that use these habitats, many of them are common and abundant and are not of conservation concern at this time. Objectives include those targeting the restoration of white pine. The proposed plan components include measures to conserve old growth and protect some old growth types. The monitoring plan includes metrics to track the forestwide changes in size classes to achieve desired vegetation conditions. Objectives to restore vegetation conditions include measures to treat fuels and restore vegetation desired conditions that would help reduce susceptibility to uncharacteristic wildfire.

The plan provides plan components that ensure that mature closed forests will be present on the landscape. These plan components include FW-DC-FOR-05, FW-DC-FOR-08, FW-DC-FOR-11, FW-DC-FOR-12 which provide for 15- to 19.9-inch diameter at breast height (DBH) and 20-inch plus DBH size classes that would meet the needs of most species that use mature closed forest. Additionally, the plan contains components to ensure old growth is provided with MA3-STD-FOR-01, and MA2 and MA3-GDL-FOR-01.

Modeling Results

Modeling results from SIMPPLLE predict an overall decline in mature closed forest stands. This decline occurs in all alternatives. The source of that decline is complicated and includes changes occurring by dominance type, size class, density and by broad potential vegetation type (PVT), in which mature closed forest in some of these categories increase while others decline.

The modeling results from SIMPPLLE indicate a decline in dense mature forests for all size classes in the warm dry PVT. These systems are currently too dense relative to the natural range of variation (NRV) for this potential vegetation type. The largest decline is in grand fir closed mature dominance types as desired dominance types for these PVTs are lower than current conditions and treatments are expected to change grand fir dominance types into other dominance types over time. Declines also occur in closed mature forest in Ponderosa and Douglas-fir dominance types because these types would be managed for lower stand densities than they currently are and a change from higher density stands to open mature forest conditions is the expected outcome for these dominance types. Again, this trend is similar under all alternatives.

A decline is also predicted by the model in the warm moist potential vegetation type (PVT). This decline happens in the Douglas-fir, larch, white pine, grand fir, and grand fir and redcedar dominance types. Only Douglas-fir and larch and Engelmann spruce and subalpine fir dominance types increase. Perhaps the biggest driver of these changes is that they are converting to open stands according to the model. The main exception is in grand fir, where it appears that the open structure forest in this dominance type also declines. This may be because they are also converting to smaller size class stands and converting to other dominance types. The change in size class is influencing the change in closed mature forest.

The large size class and the very large size class appear to be increasing in this PVT. Many of the large mature closed forests appear to be maturing into very large mature forest classes. The medium size class of closed canopy forest declines because some trees mature into large and very large size classes while others could be converting from grand fir to another type. The decline is also influenced by dominance types where grand fir and redcedar dominance types are predicted by this SIMPPLLE model to decline.

In the cool moist PVT, the model results suggest an increase in closed canopy forest. Douglas-fir, Douglas-fir and larch, larch, and Engelmann spruce and subalpine fir mature to closed canopy forests. Two dominance types of closed mature forest decline in this PVT—the lodgepole pine and grand fir dominance types. The model predicts an increase in large and very large size classes of closed forests and a decrease in pole and medium sized closed forests as they mature in this PVT group. Overall, the trend is upward in this forest type. There is a concurrent shift away from open mature forests in these types within this PVT group. While there are slight differences, all alternatives predict a similar pattern.

In the cold PVT, the amount of closed forest overall decreases. Mature closed forests dominated by Douglas-fir increase slightly. Those dominated by lodgepole pine decrease heavily, while those dominated by Engelmann spruce and subalpine fir increase dramatically and whitebark pine decreases. These are influenced by a shift to open forest conditions. There is also a change in size class of closed forest in the cold PVT group. The decrease is greatest in the pole and medium size classes with increases in the amount of large and very large size classes of enclosed forests within these PVTs. For more information, analysis, and trends of these habitats, see the Forestlands section.

In the warm dry PVT, medium, large, and very large size classes of mature closed forests fall below the natural range of variation (NRV) in some alternatives. In particular, the medium size class falls well below NRV ranges in all alternatives, though some grow into large size classes while others experience disturbance and become early seral size classes. The large size class in the warm dry broad PVT falls below NRV in alternatives Y, X, W, and the No Action Alternative, but it stays within the NRV ranges in Alternative Z and the Preferred Alternative. The very large size class in the warm dry PVT increases in all alternatives from its current state below NRV. It increases to just below the lower boundary of NRV in alternatives X, Y, and W. Very large size classes in warm dry PVT increases to just above NRV in Alternative Z and the Preferred Alternative. See figures for warm dry PVT for medium, large, and very large size classes in Appendix B of this Final Environmental Impact Statement.

Several factors cause the trends in the warm dry PVT in the mature closed forest modeling environment. Factors include the warmer-drier climate conditions in the model, resultant increase in wildfire, an increase in projected root disease, tree succession growing into the next size class, the rapid increase in the amount of pole and seed-sapling size classes, and the conversion of some dominance types into other dominance types as a result of plan desired conditions. For example, current conditions for grand fir are higher than desired conditions in the warm dry, cool moist and warm moist PVTs so the model uses a variety of actions to convert grand fir types to other dominance types. The grand fir dominance types decline sharply in the Preferred Alternative forestwide and in the warm dry, warm moist, and cool moist PVTs. Grand fir dominance would be replaced by a combination of dominance types that include Ponderosa pine, larch, grand fir and cedar, and Douglas-fir and larch. As habitats change, the amount and distribution of wildlife species would change until mature forest regrows.

The effects, if the above predictions were to happen, is that habitats for species that use mature, closed canopy forests would decline forestwide. Species that might experience this decline include the Vaux's swift, the varied thrush, the piliated woodpecker, and the fisher. Habitat for these species would decline to near or slightly below the low end of NRV levels in the warm dry PVT type.

In terms of density, the model shows that forestwide mature closed forest stands stay relatively stable though the 5-decade timesteps. It increases slightly in the cold, and cool moist, but declines slightly in the warm moist and warm dry. Density trends are inconsequential for wildlife.

Open Mature Forest Habitats

Open mature forest habitats are mature forests that have lower tree densities providing open structure, that allows enough light to support the understory. Open mature forest conditions can occur in any of the broad potential vegetation types (PVTs) and each broad PVT can support species that tend to use open mature forest conditions. The factors that provide open mature forest differ between the broad PVTs. However, open mature forest is more common in some broad PVTs than others. Open forests are found in dry forest types at all stages of succession, particularly in the warm dry broad PVT group, where site conditions or disturbances maintain lower tree density. Open mature forest structure is a naturally occurring condition maintained by low intensity fire in some of the warm dry PVTs like Ponderosa pine. Cool moist or cold forests may also be found in this condition, particularly when impacted by disturbances, such as mountain pine beetle infestations or wildfire. They can also be in this condition where variation in site conditions is less than optimal resulting in lower density stands. Open conditions in warm moist types result from mixed severity fire or insects and disease. In the warm moist and cool moist broad PVTs, insects and disease or mixed severity fire promote lower tree density. Broad-leaved habitats can also result in open forest structures including in riparian areas where periodic or seasonal flooding acts as a disturbance agent lowering tree density. Other than where trees grow in naturally lower site potential, many lower density forests are the result of disturbance processes, and thus disturbance is an important factor in the production of open forest structure.

Some wildlife species often select structural characteristics, such as age class or density, rather than dominance types, species composition, or broad PVTs. Open mature forest habitats support high biodiversity, and some wildlife species are uniquely adapted or require these conditions. The preferred habitats for several species were described as open forests or open stands. These often-included descriptions of the use of a wide variety of conifer or mixed deciduous and coniferous forests. Thus, these species were grouped into the open forest habitat group, which referred to open mid seral to old forest with an open or lower density structure. Thinning treatments have been shown to increase wildlife biodiversity after treatments in the Northwest depending on thinning intensity (Verschuyl et al. 2011).

Wildlife species grouped into the open forest habitat group includes 22 species that specialize in this habitat. Examples include the white-headed woodpecker, Nashville warbler (*Leiothlypis ruficapilla*), western wood pewee (*Contopus sordidulus*), pine grosbeak (*Pinicola enucleator*), pine siskin (*Spinus pinus*), Cassin's vireo (*Vireo cassinii*), Lewis's woodpecker, violet-green swallow (*Tachycineta thalassina*), flammulated owl, pygmy nuthatch, Williamson's sapsucker, western tanager, western heather vole (*Phenacomys intermedius*), and Townsend's solitaire. The fringed myotis was also grouped into this habitat grouping because of the habitats where it occurs in the plan area, which is within Ponderosa pine forest. However, it should be recognized that this species could have been placed in other groupings as well, as it has a wide range of habitat both within and outside of the plan area. Other wildlife, as described below, also use open forest habitats conditions.

The number of species in the open mature habitat groupings suggest that open mature forests are important within several broad potential vegetation types (PVTs) and that managing for lower density mature forests in many PVTs may be an important management goal to provide for the diversity and abundance of wildlife. These results suggest that departures in density are an important source of departure for a wide range of broad PVTs and dominance types. Key characteristics of mature open canopy forests for wildlife include open structures with the presence of large live trees with periodic very large trees and snags, diverse and abundant understory, fruiting plants, a mix of tree species present in some types, abundant insect populations, and various amounts of vertical structure, depending upon the last disturbance event. Mast production from mast producing tree species is important for some species and larger mature trees produce more mast than younger trees. Mature open forests are assumed to produce these features naturally. However, stands that lack the features mentioned above, such as snags with cavities, trees with heart rot, periodic large and very large trees, and diverse understories, may not function to provide for some of these species. Of these species about 43.4 percent of those assigned to this group use snags and only about 8.6 percent use downed wood. Four species are associated with mast or seeds.

Warm dry broad PVTs dominated by Ponderosa pine occur within many places on the Nez Perce-Clearwater and are more prevalent in the southern half of the national forest than the northern half. They occupy drier sites in the large river canyons of the Salmon, South Fork Clearwater, Middle Fork Clearwater, Lochsa, and Selway rivers. They are also present on ridgetops forestwide. In pre-Columbian times, they were maintained by frequent low intensity fire that acted as a thinning agent and achieved open stand conditions with large trees that persisted through repeated disturbance events in many places. The 2014 Forest Plan Assessment found these habitats had been reduced through fire suppression. Early logging practices targeted the large Ponderosa pines as a lumber resource and these large trees are less common than they once were. The stands of Ponderosa have since been encroached by other tree species, the most prevalent of which is grand fir, leaving them susceptible to stand replacing events which were less common in pre-Columbian times. The 2014 Assessment evaluated these under biophysical settings rather than broad PVTs. The conclusions in the report suggest that encroachment increases as they move north and upward in elevation on these Ponderosa habitat types.

The Ponderosa pine systems support a unique suite of wildlife that are uniquely adapted to those systems, several of which have received conservation attention over time because of the trends of these habitats and because these species occur at low abundance naturally in some cases. Examples of species on the Regional Forester Sensitive Species (RFSS) list include the flammulated owl, white-headed woodpecker, pygmy nuthatch, fringed myotis, and mountain quail. The white-headed woodpecker and mountain quail are analyzed as species of conservation concern in this analysis. For many of these species, warm dry forests functioning with ecosystem integrity, that is when its dominant ecological characteristics, such as composition, structure, function, connectivity, and diversity, occur within the natural range of variation and would be sufficient to provide for these species.

Open forest conditions often support higher biodiversity because the open crown facilitates understory growth that is selected by many species. Because understory plants are often composed of deciduous shrubs and trees, deciduous species also use these types. Open forest conditions are sometimes used by species that use ecotones between open and forested habitats. So long as there are snags available, many mature closed forest species can also use these habitats. Open forest conditions are more likely to produce multi-storied stand structures because sunlight can penetrate the forest floor, allowing younger trees and later successional tree species to better grow in the understory. This complexity in habitats allows many species to thrive in these habitats. Open forests can provide for wildlife species in other habitat groupings as well, such as those grouped into the forest generalist, ecotones, substrate, riparian, and deciduous forest habitats; those that seek resources; and some in the non-forested or early seral groups. This increased diversity is apparent from studies evaluating the effects of wildlife diversity in response to thinning (Verschuyl et al. 2011).

Verschuyl et al. (2011) conducted a meta-analysis on 33 studies that evaluated the effects of thinning on wildlife diversity. A meta-analysis applies statistics to evaluate the effect size, or magnitude, combining data from multiple scientific studies. When the treatment effect or effect size is consistent from one study to the next, meta-analysis can be used to identify this common effect. The finding from Verschuyl et al. (2011) was that forest thinning treatments had generally positive or neutral effects on diversity and abundance across all taxa, although thinning intensity and the type of thinning conducted may at least partially drive the magnitude of response. Thinning produces a variety of short- and long-term changes to forest structure, the most obvious of which is a decrease in tree density and increase in forest canopy gaps and abundance and diversity of mid-story trees. The increased diversity may also be because of the development of more complex understory vegetation due to increased light availability below the canopy. Thinning can cause a more rapid return to conditions simulating older seral stages which can increase the number of species using the diversified habitat. These results included studies from the Pacific Northwest and represented a variety of forest types like lodgepole, aspen, coastal hemlock and fir, interior hemlock and cedar, and mixed conifer (Verschuyl et al. 2011).

Existing Condition

The current conditions across the Nez Perce-Clearwater indicate a trend away from open stand conditions because of wildfire exclusion, forest succession, management towards old growth conditions, even aged timber harvest, and avoidance of management to conserve some wildlife species, such as lynx, goshawks, and fisher.

Threats and Stressors to open Canopy Forests

Key threats to these habitats include forest succession; fire suppression, especially when followed by subsequent stand replacing fire; even aged forestry practices; invasive plant species displacing understory vegetation; and practices that result in a reduction of snags. Some reforestation practices, such as replanting at high densities after harvest, can create denser stands that may result in future closed forest stands that are denser than occurred under natural disturbances. Grazing may impact understories depending upon intensity.

Restoration Activities

Actions that can restore these habitats include thinning treatments with snag retention, wildland fire (for example, prescribed fire or wildfire managed for resource benefit), a combination of thinning and fire, weed treatment to maintain understory, uneven aged management, green tree retention during harvest, and variable retention harvest.

Plan Direction

The plan provides a description of desired conditions for densities in various broad potential vegetation types (PVTs), the presence of large and very large trees in all age classes, and a description of features like snags and downed wood desired to be present. The desired conditions also describe the landscape patterns of these habitats. Desired conditions address the landscape proportions of size classes by PVT in the plan area, which should ensure that some open forests occur in a variety of size classes. Forests functioning within the natural range of variation (NRV) will have variation in stand densities, with some stands in an open condition. The plan also includes language in the Forestlands section that stand density reflects historic fire regimes. Objectives include those targeting restoration of forest systems. The proposed plan components include measures to conserve old growth and protect some old growth types. Desired forest conditions, specifically for the warm dry PVT group, emphasize managing these systems towards functioning within the NRV for these types. The plan provides plan components that ensure that mature open forests will be present on the landscape. These plan components include those for size classes like FW-DC-FOR-05, FW-DC-FOR-08, FW-DC-FOR-11, FW-DC-FOR-12 which provide for 15- to 19.9-inch diameter at breast height (DBH) and 20-inch plus DBH size classes that would meet the needs of most species that use open forest. Additionally, the plan contains components to ensure old growth is provided with MA3-STD-FOR-01 and MA2 and MA3-GDL-FOR-01. Specific plan components addressing warm dry Ponderosa pine forest includes FW-DC-FOR-02 (structure and function), FW-DC-FOR-03 (composition), FW-DC-FOR-04, MA1-DC-FOR-01, MA2-DC-FOR-01, MA3-DC-FOR-01 (density), FW-DC-FOR-05 (structure, composition, function), and MA1 and MA2-DC-FOR-06/MA3-DC-FOR-02 (landscape pattern, composition, connectivity). A crosswalk of plan direction with open forest types, their key ecological attributes, and threats is provided in Appendix C.

Modeling Results

Between the Draft and Final Environmental Impact Statements, adjustments were made to SIMPPLLE model assumptions and pathways that resulted in a different model prediction of habitat conditions of dry forest-associated species. The updated modeling results suggest that stands of mature open structured forest are predicted to decline overall. The decline is most apparent in the cold and cool moist broad PVTs. The warm moist and warm dry broad PVTs dips then recover by the end of the fifth decadal timestep. These outcomes were derived from the full model outputs in all dominance types (Ecosystem Research Group 2021).

In the warm moist PVT, the pattern is a slight increase overall in open mature forest. The model predicts an increase in mature open forest in Ponderosa pine, Douglas-fir and larch, larch, and white pine and a large increase in open mature grand fir. It also predicts a decline in open mature Douglas-fir, grand fir and redcedar, and lodgepole pine and a large drop in Engelmann spruce and subalpine open mature forest types. As noted above, some of these forest dominant types are converting to mature closed forest while others are converting to early seral size classes.

In the cool moist broad PVT, open mature forests decline in Douglas-fir, Douglas-fir and larch, and grand fir; drop drastically in lodgepole pine; and decline in Engelmann spruce and subalpine fir. This once again appears to be the result of forest succession changing mature open forest for mature closed forest and large and very large size classes into small size classes. In this PVT, the large and very large size class are predicted to decline while lodgepole pine is expected to increase.

In the cold PVT, the amount of open mature forest is expected to decline. Declines occur in Douglas-fir and Engelmann spruce and subalpine fir but are expected to increase in lodgepole pine and whitebark pine. Some forest dominant types increase in density from open mature to closed mature forest. In other cases, the stands convert to smaller size classes and other dominance types. For more information about these trends see the Forestlands section.

The Ecosystem Research Group conducted a wildlife specific query for the warm dry Ponderosa pine systems, specifically for Ponderosa pine associated species. This query might also provide some habitat for the fringed myotis. As there is much overlap in the habitats for these species, the Ecosystem Research Group combined the SIMPPLLE query to predict future conditions in the Nez Perce-Clearwater by alternatives into one query expanded over a range of size classes to represent all of these dry forest associated species. This query was meant to evaluate habitat parameters for the white-headed woodpecker, flammulated owl, Lewis's woodpecker, and pygmy nuthatch, as these species were identified as potential species of conservation concern in the 2014 Assessment (U.S. Department of Agriculture 2014k).

The 2014 Assessment evaluated the natural range of variation (NRV) for several Ponderosa associated species and nearly all of them were near or below the lower boundaries of the NRV (U.S. Department of Agriculture 2014k). Current conditions for white-headed woodpecker and Lewis's woodpecker habitats were both below their NRV, while the flammulated owl and pygmy nuthatch was at the low end of their NRV.

We modeled a subset of the warm dry broad potential vegetation type (PVT) to predict the change in large diameter Ponderosa pine dominated dry forest habitat because of concerns for the white-headed woodpecker and several other species receiving conservation attention associated with the park-like open structure of Ponderosa pine forest that is maintained by periodic low intensity fire. A description of the query and the model outcome are described in detail in (Ecosystem Research Group 2021).

The query for dry forest associated species assumes that highly suitable nesting and foraging habitat is limited to forested stands with an average of greater than 15 inches diameter at breast height (DBH). To address the nesting habitat needs of flammulated owls (open forest), the nesting and foraging needs of white-headed woodpeckers (open and closed forest), and the nesting needs of pygmy nuthatches (closed forest), the model tracks the availability of large diameter stands in both open (less than 40 percent canopy closure) and closed (greater than 40 percent canopy closure) forest conditions. Based upon Forest Inventory and Analysis (FIA) data, forests with an average diameter greater than 15 inches DBH contain sufficient snags to provide habitat for the species that excavate nesting cavities. SIMPPLLE logic pathways show that dense stands of potential habitat (stands greater than 40 percent canopy closure) will convert to highly suitable habitat (stands less than 40 percent crown closure) if treated by under-burning, are burned by low-to-moderate severity wildfire, are attacked by Douglas-fir beetles, or are harvested or commercially thinned to remove understory and mid-story trees. At a home range scale, timing of treatments would be designed to create a mosaic consisting of mature forest and dense understory patches of small trees, shrubs, and openings.

The query design for dry forest associated species habitat includes the following layers:

Cover types: all cover types within the following habitat groups that include either Ponderosa pine or Douglas-fir including mixed stands that contain large Ponderosa pine and Douglas-fir.

- A2, warm and very dry Ponderosa pine/Douglas-fir
- B1, warm and dry Ponderosa pine/Douglas-fir
- B2, moderately warm and dry Ponderosa pine/Douglas-fir/grand fir
- C1A, moderately warm and moderately moist Douglas-fir/grand fir

Tree size class: greater than 15-inch DBH including Break-out by diameter class and dominance type.

- 15–19.9-inch DBH—All dominance types
- 15-19.9-inch DBH—Ponderosa pine dominance type
- 20+ inch DBH—All dominance types
- 20+ inch DBH—Ponderosa pine dominance type

Canopy cover (tracked separately as open or closed):

- Stands of 15–39.9 percent canopy cover
- stands of greater than 40 percent canopy cover

There are 628,584 acres of Ponderosa pine dominated dry forest habitat (all size classes) on the Nez Perce-Clearwater National Forest. Habitat for dry forest-associated species, stands containing large and very large size classes, currently totals 179,179 acres, representing 29 percent of potential habitat on the national forest. Under the Preferred Alternative, Ponderosa pine dominated habitats increase strongly in the warm dry potential vegetation type (PVT) as well as other broad PVTs. Ponderosa pine dominated habitats increase in Management Areas 1,2, and 3 as well. The overall increase should benefit species associated with Ponderosa pine habitats.

Stands with mature trees in an open structure are a key ecological attribute for species associated with Ponderosa pine dominated forests. The plan includes proactive measures to increase the amount of lower density, mature Ponderosa pine habitats (for example, FW-DC-FOR-03, FW-DC-FOR-05 and MA3-OBJ-FOR-01). Despite these measures, the model predicts a decline in mature open warm dry Ponderosa pine dominated forests. There would be a decrease in open dry forest habitat under all alternatives over the five decades.

Over the five decades modeled, there would be an increase in closed dry forest habitat (Ponderosa pine/Douglas-fir/grand fir) under the No Action Alternative and Alternatives X and Z and a decrease in this forest type under Alternatives P, W, and Y. The modest shift from closed to open forest under Alternatives P, W, and Y suggests that vegetation management activities are contributing positively to this shift in stand structures and suggests that long-term habitat sustainability is improving. These modeled outcomes suggest that habitat for dry forest-associated species such as the flammulated owl, white-headed woodpecker, and pygmy nuthatch is not being placed at risk by these management alternatives. Keep in mind that the query measures open and closed canopy closure rather than stem density, and as forests mature, the canopy naturally closes as crowns branch out, even when the stem densities are lower. The model does not represent an absolute decline in open Ponderosa pine mature structure, simply a closing of the canopy as trees expand their crowns. Note that large and very large size classes in the warm dry broad PVT are expected to remain within the natural range of variation (NRV) (see Appendix B for large and very large size classes within the warm dry Broad Potential Vegetation Type), and that plan components in the warm dry suggest more Ponderosa pine and a desire to have an increase in larger and very large diameter size classes (FW-DC-FOR-03 and FW-DC-FOR-05).

The SIMPPLLE modeling results predicted that open forest habitats for these species continue to decline over the five-decade period modeled for Ponderosa pine dominated dry open forest and closed dry forest types. The declines vary slightly by alternative, as shown in Table 173. These results seem counter-intuitive since all alternatives emphasize restoring large, open stands of Ponderosa pine. Declines in habitat are likely due to much higher levels of high severity wildfire, attributable to 70 years of accumulating fuels from successful past wildfire suppression. While the modeled decline of this habitat is alarming, the fact that the decline within wilderness and inventoried roadless areas is no less that that within National Forest-Other Management Areas suggests that the decline is both inevitable and unavoidable due to long-term fuel accumulations resulting from fire suppression. This is consistent with thinking within the scientific literature that these habitats are vulnerable (Wisdom et al. 2000a;b;c). Another source of the change in the model is that early seral size classes increase across the warm dry PVT and that affects the amount of mature open and closed forest (See Appendix B Figure 39).

The time horizon of the model is not long enough to show the long-term outcomes of the plan on dry Ponderosa pine forest. Essentially, the model attempts to increase Ponderosa pine dominance and that does occur, but the time horizon that it takes to grow mature Ponderosa pine trees is longer than the 50-year analysis window presented and even longer than the 150-year future projection. Furthermore, the range of treatments available in the modeling environment and the way those treatments were applied in the model do not match the range of conditions on the ground, and the treatment options available to practitioners in reality. For example, the model bases its decisions for treatment on dominance type but is not sophisticated enough to recognize the complexity of stand composition. In the model for example, a stand might be identified as grand fir dominant and the prescription in the model was to treat grand fir with a regeneration treatment to change the dominance type which results in an early seral condition in the model. In reality, practitioners might recognize Ponderosa pine as a component in the stand and apply a treatment to remove the grand fir but leave the Ponderosa pine resulting in a stand that is open in structure and dominated by mature Ponderosa pine trees.

Table 173. Acres of modeled habitat for dry forest-associated species by forest plan alternative and timestep for both open forest and closed forest structural conditions including Ponderosa pine, Douglas-fir, and grand fir

Dry Forest Habitat	Alternative	Decade 0	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Closed	No Action	139,076	146,583	156,193	158,427	161,501	155,847
Closed	P	139,076	147,933	152,560	156,296	138,879	134,603
Closed	W	139,076	140,349	142,051	140,006	136,972	136,423
Closed	X	139,076	143,668	138,422	143,001	142,179	141,614
Closed	Y	139,076	141,986	142,418	147,438	143,915	134,557
Closed	Z	139,076	152,142	158,464	158,258	156,167	154,351
Open	No Action	40,103	26,386	21,554	17,094	15,060	20,805
Open	P	40,103	20,523	17,288	16,086	15,002	15,038
Open	W	40,103	18,731	17,481	16,545	15,562	15,985
Open	X	40,103	21,603	22,108	18,405	15,906	15,931
Open	Y	40,103	20,409	17,341	15,172	15,886	13,681
Open	Z	40,103	21,019	19,167	17,022	17,425	15,878

Table 174. Acres of habitat for dry forest-associated species by forest plan alternative and timestep for both open forest and closed forest structural conditions in Ponderosa pine only

Dry Forest Habitat	Alternative	Decade 0	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
Closed	No Action	25,795	50,155	56,147	59,395	63,381	61,805
Closed	P	25,795	47,285	51,450	57,804	47,749	48,701
Closed	W	25,795	41,993	45,160	48,085	49,655	52,019
Closed	X	25,796	48,151	48,266	55,084	58,252	59,971
Closed	Y	25,795	46,987	45,931	50,857	51,215	48,879
Closed	Z	25,795	50,847	54,173	56,578	58,100	59,305
Open	No Action	30,848	16,547	14,489	9,789	7,843	11,581
Open	P	30,848	11,214	10,341	8,752	8,033	7,762
Open	W	30,848	8,949	10,406	9,584	8,766	8,739
Open	X	30,849	12,151	15,101	11,325	9,194	8,860
Open	Y	30,848	10,495	10,214	7,991	8,587	6,807
Open	Z	30,847	11,159	11,711	9,412	9,871	8,356

Table 175. Percent change in habitat in both close and open Ponderosa pine dominated dry forests

Alternative	Open Dry Forest Query Predicted Percent Change	Closed Dry Forest Query Predicted Percent Change
No Action	62.5% Decrease	139.6% Increase
Preferred	74.8% Decrease	88.8% Increase
W	71.6% Decrease	101.6% Increase
X	71.3% Decrease	132.5% Increase
Y	77.9% Decrease	89.5% Increase
Z	72.9% Decrease	129.9% Increase

Data Source: SIMPPLLE modeling

Modeling results substantiate findings within published wildlife research which suggest that the Ponderosa pine ecosystems have been and continue to have a declining trend (Wisdom et al. 2000c, a, b) due to activities such as suppression of wildfire and timber practices. Wisdom et al. (2000c, a, 2000d) suggested that low elevation old forests were changed from low density forests maintained by low intensity fire into more dense stands invaded by species such as Douglas-fir and grand fir because of fire suppression. Timber harvest practices changed these systems to mid-seral age classes. In its current condition, these habitats are more susceptible to stand-replacing fires and increasingly vulnerable to insect and disease related tree mortality (Wisdom et al. 2000b, c, a). Wisdom et al. (2000b, c, 2000d) estimated that source habitats for low elevation old forest had declined in 70 percent of watersheds within the Columbia River Basin between the historical and current periods, including a decline in watersheds in the plan area. Under all alternatives, the modeling predicts another 25 to 39 percent decline in these habitats, which is a trend against the potential long-term persistence of Ponderosa pine associated species.

These conditions and trends may require active management to restore more desirable forest structure and composition. These results may indicate the actions modeled are not progressive enough or do not take the appropriate actions to increase or maintain open mature forests in this broad potential vegetation type (PVT). The model represents a simplification of a complex process and could be based upon questionable assumptions. The modeling represents change on the Nez Perce-Clearwater under a warmer drier scenario with an assumed greater amount of wildfire. The model is using a combination of wildfire, prescribed fire, and silvicultural prescriptions to change dominance types and increase the amount of early seral habitats. Keep in mind, the outcomes are a result of the fact that the model used wildfire or prescribed fire and disease in Management Areas 1 and 2 to trend back towards the natural range of variation (NRV). If the assumptions about how these systems burn are correct, then this may represent a useful estimate of future trends. In areas where timber harvest is allowed, stands may need to be thinned or thinned and burned to decrease grand fir while retaining Ponderosa pine instead of using even aged management to convert dominance types.

Burned, Diseased, and Insect Infested Forested Habitats

Only two species were grouped into this habitat subgrouping. They include the black-backed woodpecker and American three-toed woodpecker. Both species have been the subject of conservation interest. The black-backed woodpecker is a Regional Forester Sensitive Species (RFSS) in the Northern Region, while the American three-toed woodpecker is a RFSS in the Intermountain Region. Burned and insect infested trees are the primary habitat of the black-backed woodpecker and the American three-toed woodpecker. These two species seek out and exploit these disturbed areas for insects. While uncommon except in disturbed areas, there is no significant decline in the populations of these two species according to the Intermountain Bird Conservatory long-term trend monitoring of bird populations.

Since these habitats are ephemeral, they require periodic fires and disease or insect outbreaks to persist. A number of snag dependent species could have also been included in this group but better fit in other habitat groupings. Snags are analyzed as a key ecological characteristic of forested habitats.

The key indicators for these species include the amount of disturbance from fire, insects, and disease under the plan. There are no species-specific plan components designed for these species. However, a couple factors contribute to habitat for these species. Natural amounts of root rot, insect outbreaks, and fire all contribute to habitat for these two species. Fire suppression is perhaps the biggest threat to this habitat group.

Existing Conditions and Trends

Several large fires, insect outbreaks, and disease events have affected much of the conifer forest on the Nez Perce-Clearwater. These disturbance events have created large areas of disturbed habitat that have provided habitat for species in this subgrouping. The trends of these conditions are dependent upon the weather and moisture conditions. Under a future climate, which is projected to be warmer and drier, there should be increased incidences of wildfire, insect outbreaks, and disease. Therefore, the trend is upward. Compared to conditions in the past, current conditions in the plan area for disease and insect infestations are more prevalent than they were under natural disturbance because the dominance types have shifted towards species more susceptible to disease and climatic conditions have facilitated infestations of bark beetles and other tree damaging pests. Burned forests are probably less abundant than they were historically because of fire suppression.

Threats and Stressors

Burned, diseased, and insect infested habitats are modified through forest activities, such as salvage logging and treatments to reduce root rot. Other factors that affect the amount of these habitats include fire suppression. These habitats otherwise have few threats.

Restoration Activities

There are no restoration activities to enhance insect and disease habitats. Usually, projects seeking to restore forests are designed to reduce these habitat types or harvest lost timber. However, prescribed fire can create habitats used by species that use burned forests.

Plan Direction

The plan does not have species specific components for these species. In general, the goal of the plan is to increase fire disturbance, change dominance types, and make the national forest less prone to disease and insect outbreaks. Plan components in the Forestlands section include measures to restore size class distribution, within stand characteristics, density, and landscape patch and pattern. This includes plan direction to increase the amount of young size classes while, at the same time, increasing stands of large and very large size classes. Combined plan direction will aim to reduce susceptibility to insects and disease but increase burned forest.

Another overarching goal of the plan is to restore fire adapted ecosystems. The plan contains objectives for burning to restore structure, function, composition, and connectivity of forests. Plan components in the Fire Management section seek to facilitate the use of wildland fire to restore natural disturbance.

The plan does not contain components prohibiting or restricting salvage harvest. See the Land Management Plan for plan components that pertain to the soils resource and timber. These plan components are meant to facilitate the Nez Perce-Clearwater's ability to respond to abundant insects and disease outbreaks and timber lost to fire. Insect and diseased forests and burned forest will still be present on the landscape despite these measures because salvage harvest is often not possible because the terrain is too steep and landslide prone and because of delicate soil conditions. Many burned areas of the Nez Perce-Clearwater will occur in wilderness and Idaho Roadless Rule areas. These activities are either prohibited within wilderness and some Idaho Roadless Rule area themes or not accessible from existing roads in Idaho Roadless Rule areas where this activity is allowed.

Modeling Results

The SIMPPLLE model was used to model trends in burned forests for species such as three-toed woodpeckers and black-backed woodpeckers. Fire assumptions and calibration were adjusted between the Draft and Final Environmental Impact Statements. The query design for burned forest-associated species considers only recent burns less than 10 years old and included the following:

Habitat Type Groups: all habitat groups (excluding high elevation alpine cover types WB, WB-ES-AF, and AL-WB-AF) including:

- A2, warm and dry
- B1, warm and dry
- B2, warm and dry
- C1A, warm and dry
- C1B, warm and dry
- C2, warm and moist
- C3, warm and moist
- D1, warm and moist
- E1, warm and moist
- D3, cool and moist

Pre-disturbance tree size class greater than 10-inch diameter at breast height (DBH) including:

- 10–14.9-inch DBH
- 15–19.9-inch DBH
- greater than 20-inch DBH

Pre-disturbance canopy cover greater than 15 percent including:

- less than 15 percent
- 15–39.9 percent
- 40–69.9 percent
- 70–100 percent

The query for this species guild was limited to burned forest of medium, large, and very large forest for only 10 years following the burn. That short timeframe was incorporated to address the needs of the black-backed woodpecker. This substantially limited the number of acres meeting those criteria. For other fire associated species like mountain bluebirds (*Sialia currucoides*) or olive-sided flycatchers (*Contopus cooperi*), which use burned areas for longer periods, the acres modeled in this analysis must be considered very conservative. Differences between alternatives and management areas are not significant.

It is difficult to compare burned acres against natural range of variation (NRV) for several reasons:

1. Fire Return Intervals (FRIs) vary across the Nez Perce-Clearwater from very short in the warm dry potential vegetation type (PVT) to very long in the cold PVT. Simplistically, if we assumed a 50-year forestwide average FRI, recognizing the Nez Perce-Clearwater's predominance of warm dry, warm moist, and cool moist PVTs, that might suggest that 20 percent or roughly 600,000 acres would be available per decade for black-backed woodpeckers and other fire-associated species.
2. Warm dry and warm moist PVTs tend to burn at low or mixed severities. Those lower severity wildfires typically do not provide habitat for fire-associated species. Consequently, the aforementioned 20 percent NRV estimate is unrealistically high.

3. Moderate and high severity wildfires only provide black-backed woodpecker habitat within stands 10 inches diameter or greater. Thus, fires burning in seedling and sapling or pole-sized stands, or double burns that occur within previously burned stands contribute no habitat for that particular species further suggesting the aforementioned 20 percent estimate is too high.

Considering all those factors, the range of habitat provided by the alternatives over five decades may not be much below mean NRV. More importantly, from a species viability standpoint, moderate and high severity wildfires are clearly increasing due to a combination of accumulating fuels resulting from wildfire suppression and warmer, drier weather. As discussed in Chapter 2, fire-associated species like the black-backed woodpecker occur at high densities in recent burns, despite the habitat bottleneck that was generated by the absence of wildfires in the years from 1930 to 2000. SIMPPLLE-modeled vegetation outcomes suggest that medium, large, and very large size classes will remain abundant, albeit at more open stand structures. Consequently, there will be no interruption of potential burned forest habitat on the Nez Perce-Clearwater. The amount of burned forest remains relatively stable over the five decadal timesteps (Figure 60).

Modeling in SIMPPLLE indicates that the Nez Perce-Clearwater will undergo sufficient fire and disease episodes over the next 50 years. The trend from the specific query for burned forests suggests that burned forest will increase across the five-decade period. The model predicts, based upon its assumptions and parameters, that many acres will be burned in the first decade and that the amount of burned forests increases dramatically. In the following decades, the amount of burned forests declines through time after the first decade. The trends in all alternatives are similar. So, while susceptibility to insects and disease declines, the amount of burned forests available for these species will increase. These trends should allow species that rely on burned forests to persist long-term. Trend in burned forest acres by alternative.

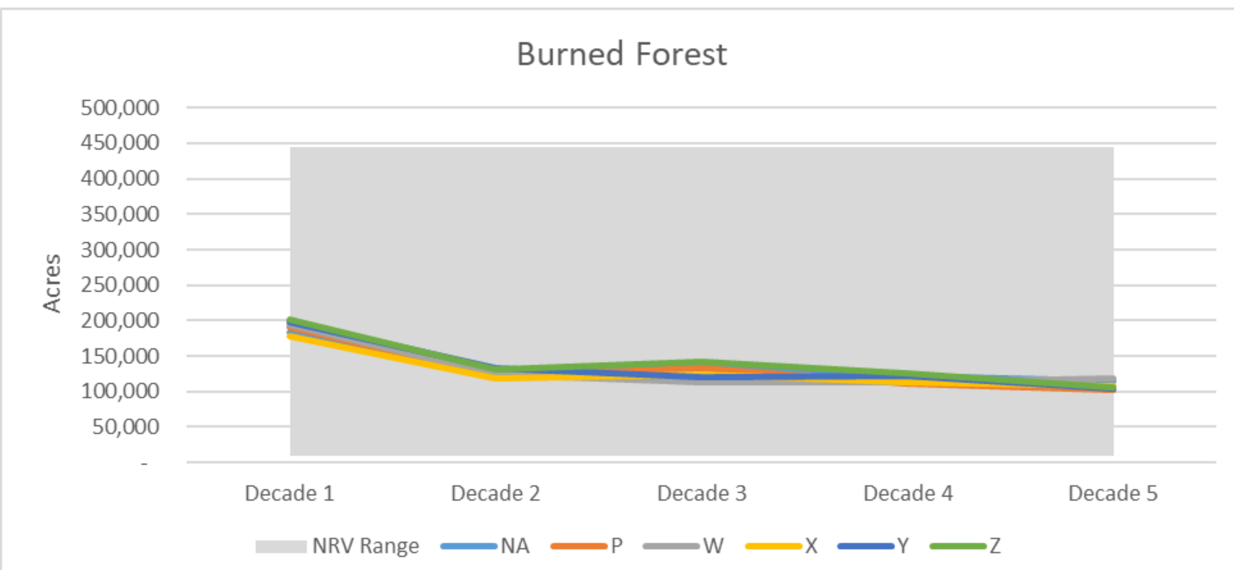


Figure 60. Trend in burned forest acres by alternative

Summary of Environmental Consequences to Forested Wildlife Habitats from Plan Components of Other Resources

Table 176 provides a summary of environmental consequences by resource area, whether there are adverse environmental consequences, and explanation of effects.

Table 176. Environmental consequences to forested wildlife habitats from plan direction

Resource Area	Adverse Environmental Consequences	Explanation
Terrestrial Ecosystems	No	No effect
Biophysical Features	No	No effect
Forested Lands	Yes	Larger size classes of mature forest, both open and closed, expected to decline. Early seral forest expected to increase. However, large and very large trees should increase across the plan area. Some timber management practices may reduce snags in some areas.
Carbon Storage and Sequestration	No	No effect
Meadow, Grassland, and Shrubland	No	No effect
Fire Management	Yes	Fires will still be suppressed, especially in Management Area 3. Plan components should provide for more management of wildlife fires for resource benefit compared to the 1987 Plans. Wildfire is the biggest source of disturbance according to the models. The Nez Perce-Clearwater may burn more under additional fuel and warmer climates. This would shift some forests to younger age classes despite management towards mature and old forests and towards very large and large trees. Fires are needed to trend towards the natural range of variability. Some areas around structures and roadways may lack snags as a result of plan direction.
Invasive Species	No	No effect
Soil Resources	Yes	Plan direction may prevent some forest habitats from being restored by some methods because of soil protections. The emphasis in protecting the soils is critical for future forest conditions.
Aquatic Ecosystems	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Water and Aquatic Resources	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Conservation Watershed Network	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Riparian Management Zones	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Infrastructure	No	No consequences
Lands and Special Uses	Yes	Plan direction may shift special uses, such as utility lines and infrastructure, upland into forested habitats.
Recreation	Yes	Plan direction may shift recreation trails and facilities upland into forested habitats.
Wildlife	Yes	Plan direction for Canada lynx would make management towards the natural range of variation more difficult in cool moist and cold potential vegetation type groups. This would result in further departures and potentially uncharacteristic fire. Plan direction for fisher would require consideration of landscape configuration.
Multiple Use Wildlife	No	No consequences
Multiple Use Elk	Yes	Some management would be directed towards improving elk habitat in areas with higher site potential. Some of these forests

Resource Area	Adverse Environmental Consequences	Explanation
		would shift towards early seral conditions, which may reduce mature forest.
Air Quality	Yes	Plan components for air quality may sometimes restrict the use of prescribed burning to achieve forest restoration.
Tribal Trust	No	No consequences
Cultural Resources	No	No consequences
Municipal Watersheds	No	No consequences
Sustainable Recreation	Yes	Some recreation may disturb wildlife habitats and spread invasive plant species, and motorized roads and trails may fragment forest habitats.
Scenery	Yes	Management direction in scenery may alter some projects designed to restore forest habitats.
Public Information, Interpretation, and Education	No	No consequences
Land Ownership and Land Uses	Yes	Plan may facilitate infrastructure development in the plan area.
Suitability	Yes	Some types of management towards achieving forest desired conditions may be prevented in some areas labeled as not suitable.
Timber	Yes	Timber management has the potential to reduce snags, coarse woody debris, and mature open and closed forest while increasing early seral habitats. Guidelines for snags and downed wood in the Forestlands section should retain some snags. Timber management direction allows liberal salvage operations, which could have impacts to burned forest. This could reduce some burned forest and dead tree habitat but not all. Reforestation practices can result in denser stands, which may decrease the chances for open mature forest structure. Fire would not be a preferred tool in areas suitable for timber production. These effects would be most apparent in Management Area 3.
Energy and Minerals	Yes	Mineral and energy activities under the plan may impact or fragment forest habitats for wildlife.
Livestock Grazing	Yes	Direction for grazing may affect some early seral habitats. Effects should be temporary and minor.
Special Forest and Botanical Products	Yes	Plan direction facilitates collection of firewood along roadways. These activities can reduce downed wood and snags important for forest wildlife.
Designated Wilderness	Yes	Plan direction for wilderness would facilitate wildfire to change forest habitats.
Wild and Scenic Rivers	No	Plan direction for wild and scenic rivers provides some restrictions on vegetation management. Some projects may be altered or prevented due to restrictions within wild and scenic rivers.
Lolo Trail National Landmark	Yes	Plan direction would direct management to be achieved through prescribed fire or wildland fire use.
Recommended Wilderness	Yes	Identification of recommended wilderness would convert some lands into more restricted Idaho Roadless Rule area themes, which would restrict the ability or means to achieve a trend towards the natural range of variation. Wildland fire use would be required to achieve desired conditions in recommended wilderness.

Resource Area	Adverse Environmental Consequences	Explanation
Idaho Roadless Rule Areas	Yes	Management direction in some Idaho Roadless Rule themes would restrict the means to achieve desired conditions and the purposes for why it is proposed.
Research Natural Areas	No	No consequences
Geographic Areas	No	No consequences
Gospel-Hump	No	No consequences
Lower Salmon	No	No consequences
Pilot Knob	No	No consequences
Special Interest Areas	No	No consequences

Forest Understory Habitats

Some species are associated with understory habitat conditions. These are key characteristics of forested habitats. Understory habitats are important in all forested habitat groups. These species include the snowshoe hare, Swainson's thrush, common yellowthroat (*Geothlypis trichas*), western heather vole, and blue-headed vireo. Snowshoe hares have been associated with horizontal cover, which in many cases measures forest understory. The heather vole is associated with evergreen ground cover. Swainson's thrush habitat could be described as mature forest, but understory vegetation is emphasized as important. The common yellowthroat occurs in many habitats, but the common thread is that it requires dense growth of low vegetation. It could be said that forest understory is probably important for many species in the deciduous forests, the open forests, and the closed forests. Forest understory tends to be associated with site conditions and understory dominant plants are often associated with habitat type groups. The condition or abundance of understory can be affected by the amount of light penetrating to the forest floor. Understory vegetation can decline or change through time as the canopy closes. Thus, the quality or abundance of understory habitats in many cases are dependent upon lack of overstory canopy. Thus, they are often disturbance dependent. Duguid and Ashton (2000b) evaluated a meta-analysis on the effects of forest management on understory vegetation. Across 96 studies, they found no consistent effects on understory species' richness from forest management for timber. Thinning or uneven aged management increased understory diversity. Where regeneration harvest showed no effect on species' richness, stands in later successional stages showed a decrease in understory species richness compared to unlogged stands. Their research suggested that site characteristics had more influence than timber management. Forests with better site characteristics have more abundant and diverse understories. Forest understory vegetation is usually more abundant along forest edges with non-forested habitats and in early seral forests. Understory plants do well along riparian areas and in disturbed forests.

Ecotone, Forest Edge, or Forest Mosaic

It has long been known that many wildlife species prefer to use ecotones. An ecotone is a transitional area of vegetation between two different plant communities, such as forest and grassland. In examining the descriptions of habitats preferred by the species that occur on the Nez Perce-Clearwater, it became clear that many species select ecotones as key habitat features. The species were grouped into the ecotone, forest edges, or habitat combinations habitat grouping if the description of their habitats included features such as both open and forested habitats, if they required trees for breeding but open habitats for other phases of their life cycle, or if they preferentially use forest edges as selected habitats. A total of thirty-one species were grouped into this habitat grouping and analyzed with respect to how the plan provides for these species. A list of species and their habitat descriptions can be found within Appendix C. Examples of species in this group include wild turkeys (*Meleagris gallopavo*), black-billed magpies (*Pica hudsonia*), mourning doves (*Zenaida macroura*), the short-tailed weasel, the northern flicker, northern saw-wet owl, olive-sided flycatcher, and ungulates like elk, deer, and moose. While they might have variation in their habitat needs, the common feature they all use are ecotones.

Ecotones have a higher biological diversity because species that use either habitat type can occur along with species that select ecotones as preferred habitat and species that require both adjacent habitat types within their home range. The presence of species from non-forested vegetation, early seral habitats, and forest species can therefore all be present near or on edges.

Ecotones can be natural or created by disturbances. In limited places on the Nez Perce-Clearwater, natural meadows form a natural mosaic with forests that provides ecotones, but these situations are less common because conifer forests dominate across wide areas of the Nez Perce-Clearwater. More commonly, ecotones are created through disturbances that create early seral conditions next to older age classes. Thus they are disturbance dependent habitats. Under natural disturbance, these situations are created through wildfire; insects and disease; and windthrow. The size, shape, and configuration of ecotones were influenced by the configuration of biophysical features, such as slope, aspect, and topographic position and the size, shape, distribution, and intensity of fires burning under varying conditions. Natural fires started burning under cool or wetter conditions, burned at low intensity, and remained small. These types of burns were frequent and common. When conditions became warmer or drier and weather conditions favored fire, fire starts burned hotter and larger. Yet, even when this happened, many areas of the Nez Perce-Clearwater burned in low or mixed severity fires.

Fires can burn at a variety of intensities, creating variable sized patches with irregular edges, feathered edges, completely burned areas, or patches of unburned trees and thinned forest, all of which produce a variable landscape. Furthermore, some tree species are capable of surviving fire well and patches often contain large and very large trees, even when in an early seral stage (Hessburg et al. 2015). Over time and wider spatial scales, this disturbance pattern created heterogeneous forest conditions with many forest edges of various age classes and dominance types influenced by topography. These characteristics should be considered key characteristics of patch dynamics at the landscape scale.

After European settlement, fire suppression and timber management changed this pattern at the landscape scale. Small fires were quickly put out and larger fires were contained. Over time, this changed the pattern at which these disturbances occur. Furthermore, timber harvest altered the size distributions, shapes, and spatial arrangements of successional patches (Hessburg et al. 2015). In cool, mesic mixed-conifer forests, where dispersed clear cuts were emphasized, successional patches were bisected by plantations, which were often smaller than natural disturbance events by order of magnitude.

Timber management in drier types removed fire tolerant tree species and the subsequent growth resulted in more homogenous stands and subsequent regeneration and release of shade-tolerant conifers, which increased the patch size and abundance of dense, multistory forest conditions (Hessburg et al. 2015). In many areas, livestock grazing removed fine fuels and reduced fire frequency, further contributing to fire exclusion. The pattern observed in modern-day managed pine and mixed conifer landscapes is largely the result of stand management, roads, livestock grazing, and fire exclusion, which is now being altered by wildfires that often defy suppression efforts during extreme weather conditions (Hessburg et al. 2015). These conditions drive forest patch and patterns into larger and more severe disturbances.

Natural meadows, grasslands, and persistent shrub areas contribute to habitat ecotones. These features exist today like they did prior to European settlement but their boundaries have been encroached by trees and smaller openings have disappeared (Hessburg et al. 2015). This change has been the result of a lack of disturbance in these locations. Some areas of the Nez Perce-Clearwater have mollisol soils, which form under prairie or grasslands over long time periods. Many of these mollisols are currently forested, but the presence of mollisols is an indicator that was not always the case.

Of species in the ecotone, forest edge, or mosaic habitat group, seven use snags or dead parts of live trees and four use downed wood as habitats. The species that use snags include the olive sided flycatcher, mountain bluebird, northern saw-wet owl, hoary bat (*Lasiurus cinereus*), northern flicker, great gray owl, and western blue bird. Those species that use downed wood include a different suite of species, including the red-tailed chipmunk (*Neotamias ruficaudus*), short-tailed weasel, American pygmy shrew (*Sorex hoyi*), and dusky or montane shrew (*Sorex monticolus*). This underscores the importance of these features along edges. From an ecological perspective, in many cases, snags are sometimes more abundant near ecotones for a couple reasons. First, fires kill and leave trees standing on the edges of patches or trees are left alive but die later due to damage. Secondly, where natural persistent meadows occur, the soils and ecological conditions are often less optimal for tree growth and habitats are often in the margins when trees grow in these habitats and trees tend to be less healthy growing here.

Some population trends of birds that were grouped into the Ecotone, Forest edge, or Forest Mosaic habitat group are available from the Intermountain Bird Observatory data accessed on March 24, 2023. The stratum queried was the Idaho BCR10 regional stratum. There are population trends for 21 birds that use ecotone habitat of which 14 are declining and 6 are increasing. Some declining trends have large variation in the data which should be viewed with discretion. Four declining species have large variations in the data such that the trends are less reliable and include the lark sparrow (*Chondestes grammacus*), western kingbird (*Tyrannus verticalis*), ring-necked pheasant (*Phasianus colchicus*), and the merlin (*Falco columbarius*). The lark sparrow, ring-necked pheasant, and merlin are uncommon birds on National Forest System lands which accounts for the wide variation in the trend data. That leaves 11 species with sufficient data for reliable trend inferences. Of those with reliable data, five species have declined by more than 20 percent annually, one has declined by 16 percent, and five have declined less than 5 percent per year over 13 years of data collection. In general, these are stronger declines than those in the forested habitat groups. Ecotone habitats rely in part on disturbance to create or maintain edge or ecotone habitats and the higher rate of decline regionally may indicate a decline in the quality or abundance of forest edge or ecotone habitats.

Hessburg et al. (2015) recommended seven principles to restore the fire prone landscapes of the Pacific Northwest. Five of the recommended principles speak to landscape pattern and patches as follows:

- **Principle 1:** Regional landscapes function as multi-level, cross-connected, patchwork hierarchies.
    - ♦ Implication: Conduct planning and management at appropriate scales to effectively restore multi-level landscape patterns, processes, and dynamics.
- **Principle 2:** Topography provides a natural template for vegetation and disturbance patterns at local landscape, successional patch, and tree neighborhood scales.
    - ♦ **Implication:** Use topography to guide restoration of successional and habitat patchworks.
- **Principle 3:** Disturbance and succession drive ecosystem change.
    - ♦ Implication: Move toward restoring natural fire regimes and the variation in successional patterns that supported them so that other processes may follow.
- **Principle 4:** Predictable patch size distributions historically emerged from linked climate-disturbance-topography-vegetation interactions.

- ♦ Implication: Move toward restoring size distributions of historical successional patches and allow changing climate and disturbance regimes to adapt them.

- **Principle 5:** Successional patches are "landscapes within landscapes."
  - ♦ Implication: In dry pine and dry to mesic mixed-conifer forests, restore characteristic tree clump and gap variation within patches.

Changes in landscape pattern are an important source of departures from the natural range of variability. Landscape patterns of patches and disturbances influence the abundance and distribution of species that use ecotones. They may also influence the connectivity of habitats for some species. For example, a homogenous landscape of mature forest might influence connectivity for land-based species that use early or non-forested habitats.

It should be noted that not all wildlife species benefit from ecotones. Some species that use interior forests can be adversely affected by an increased forest edge. Similarly, some studies have shown that brood parasitism increases in songbird nests along edges for the brown-headed cowbird (*Molothrus ater*). Highly fragmented landscapes can reduce overall wildlife diversity. Therefore, it is appropriate to have the size and shape of habitat patches configured similarly to how they were under natural conditions.

Existing Condition

Conditions in the plan area for landscape patch and pattern are departed from historical conditions like the departures described by Hessburg et al. (2015) above. Some areas of the Nez Perce-Clearwater are more departed than others when it comes to patch size and pattern. Wilderness areas have been allowed to burn more naturally since it was created, and these areas are more similar to the natural range of variation than the rest of the national forest. Many small fires burn frequently with periodic larger fires that overlap in extent with previous fires driving conditions back towards a more natural patch pattern. The managed front in Management Area 3 is the most departed because it has been managed to reduce the loss of timber resources from fire and timber harvest practices have favored more homogeneity and larger patches. Idaho Roadless Rule areas are departed at an extent somewhere between wilderness and managed front areas.

Restoration Activities

Restoration activities may include wildland fire (prescribed fire; wildland fire use); mechanical treatments and fire surrogates; and timber harvest. There are no objectives specific to restoring patch and pattern per se, but restoration following the desired conditions should lead managers to design projects that should help restore the landscape patch and pattern to provide for a variety of wildlife.

Plan Direction

To address this important aspect of departure in the plan, plan components for terrestrial vegetation contain language attempting to incorporate some of the principles outlined by Hessburg et al. (2015). See Sections 2.1.1, 2.1.3, and 5.1 of the Land Management Plan for plan components that pertain to terrestrial ecosystems, forestlands, and timber. More information is available in the Forestlands section about patch size. Desired conditions for proportions of size classes, along with those for landscape patch and pattern and maximum allowed size of regeneration harvest, should provide for a variety of wildlife species, including those associated with forest edges. Plan direction for patch and pattern and ecotones does not vary by alternative but the tools available, such as timber harvest, prescribed fire, and wildfire managed to achieve land management plan objectives, differ by land allocation where some tools cannot be used in some land types or are emphasized differently by land type. For example, timber harvest is the preferred tool in Management Area 3, whereas natural disturbance is generally the only tool allowed within wilderness.

Modeling Results and Predicted Outcomes

Patch size and distribution was modeled twice, first by Ecosystem Research Group with a simplified query, and second analysis was conducted by the Forest Service in conjunction with researchers from Rocky Mountain Research Station to produce a more robust and intensive analysis of patch size and distribution. The purpose of the two queries were different. The purpose of the Forest Service's query was to understand the natural range of variation (NRV) for patch size and distribution and understand the appropriate scale at which to manage for patches. The purpose of the Ecosystem Research Group query was to estimate and understand the future trend in patch size.

Patch size estimates are influenced by the pixel size in the model, and the grain size of the unit. In this case the smallest unit in the model was 5.56 acres and so the lack of smaller sized openings brings the average down. Therefore, the outputs are best interpreted as general trends or estimates and not as precise estimates.

SIMPPLLE outputs, in conjunction with a fragstats or a spatial query, can provide inferences about landscape patch and pattern under the NRV and the alternatives. Ecosystem Research Group used SIMPPLLE model outputs and a patch query to describe the future landscape patch and pattern outcome under the plan.

The Forest Service's query estimated the NRV for patch size. The spatially interactive model SIMPPLLE was used to consider the effects of forest growth and disturbance for a period of approximately 1,000 years before present. Empirical data, expert knowledge, and relevant scientific studies were used as a basis for the model information and assumptions. Thirty independent stochastic model runs were used to estimate the approximate average patch size for transitional or seedling-sapling forest, or openings, that existed historically. Results were quantified to show the range of sizes that occurred historically as well as the acreage amounts in size class ranges. Metrics include average patch size, area weighted mean patch size, and patch sizes classified with the Jenks Natural Breaks algorithm. This effort better addressed many of the challenges in modeling patch size and distribution. The Forest Service effort included careful evaluation of the effect of grain size, pixel adjacency and used distribution analysis to more fully understand patch size, pattern and distribution. The purpose of the Forest Service effort was not to project future change in patch size but to understand the distribution of patch sizes under natural disturbance, estimate the NRV for patch size to inform the proper scale of management.

The results revealed that the area weighted mean today is much smaller than modeled estimates of the natural range of variation (NRV) both forestwide and within broad potential vegetation types (PVTs). Similarly, the average patch size was also smaller today than the average patch size under modeled NRV. The limit on harvest opening size over the past 30 years imposed by National Forest Management Act (NFMA) is partially responsible for the trend in smaller patch sizes. Stand-replacing fire is the largest driver of historical openings and their size distribution on the Nez Perce-Clearwater National Forest. Changes to management strategies around opening creation events such as fire and timber harvesting can potentially help restore some of this pattern. The study recommended concentrating mechanically created opening sizes towards the average size within the second Jenks break, which is larger than the NFMA limit, but also relying on natural processes such as wildfire to create the larger openings. The Forest Plan employs such a strategy, which should trend the Nez Perce-Clearwater more towards the NRV of larger average and larger area weighted average patch size conditions. It does so with the 207-acre minimum patch size standard (FW-STD-TBR-06) prior to requiring regional forester's approval, and through plan direction that suggests a landscape pattern consistent with the NRV (for example, MA1 and MA2-DC-FOR-06, MA3-DC-FOR-02, MA1 and MA2-DC-FOR-07, MA3-DC-FOR-04, MA1 and MA2-DC-FOR-

08, MA3-DC-FOR-06, MA1 and MA2-DC-FOR-05, and MA3-DC-FOR-09). The modeling suggests that there will be a range of patch sizes to provide for species that use early seral and edge habitats.

Ecosystem Research Group analyzed patch size performed using the Forest Service-developed SIMPPLLE Output and Analytic Processor (SOAP). Patch statistics were performed on SIMPPLLE outputs and the following metrics were generated: total area of patches, average patch size, and average weighted mean. The patch query focused on seedling and sapling stands greater than one modeling cell (5.56 acre), so the smallest patches analyzed would be at least three modeling cells, or 17 acres (Table 177).

Table 177. Average patch size by alternative, timestep, and Management Area (MA)

MA	Alternative	Decade 0	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
MA1	No Action	41	102	119	196	201	273
MA1	P	41	101	118	191	197	269
MA1	W	41	102	123	196	197	271
MA1	X	41	101	120	196	200	270
MA1	Y	41	106	123	192	196	270
MA1	Z	41	101	118	193	199	272
MA2	No Action	43	79	96	118	126	158
MA2	P	43	81	100	123	126	158
MA2	W	44	83	102	124	130	170
MA2	X	44	78	95	120	129	164
MA2	Y	43	77	97	123	128	158
MA2	Z	44	82	102	142	136	178
MA3	No Action	39	100	85	83	97	97
MA3	P	39	105	94	97	98	110
MA3	W	39	109	96	104	105	96
MA3	X	39	130	112	99	97	86
MA3	Y	39	95	88	88	91	106
MA3	Z	39	93	85	103	97	95

Table 178 presents the total acres of patches greater than 17 acres by alternative and timestep.

Table 178. Total acres of patches by alternative, timestep, and management area

MA	Alternative	Decade 0	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
MA1	No Action	8,910	57,519	99,297	233,324	257,375	331,149
MA1	P	8,910	56,931	98,790	229,143	254,666	329,948
MA1	W	8,910	58,038	103,566	231,871	254,533	328,952
MA1	X	8,910	57,186	102,312	232,955	257,906	329,091
MA1	Y	8,910	61,555	104,045	231,344	253,704	328,142
MA1	Z	8,910	56,603	98,873	229,246	257,478	331,735
MA2	No Action	15,909	114,727	160,897	199,684	216,336	271,954
MA2	P	15,909	94,142	145,581	192,203	236,282	287,965

MA	Alternative	Decade 0	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
MA2	W	15,809	101,849	169,488	193,148	217,937	276,442
MA2	X	15,803	116,004	156,828	199,470	217,089	269,691
MA2	Y	15,909	86,290	154,276	198,125	227,055	290,349
MA2	Z	15,853	67,806	101,341	174,575	223,214	305,543
MA3	No Action	32,325	187,865	155,333	134,781	151,048	122,135
MA3	P	32,325	222,801	203,023	164,899	184,692	193,263
MA3	W	32,442	251,995	228,390	214,985	159,938	141,114
MA3	X	32,442	294,374	253,161	160,699	149,496	147,083
MA3	Y	32,325	199,547	184,307	166,830	170,098	178,326
MA3	Z	32,337	166,825	143,085	173,678	175,474	150,793

Results from Ecosystem Research Group's patch size analysis suggested that the size and total area of patches increase through time under all alternatives and within each of the three management areas. By timestep five, the average patch sizes are the largest in wilderness areas, smaller in Management Area 2, and smallest in Management Area 3. The modeled increase in patch size and number of larger patches can be attributed to an increase in large moderate and high severity wildfires, which is common to all alternatives. Because of the emphasis on landscape pattern, and larger patch size in the plan and because of the projected increase in fires, the plan will produce a landscape with more habitat edges, and a more complex forest mosaic to provide for species that use ecotones. The management under the plan components would benefit species that use ecotone habitats.

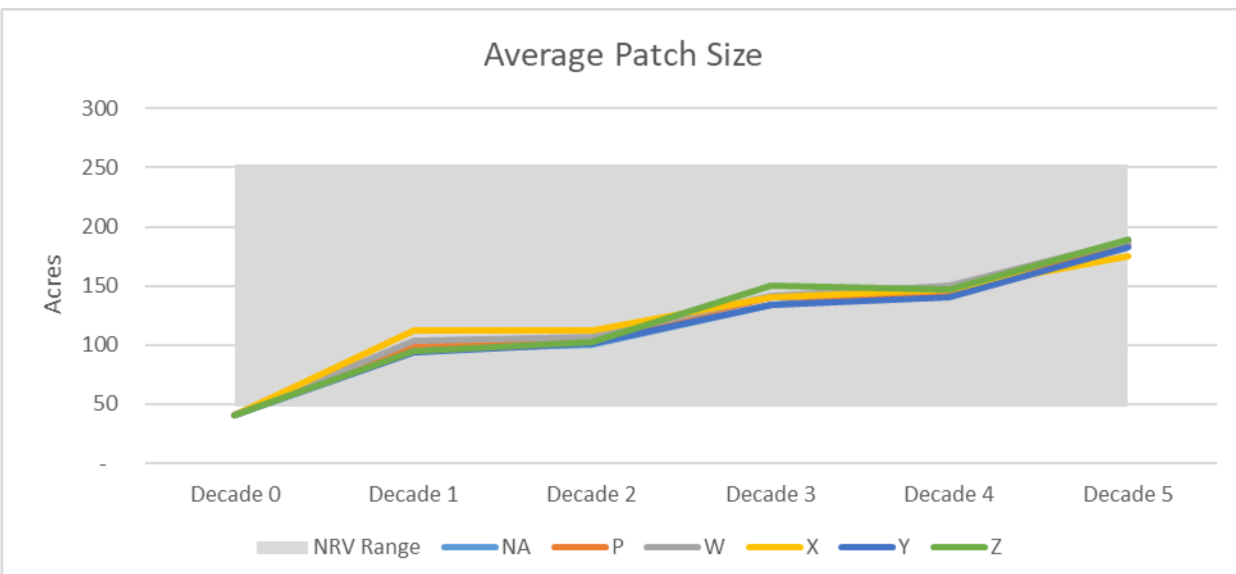


Figure 61. Average patch size by alternative. NA = No Action Alternative

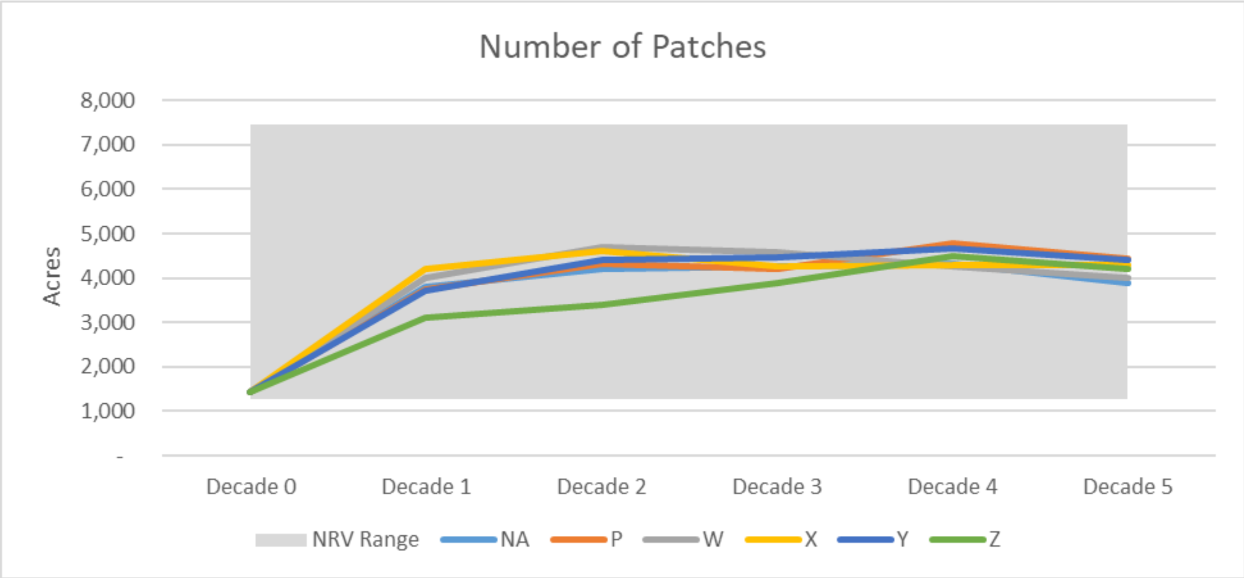


Figure 62. Change in patches over five decades by alternative. NA = No Action Alternative

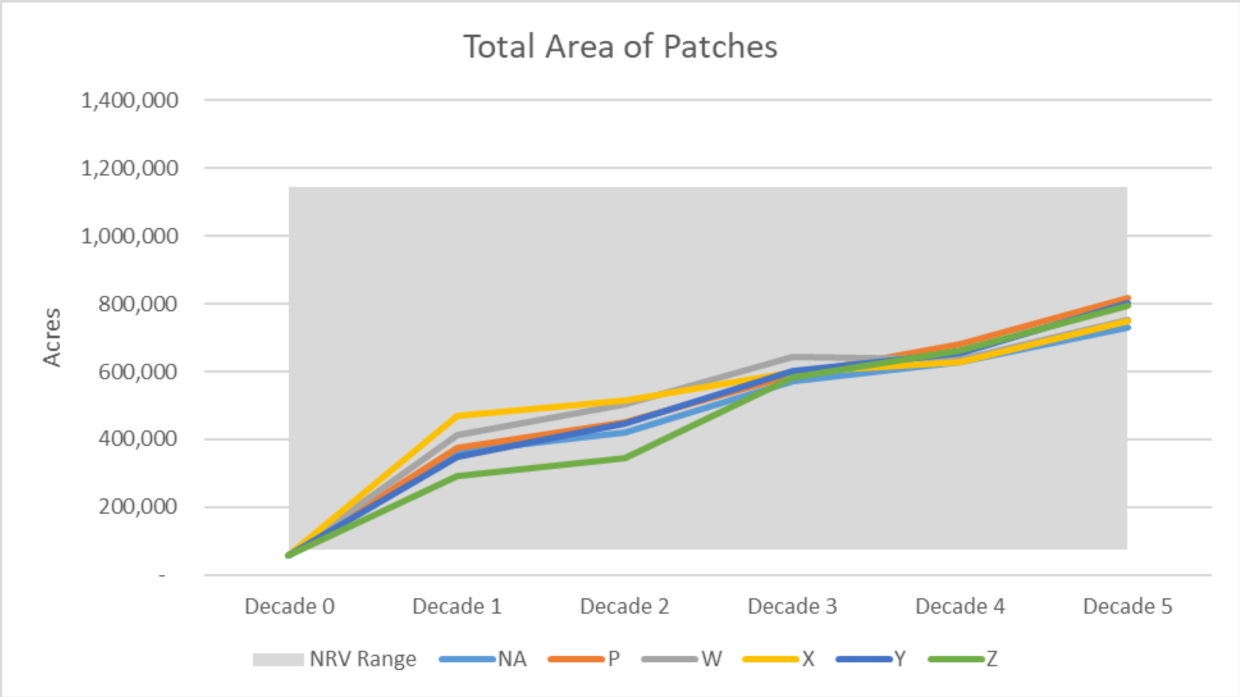


Figure 63. Total area of patches by alternative. NA = No Action Alternative

Environmental Consequences

Land allocations influence patch size distribution because of differences in how fires would be managed. Wilderness and recommended wilderness are managed with limited suppression efforts so patch sizes trend larger. The alternatives with more wilderness will provide more areas with larger patch sizes, while those with less wilderness will provide less or no areas with larger patch sizes. Management Area 2 direction and management (mostly Idaho Roadless Rule areas) should promote larger patch sizes than previously occurred because of the emphasis on fire as a disturbance driver, but fire suppression activities will likely still occur more often in Management Area 2 than in wilderness and recommended wilderness.

Nevertheless, the patch size, and amount of edge habitats will increase in the plan area under all alternatives, which is consistent with the natural range of variability for patch size distribution.

Table 179 summarizes environmental consequences to ecotone, forest edge, or forest mosaic from plan direction.

Table 179. Environmental consequences to ecotone, forest edge, or forest mosaic from plan direction

Resource Area	Environmental Consequences	Explanation
Terrestrial Ecosystems	No	No consequences or beneficial consequences on patch size, forest edge and ecotone habitats.
Biophysical Features	No	No consequences
Forested Lands	Yes	These plan components emphasize managing landscape patterns similar to patterns under the natural range of variability. Plan components should direct management to improve landscape patch and pattern. These plan components will promote habitats for species that use edges. These plan components would increase the average patch size to trend towards the natural range of variability for patch size. These plan components contain plan desired conditions to manage the landscape pattern similar to those under natural disturbances.
Carbon Storage and Sequestration	No	No consequences
Meadow, Grassland, and Shrubland	Yes	Management direction should improve non-forested habitats.
Fire Management	Yes	Fire management can change the landscape pattern. The direction under the Land Management Plan should facilitate an improved patch and pattern. Though some management may still suppress fires, which would continue to cause departures from historic patch and pattern. Plan direction provides the flexibility and emphasis to improve fire management for resource benefits.
Invasive Species	No	No consequences
Soil Resources	No	No consequences
Aquatic Ecosystems	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction especially in riparian areas. Overall these effects should be minor in scope and impact for species that use ecotones.
Water and Aquatic Resources	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Conservation Watershed Network	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Riparian Management Zones	No	No consequences
Lands and Special Uses	No	No consequences
Recreation	No	No consequences
Wildlife	No	No consequences
Multiple Use Wildlife	No	No consequences
Air Quality	Yes	Air quality measures in the plan, as well as those required by each individual state, may sometimes prevent, hinder, or reduce prescribed burn windows.
Tribal Trust	No	No consequences

Resource Area	Environmental Consequences	Explanation
Cultural Resources	No	No consequences
Municipal Watersheds	Yes	Some management activities to restore forest ecosystems would be prevented or restricted by plan direction in some areas.
Sustainable Recreation	Yes	May facilitate disturbance of these habitats by recreationists. Motorized roads and trails have the potential to fragment habitat.
Scenery	No	No consequences
Public Information, Interpretation, and Education	No	No consequences
Infrastructure	No	No consequences
Land Ownership and Land Uses	No	No consequences
Suitability	Yes	Some types of management towards achieving forest desired conditions may be prevented in some areas as not suitable.
Timber	Yes	Timber management has the potential to continue departures in patch size and distribution. It may also serve to improve patch size and pattern and increase early seral habitats. Reforestation practices can result in denser stands and shorter lived early seral habitats, which may decrease the longevity of edges. Fire would not be a preferred tool in areas suitable for timber production, which naturally increases habitat heterogeneity. These effects would be most apparent in Management Area 3.
Energy and Minerals	Yes	Plan direction may facilitate fragmentation and impacts to patch configurations.
Livestock Grazing	Yes	May facilitate impacts from grazing within the open or early seral forest. Should have minor consequences because of the utilization plan direction of 35 to 55 percent.
Special Forest and Botanical Products	No	No consequences
Designated Wilderness	No	No consequences
Wild and Scenic Rivers	No	No consequences
Lolo Trail National Landmark	No	No consequences
Recommended Wilderness	Yes	Would remove some means and reasons for achieving desired conditions for patch and pattern. Fire would be the primary tool.
Idaho Roadless Rule Areas	Yes	Would remove some means and reasons for achieving desired conditions for patch and pattern. Fire would be the primary tool.
Research Natural Areas	No	No consequences
Geographic Areas	No	No consequences
Gospel-Hump	No	No consequences
Lower Salmon	No	No consequences
Pilot Knob	No	No consequences
Special Interest Areas	No	No consequences

Non-Forested or Early Seral Terrestrial Habitats

A total of 54 species were grouped into the non-forested or early seral habitats group. In many cases, these species can be found in either non-forested habitats or in forestlands in an early seral condition. Therefore, this grouping combines both together as a logical grouping.

This broad grouping contains three habitat subgroups:

- meadow, grassland, forbland, and shrubland
- shrubland, thickets, woodlands, and early seral forests
- sparse, barren, or bare ground habitats

As a group, these species make up 14.5 percent of the species on the Nez Perce-Clearwater. The scientific literature was not always clear, nor consistent, in describing habitats for some of these species. Specifically, habitat descriptions often conflated grasslands, shrublands, thickets, and woodlands for some of these species. Some species in this group were identified as preferring grassland, meadow, forbland, and shrubland, while other species were identified as using shrubland, thicket, woodland, and early seral habitats. Seemingly, habitats like grasslands seemed perhaps like they would be functionally different than habitats like shrublands or woodlands. Where possible, these species were placed into subgroups that reflect these differences, but it should be recognized that there is a lot of overlap with some species within these habitat groups, while other species seem more limited to grasslands, for example.

Many other species in other habitat groups also use these habitats. For example, many species in the ecotone habitat grouping, habitat generalists' group, resources habitat groups, substrate habitats grouping, broad-leaved vegetation habitat group, and open forest groups can also be found in non-forested habitats. Taken together, the number of species that use non-forested or early seral habitats represent a large portion of the wildlife biodiversity of the Nez Perce-Clearwater. For example, broad-leaved shrubs often occur within early seral forest conditions and are used by some of the species in the broad-leaved habitat group. Similarly, many species are grouped into substrate habitat groups because they rely on features like cliffs, burrows in cutbanks, or habitats under rocks but some of these species prefer these features within non-forested areas. Appendix C contains a table showing the habitat descriptions of species and shows the habitat groups in which they were assigned.

The first habitat subgroup is the meadow, grassland, forbland, and shrubland habitat subgroup, which includes 27 species. Species assigned into this habitat subgroup include the Brewer's blackbird (*Euphagus cyanocephalus*), American badger, American goldfinch (*Spinus tristis*), northern harrier (*Circus hudsonius*), Savannah sparrow (*Passerculus sandwichensis*), mountain cottontail, American kestrel, western meadowlark (*Sturnella neglecta*), Say's phoebe (*Sayornis saya*), vesper sparrow (*Pooecetes gramineus*), northern pocket gopher (*Thomomys talpoides*), montane vole (*Microtus montanus*), brown-headed cowbird, and meadow vole (*Microtus pennsylvanicus*). This grouping also includes non-native species like the European starling (*Sturnus vulgaris*), Eurasian collared dove (*Streptopelia decaocto*), house sparrow (*Passer domesticus*), grey partridge (*Perdix perdix*), and rock pigeon (*Columba livia*). Most of these species are herbivores or granivores, and predators usually feed on rodents or birds. Key ecological characteristics include grass and herbaceous vegetation; seeds or grains for some species; loose friable soil for burrowing; and robust prey populations for predatory species. Fire can act to maintain grassland and shrubland habitats. These habitats are prone to invasion by invasive plants. Only two of the species in this group use snags—the American kestrel and the European starling.

The next habitat subgroup is the shrublands, thickets, woodlands, and early seral forests subgroup. These species include herbivores, granivores, insectivores, frugivores, browsers, and nectar feeders. This subgroup includes species like mountain quail, Brewer’s sparrow (*Spizella breweri*), calliope hummingbird (*Selasphorus calliope*), dusky flycatcher (*Empidonax oberholseri*), fox sparrow (*Passerella iliaca*), spotted towhee (*Pipilo maculatus*), lesser goldfinch (*Spinus psaltria*), yellow-breasted chat, MacGillivray's warbler (*Geothlypis tolmiei*), Bewick's wren (*Thryomanes bewickii*), white-crowned sparrow (*Zonotrichia leucophrys*), gray catbird (*Dumetella carolinensis*), spruce grouse (*Falcipennis canadensis*), and mule deer. Most of these species seek shrublands, thickets, or early seral forested habitats. A couple non-native species occupy these habitats as well, such as the house finch (*Haemorhous mexicanus*) and California quail (*Callipepla californica*). Key ecological characteristics for these habitats include deciduous shrubs or small trees, thickets, fruiting plants, nectar resources, browse, and insect populations. Only one of these species, the Bewick’s wren, uses snags or downed wood. Only yellow-pine chipmunk uses downed wood. Both prescribed and wildfire are key characteristics to maintain or create these habitats. Most of these features are assumed to be present when functioning in the natural range of variability.

A much smaller subgrouping includes those species that rely on sparse, barren, or bare ground habitats. Species included in this group include the killdeer, horned lark (*Eremophila alpestris*), and kit fox (*Vulpes macrotis*). The kit fox may not actually occur in the plan area but was included because there is one observation listed in the species diversity database for Idaho. Kit foxes usually inhabit deserts, and their range only extends north near Boise, so that identification was likely erroneous.

Population trends of birds that were grouped into the non-forested or early seral habitat group are available from the Intermountain Bird Observatory data accessed on March 24, 2023. The stratum queried was the Idaho BCR10 regional stratum. There are population trends for 42 birds of which 34 are declining while 8 are increasing. Some declining trends have large variation in the data which should be viewed with discretion. Eight declining species have large variations in the data such that the trends are less reliable and include the killdeer, barn swallow (*Hirundo rustica*), Swainson’s hawk, California quail, Eurasian collared dove, yellow-breasted chat, sage thrasher (*Oreoscoptes montanus*), and house finch. These birds are either uncommon or are patchily distributed which account for the wide variation in the trend data. That leaves 26 species with sufficient data for reliable trend inferences. Of those with reliable data, 13 species have declined by more than 20 percent annually, 2 have declined between 10 to 20 percent, and 11 have declined less than 10 percent per year over 13 years of data collection. In general, these are stronger declines than those in the forested habitat groups. Early seral or non-forested habitats rely in part on disturbance to create or maintain edge or ecotone habitats and the high rate of decline regionally by these species may indicate a decline in the quality or abundance of early seral or non-forested habitats regionally.

Distribution and Trend in the Plan Area

The meadow, grassland, forbland, and shrubland habitat subgroup includes persistent mountain meadows at higher elevations, bogs or peatlands, and lower montane foothills distributed along the Salmon River and South Fork Clearwater, on the Island, and at lower elevations or mid elevation ridge tops, especially on the Nez Perce portion of the national forest. They can also occur at high elevation ridgelines, particularly in alpine meadows and persistent shrublands. There are substantial quantities of these habitats along the North Fork Clearwater River as well.

Natural or persistent grassland and forbland habitats are relatively uncommon in the plan area because of the heavy dominance by coniferous forests. More common are grass shrub seral stages of forestlands, which can be either ephemeral or persistent. Grasslands and shrublands commonly occur after fire, timber harvest, or other disturbances. Persistent shrublands can occur after repeated burns on forested habitats.

The modeling suggests that these habitats are less abundant than they were under natural disturbance, as fires maintained these habitats. Some mesic meadows have shrunk at the margins and smaller meadows have likely disappeared altogether through conifer encroachment Hessburg et al. (2015).

Modeling of the natural range of variability suggests that these habitats have declined in the plan area. Small size classes in the 0- to 4.9-inch class and the grass shrub stage appear to be less abundant currently than they were under natural disturbance as the result of fire exclusion and subsequent succession.

Key Threats

The key threats are similar for these two subgroupings. The primary threat to both includes forest succession and fire suppression. Invasive plants pose a serious threat to the meadow, grassland, forbland, and shrubland habitat subgrouping because they are prone to invasion and can be dominated by these species. Common invaders include yellow star thistle, cheatgrass, Medusa head, bulbous bluegrass, and spotted nap weed. Invasive plants may also occur in the shrublands, thickets, woodlands, and early seral forests subgroup and could degrade the habitat for some species. However, in these subgroups, shrubby or woody vegetation can compete with invasive plants better than in grassland habitats. Grazing could impact these habitats at higher intensities. Silviculture practices to replant trees and control competition from shrubs could alter these habitats or shorten their duration once created through timber harvest. In some cases, over browsing by big game or livestock has impacted the condition of some of these habitats.

Natural grasslands and persistent shrublands were exploited heavily after European settlement by unregulated livestock grazing. These uses could have affected species' composition and the condition that may persist today. Intensive sheep grazing probably reduced the amount of shrub dominated habitats, which may take decades to recover. Grazing intensities today are much less than they were historically and have less impact.

Restoration Activities

Depending upon site conditions and desired outcomes, restoration activities include mechanical removal of trees through timber harvest but also lop and scatter; cut, pile, and burn; mastication; chaining; and girdling. Wildland fire may be particularly effective. Restoration may include the control of invasive plant species or planting native vegetation. All these activities are designed to setback succession and reduce conifer or invasive weed encroachment.

Plan Direction

Plan direction for these habitats includes desired conditions to restore size class distribution in all of the potential vegetation types, particularly those for the seral grass or shrub and 0- to 4.9-inch size class. Direction to help inform the pattern of these habitats is included within the forested plan components regarding landscape patch and pattern. Objectives to restore size class and dominance types will benefit species that use non-forested and early seral habitats.

Additional direction is found in the meadow, grassland, and shrubland plan components. These components describe a desire to have less encroachment by conifer trees and describe the desired species compositions by type. Direction in the Fire Management section will serve to promote wildland fire to restore fire prone landscapes.

Plan direction to prevent or control invasive plant species are relevant to conserving and restoring these habitats.

Plan direction for sustainable grazing includes measures to ensure sustainable use of these habitats by livestock. While livestock can be a stressor to these habitats at higher intensities, lower and moderate intensities can usually be sustained with no, less, or beneficial impacts. Livestock grazing plan components are particularly relevant and should allow sustainable use by livestock while maintaining the health of non-forested and early seral habitats.

Plan direction under tribal trust and responsibilities may have implications for early seral, meadow, grassland, or shrubland habitats. See the Land Management Plan for plan components that would have implications for the conservation or use of these habitats.

Under the wildlife section of the Land Management Plan, plan components provide for or direct the management of non-forested or early seral habitats. Under the multiple uses' wildlife section, plan components have implications for habitat conditions or the amounts in non-forested early seral habitats.

Plan direction for designated and recommended wilderness emphasizes a management system through natural processes. This direction should maintain or increase non-forested vegetation and early seral habitats. A crosswalk of plan components with early seral and non-forested vegetation is provided in Appendix C.

Modeling Results

The SIMPPLLE model projects disturbance and forest vegetation response. It was not configured to model naturally occurring non-forested habitats. It does model the amount of early seral habitats. In all alternatives, early seral habitats increase through the 50-year period.

Environmental Consequences

Table 180 summarizes the environmental consequences to non-forested or early seral terrestrial habitats from plan direction.

Table 180. Environmental consequences to non-forested or early seral terrestrial habitats from plan direction

Resource Area	Environmental Consequences	Explanation
Terrestrial Ecosystems	No	No consequences or consequences beneficial to early seral or non-forested habitats.
Cave and Karst Features	No	No consequences
Forestlands	Yes	Plan components should direct management to increase and restore early seral habitats.
Carbon Storage and Climate Change	No	No consequences
Meadow, Grassland, and Shrubland	Yes	Management direction should improve and increase non-forested and early seral habitats.
Fire Management	Yes	Fire management can change the amount and quality of early seral habitats. The direction under the Land Management Plan should facilitate an increase in these habitats.
Invasive Species	Yes	Invasive species management would help conserve early seral and non-forested habitats and limit the spread of invasive species.
Soil Resources	No	No consequences
Aquatic Ecosystems	Yes	Some management activities to increase non-forested or early seral forests would be prevented by plan direction.
Water and Aquatic Resources	Yes	Some management activities to restore forest ecosystems would be prevented by plan direction.
Riparian Management Zones	Yes	Some constraints within the direction for riparian management zones might prevent or reduce efforts to restore or treat early seral or non-forested habitats. However, the plan does contain direction to treat

Resource Area	Environmental Consequences	Explanation
		riparian areas and mesic non-forested habitats to maintain or restore non-forested habitats.
Conservation Watershed Network	Yes	Some management activities to restore early seral or non-forested conditions would be prevented by this plan direction.
Infrastructure (Aquatics and Riparian)	No	No consequences
Energy and Minerals (Aquatic and Riparian)	No	No consequences
Livestock Grazing (Aquatics and Riparian)	No	No consequences
Lands and Special Uses (Aquatics and Riparian)	No	No consequences
Recreation (Aquatics and Riparian)	No	No consequences
Wildlife	No	No consequences
Multiple Use Wildlife	No	No consequences
Air Quality	Yes	Some prescribed fires would be prevented through air quality regulations.
Tribal Trust	No	No consequences
Cultural Resources	No	No consequences
Municipal Watersheds	Yes	Some management activities to restore forest ecosystems would be prevented or restricted by plan direction within within municipal watersheds which are limited in scope.
Sustainable Recreation	Yes	May facilitate disturbance of these habitats by recreationists. Motorized roads and trails have the potential to fragment habitat. Recreation opportunity spectrum is the primary mechanism used in the plan to establish the suitability of motorized uses. These plan components identify where motorized uses are suitable. Areas identified as suitable for motorized uses can set the stage for future development of motorize routes which could impact nonforested and early seral habitats.
Scenery	Yes	May alter some projects designed to increase these habitats.
Public Information, Interpretation, and Education	No	No consequences
Infrastructure	Yes	Infrastructure management primarily focuses on maintanence and presence of infrastructure like roads and buildings. They emphasize responsibility and good maintanence practices for these features. The direction in infrastructure might have some minor site specific impacts to early seral or non-forested habitats.
Land ownership and Land Uses	No	No consequences
Ecosystem Services	Yes	Ecosystem services plan direction emphasizes the use of ecosystem services, some of which could create indirect impacts to non-forested habitats. Examples include snag or downed wood removal from non-forested habitats, or impacts to non-forested habitats from recreation. Restrictions in closing motorized access found in FW-GDL-ES-01 could potentially result in retaining or relocation motorized routes in non-forested habitats.

Resource Area	Environmental Consequences	Explanation
Timber	Yes	Timber management would increase these habitats. Reforestation practices can result in denser stands and shorter lived early seral habitats, which may decrease the longevity of early seral habitats. Fire would not be a preferred tool in areas suitable for timber production, which naturally increases habitat heterogeneity. These effects would be most apparent in Management Area 3.
Energy and Minerals	Yes	Plan direction may facilitate fragmentation and impacts to patch configurations.
Livestock Grazing	Yes	May facilitate impacts from grazing within the open or early seral forest. Should have minor consequences because of the utilization plan direction of 45 percent.
Special Forest and Botanical Products	No	No consequences
Designated Wilderness	No	No consequences
Wild and Scenic Rivers	No	No consequences
Recommended Wilderness	Yes	Would remove some means and reasons for achieving desired conditions for early seral and non-forested habitats. Fire would be the primary tool. In general, early seral habitat would increase in extent because of recommended wilderness management.
Eligible and Suitable Wild and Scenic Rivers	Yes	Direction in Eligible and Suitable Wild and Scenic Rivers are protective or constraining, but this direction might prevent some activities to create or maintain early seral or non-forested habitats within river cooridors because of the emphasis on protecting or enhancing Outstandingly Remarkable Values.
Idaho Roadless Rule Areas	Yes	Would remove some means and reasons for achieving desired conditions for early seral and non-forested habitats. Fire would be the primary tool.
Research Natural Areas	No	No consequences
Geographic Areas	No	No consequences
Gospel-Hump Geographic Area	No	No consequences
Lower Salmon Geographic Area	No	No consequences
Pilot Knob Geographic Area	No	No consequences
Lolo Trail National Historic Landmark Geographic Area	Yes	Would constrain some activities typically used to create or maintain early seral or non-forested habitats. However, they emphasize natural disturbance to managed these habitats. Consequences are minor because the Landmark is limited in area and this plan direction otherwise has no detrimental consequences.
Special Areas	No	No consequences
Suitability	Yes	Some types of management towards achieving forest desired conditions may be prevented in some areas listed as not suitable. Suitability plan components are associated with land allocations and are consistent with the emphasis management in those areas. While mechanical treatments are constrained in some land allocations other tools are emphasized such as wildfire, which should trend towards larger openings sizes and greater amounts of early seral habitats. Motorized suitability sets the stage for future motorized route

Resource Area	Environmental Consequences	Explanation
		development and could lead indirectly to impacts of roads and some early seral or nonforested habitats.

Connectivity

The Nez Perce-Clearwater National Forest consists of a large contiguous block of public land with few obstructions to disrupt connectivity and animal movements. Most of its boundary is bordered by other national forests save for the western boundary, parts of the Palouse Ranger District, and the area between the Salmon and Snake River commonly referred to as the Island. Landownership on lands west of the Nez Perce-Clearwater boundary is made up of a combination of private lands managed for timber, state lands managed for timber, and privately owned lands used for agriculture or development. Terrestrial habitats are well connected throughout the interior of the plan area. The primary manmade barriers are Highway 12 and Highway 64. The plan also contains natural barriers like large rivers such as the North Fork of the Clearwater, the Lochsa River, the Selway River, the middle Fork of the Clearwater River, and the Salmon River.

The plan contains desired conditions that were designed to provide connectivity for wildlife. Plan components designed to provide connectivity include FW-DC-WL-03, FW-DC-WL-06, FW-DC-WL-09. Plan direction for landscape pattern also was intended to provide connectivity. These include MA1 and MA2-DC-FOR-06, MA3-DC-FOR-02, MA1 and MA2-DC-FOR-07, MA3-DC-FOR-04, MA1 and MA2-DC-FOR-08, MA3-DC-FOR-06, MA1 and MA2-DC-FOR-05, and MA3-DC-FOR-09.

The most prominent barriers to connectivity are human made features like high-speed highways, cities, or reservoirs. The land allocations and associated suitability plan components provide the ecological conditions to provide connectivity because they prevent or constrain many activities that would disrupt connectivity. For example, the Idaho Roadless Rule prohibits construction or reconstruction of roads in wilderness management prohibits construction of roads, buildings, and most other activities. Designated wild and scenic rivers prohibit dam building. Approximately two thirds of the National Forest System lands in the planning area are either Idaho Roadless Rule or wilderness areas. Essentially, connectivity is well provided on the Nez Perce-Clearwater National Forest. Land allocations and their associated suitability plan components can conserve large blocks of land for connectivity. Land allocations vary by alternative in how they provide for connectivity. Of greatest conservation value related to connectivity are recommended wilderness, but to a lesser extent suitable and eligible wild and scenic rivers, and research natural areas. Alternative W provides the most recommended wilderness while Alternative X provides the least with zero recommended wilderness. The No Action Alternative, Alternative Y, and Alternative Z provide intermediate levels of recommended wilderness. The Preferred Alternative strikes a balance the amount of recommended wilderness provided and provides recommended wilderness in locations important to connectivity such as in the Mallard Larkins, the Hoodoo, and Meadow Creek recommended wilderness areas. It should be noted that all proposed recommended wilderness in all alternatives is derived from Idaho Roadless Rule areas that already receive protective management by the Idaho Roadless Rule. Recommended wilderness allocations would provide additional protection to already protected lands. Namely, prohibitions on motorized and mechanized uses under the Preferred Alternative. The area along the Idaho-Montana border has been identified as an important area for North and South movements for wide ranging wildlife like wolverines (Carroll et al. 2020) and grizzly bears (Peck et al. 2017). The majority of the area along the Idaho-Montana border are included in either designated wilderness, recommended wilderness, or Idaho Roadless Rule areas.

Suitability plan components and plan direction for existing land designations can also contribute to connectivity because they restrict activities that disrupt connectivity. For example, plan direction and suitability plan components for Idaho Roadless Rule Areas, designated wilderness, and designated wild and scenic rivers all constrain or prohibit many activities that disrupt connectivity, such as road building, and construction of buildings. Suitability plan components within Idaho Roadless Rule areas find road building unsuitable in most Idaho Roadless Rule areas. Suitability plan components in designated wilderness areas find timber production, timber harvest road construction, most mineral activities, construction of new buildings, motorized travel, and mechanized travel as unsuitable. Activities such as livestock grazing and mineral extraction are conditionally suitable according to designating legislation and wilderness management plans.

Collectively, land allocations in the Nez Perce-Clearwater, especially those in designated wilderness, designated wild and scenic rivers, suitable wild and scenic rivers, Idaho Roadless Rule areas, Research Natural Areas, and the National Historic Landmark are managed with restrictions on the suitability of uses. As such they will provide for large tracts of lands with high connectivity value that have few barriers and management that restricts the creation of new barriers. These lands combined account for approximately two thirds of the nearly 4 million acres within the plan area. Connectivity is well provided and not a concern on the Nez Perce-Clearwater National Forest under the revised plan.

Habitat Generalists

Several species are found so widely and in so many habitats that they did not fit within the other habitat groupings. These include species like the North American deer mouse (*Peromyscus maniculatus*), porcupine (*Erethizon dorsatum*), common raven (*Corvus corax*), and long-tailed vole (*Microtus longicaudus*). These species are found in a diverse range of habitats and will likely be present within many areas of the Nez Perce-Clearwater. These species will not be evaluated further.

Resource Habitats

Some species are reliant on available resources rather than specific habitat types or structure. These species can occur in any habitat so long as their specific resource needs are met. Some examples include predators that can persist in a wide range of habitats so long as they have prey or hummingbirds that rely on nectar resources but can otherwise occur within a wide variety of habitats. Species in this group can be found in many habitats, from deserts to grasslands to forests. This grouping came about because these species did not fit into other habitat groupings because of the variability of the habitats in which they are found. In total, there were 16 species grouped into these habitat groupings, but it should be recognized that some of these species are found in forested, non-forested, ecotone, or edge habitats.

Examples of species in the resource habitat grouping include carnivores and scavengers, such as the red fox, bobcats, coyotes, mountain lions, wolves, long tailed weasels, and turkey vultures. It also includes bird species that rely on mast, such as the red crossbill (*Loxia curvirostra*), white-winged crossbill (*Loxia leucoptera*), and Clark's nutcracker (*Nucifraga columbiana*). Similarly, fruiting plants are the main drivers of waxwing habitat selection and include both the bohemian waxwing and cedar waxwing (*Bombycilla cedrorum*). The last group of species that use resource habitats include hummingbirds, such as the rufous hummingbird (*Selasphorus rufus*) and black-chinned hummingbird (*Archilochus alexandri*), that are reliant on nectar resources.

Most species are reliant upon resources available in their respective niches, though. Several other wildlife species could have also been grouped into this habitat grouping as well but were a better fit in other groupings based upon their habitat descriptions. Examples include pine siskin, calliope hummingbird, pygmy nuthatch, red squirrel, and flying squirrel. Many migratory bird species are insectivorous in the spring and frugivores, or fruit eaters, in the fall.

Some bird population trends of species grouped into the resource habitat group are available from the Intermountain Bird Observatory data accessed on March 24, 2023. The stratum queried was the Idaho BCR10 regional stratum. There are population trends for seven birds of which three are declining and four are increasing. The declining species includes the cedar waxwing, the rufous hummingbird, and the black-chinned hummingbird. Of note also, is that the calliope hummingbird is also declining but was placed in the non-forested or early seral habitat group. The species that declined were those that rely on nectar resources or fruit. The black-chinned hummingbird is the species with a declining trend but has large variation in the data which should be viewed with discretion, but it declined by 39 percent annually. The rufous hummingbird declined by 14.1 percent and the cedar waxwing declined by 24.9 percent each year over the 13-year sample period. The calliope hummingbird declined by 26.3 percent per year. The resource habitat species that rely on seeds or mast did not decline. Nectar and fruit producing vegetation rely in part on disturbance to create or maintain habitats and the higher rate of decline regionally may indicate a decline in the quality or abundance of these resource habitats.

The resources these species rely on could be considered key ecological characteristics of habitats rather than distinct habitats. Prey, nectar resources, and mast are expected to be provided by habitats that have ecosystem integrity. Mast or tree seeds are provided by conifer trees like whitebark pine, western white pine, Ponderosa pine, spruce, and Douglas-fir. Larger trees produce more mast than younger trees of the same species. Shifts towards a dominance type from those that produce mast to those that do not, for example conversion to grand fir from Ponderosa pine, has reduced some mast trees in some areas. Western white pine and whitebark pine both produce cones that produce mast. Exotic forest diseases, such as blister rust, have reduced some mast producing trees as well.

Nectar resources are provided by forbs and deciduous shrubs and trees. Fruits are provided by these same features. Nectar resources and fruiting plants are more abundant in early seral, non-forested, and riparian habitats and open forests than in closed canopy forests (Hanula et al. 2016). Bees and butterflies generally favor open forest habitats regardless of forest type, geographic region, or the method used to create these habitats. Dense shrub layers of native or nonnative species beneath forest canopies negatively impact herbaceous plant cover, diversity, and pollinators (Hanula et al. 2016). Fruiting plants include many deciduous trees, shrubs, and forbs. Some notable species include huckleberry, chokecherry, raspberry, strawberry, blackberry, thimbleberry, and elderberry. Threats to nectar resources and fruiting plants include fire suppression, forest succession, grazing, habitat fragmentation, pesticides, and invasive plant species. Many broad-leaved, deciduous trees and shrubs produce fruit and nectar resources. Plan components that favor early seral forests, non-forested habitat, and deciduous or broad-leaved forests would produce nectar and fruit resources for many wildlife species. These plan components include FW-DC-FOR-05, FW-DC-FOR-08, FW-DC-FOR-11, FW-DC-FOR-12 especially in seral grass or shrub, and 0- to 4.9-inch size classes. For nectar or pollination resources, the plan includes FW-DC-TE-03. FW-DC-TE-05 and FW-OBJ-TE-01 that encourage resources for pollinators and species that use deciduous, fruit producing vegetation.

Restoration activities for mast producing trees include the conversion of dominance types toward mast producers like Ponderosa pine, western white pine, and whitebark pine. Restoration of nectar resources includes any activities that open canopies or disturb non-forested habitat, such as thinning, timber harvest, wildland fire, and plantings. Treatment of invasive plant species could restore some native nectar sources, though invasive plant species often have flowers.

Plan direction for these activities is found within the forestland; meadow, grassland, and shrubland; and riparian plan components. Objectives include restoring some dominance types of mast producing trees, such as white pine and whitebark pine; increasing the dominance of Ponderosa pine; increasing early seral forests; and restoring camas and huckleberry. Plan components included those for dominance types such as FW-DC-FOR-03, FW-DC-FOR-06, FW-DC-FOR-09, FW-DC-FOR-13 and provide direction to provide a variety of tree species that produce mast important for wildlife, especially when composed of larger size classes. See the Land Management Plan for plan components that pertain to terrestrial ecosystems. A crosswalk of plan direction with resource habitats can be found in Appendix C.

Substrate Habitats

Many species of wildlife in the plan area use or depend on soils, rock, cliff, talus, caves, or non-vegetative characteristics, in part or exclusively, for their habitat requirements. This report refers to those habitat features as substrate habitats, which include soil conditions, spaces under rocks or debris, rock outcrops, talus, cliffs, caves, mines, cervices, cut banks, or other geological features. For example, many species depend on the ability to burrow into soils for dens and hiding habitats but are otherwise generalists in regards to vegetation. Other species are specialized to both vegetation and also require burrowing habitats. A suite of species is reliant upon rock outcrops, talus, or cliff habitats. The effects to substrate habitats are analyzed under the assumption that, if these habitats are provided, then these species would contribute to the diversity and abundance of wildlife. Analysis for soil resources can be found in the soil specialist report.

Many species were grouped into the substrate habitats grouping. Substrate habitats are features such as cliffs, soil, rock outcrops, caves, mines, steep terrain, habitat under rocks or logs, or other non-vegetated features. Wildlife species in this group often occur in a wide array of habitats if there is the presence of their preferred substrate features. Substrate habitat subgroupings include species that use habitats under rocks, logs, or leaf litter; rock outcrops, talus, cliffs, or cutbanks; caves, crevices, or mines; steep terrain; roosting habitats; and substrate or soil and non-forested habitats. A total of 88 species were grouped into this habitat grouping.

The subgroup habitat under rocks, logs, or leaf litter includes ground dwelling species like reptiles, amphibians, mollusks, and some small mammals. The western terrestrial garter snake (*Thamnophis elegans*), ring-necked snake, rubber boa (*Charina bottae*), Selway forestsnail, nimapuna disc, vagrant shrew (*Sorex vagrans*), and masked shrew (*Sorex cinereus*) are examples.

The subgrouping rock outcrops, talus, cliffs, or cutbanks habitat supports birds, small mammals, and some mollusks. Examples of these species include the American pika, peregrine falcon, cliff swallow (*Petrochelidon pyrrhonota*), bushy-tailed woodrat (*Neotoma cinerea*), white-throated swift (*Aeronautes saxatalis*), salmon coil (*Helicodiscus salmonaceus*), and Seven Devils mountainsnail. These species mostly use these features in non-forested habitats. Twenty-two species were included in this subgrouping.

Bat distribution and habitat use is highly variable, as most bat species use a wide variety of habitats from forests and grasslands to deserts. The main driver of their distribution is based upon the availability of their preferred roosting habitats. Their roosting habitats can be snags, talus, mines, caves, cliffs, crevices, hollow trees, trees with sloughing bark, or buildings. Therefore, a subgrouping was created as roosting habitats that fit this pattern of use. Bats that occur in the Nez Perce-Clearwater include the little brown bat, silver-haired bats, big brown bats (*Eptesicus fuscus*), long-legged myotis, long-eared myotis, Townsend's big-eared bat, California myotis (*Myotis californicus*), and western small-footed myotis (*Myotis ciliolabrum*). Species like the Townsend's big eared bat are wholly reliant on caves and mines, whereas other species sometimes use caves but can be found in other features. Hollow trees and snags are important for some bat species in both winter and summer. This subgrouping includes eight species of bats. Some other bat species were grouped into other groups based on habitat descriptions, but most could have been placed here as well.

Only two species are included in the steep terrain subgroup—mountain goats and bighorn sheep. Steep terrain features are the selected habitat feature for these two species. These habitats must also have vegetation as forage. They use these habitats to escape predation.

Three species occur in a wide range of habitats but require burrowable soils as a key feature. These include golden-mantled ground squirrel (*Callospermophilus lateralis*), Columbian ground squirrel (*Urocitellus columbianus*), and Great Basin pocket mouse (*Perognathus parvus*). Other species in other habitat groups could also have been placed here but were a better fit in other groupings. Similarly, some might argue that these species could have been placed in other habitat groupings.

There is a suite of species that require substrate habitats in conjunction with open or non-forested habitats. These species were grouped into the substrate and non-forested habitat subgroup and include golden eagles (*Aquila chrysaetos*), which require cliffs with non-forested habitats for foraging, and barn swallows that need some substrate to attach their nest and non-forested habitats for foraging. The yellow-bellied marmot uses non-forested habitats along with rock outcrops. The northern rough-winged swallow (*Stelgidopteryx serripennis*) uses cliffs or rock cuts in roads and forages over non-forested habitats. In total, six species were grouped with this habitat grouping.

Some population trends of birds that were grouped into the substrate habitat group are are available from the Intermountain Bird Observatory data accessed on March 24, 2023. The stratum queried was the Idaho BCR10 regional stratum. There are population trends for seven birds of which four are declining and four are increasing. Three of the four declining species have large variation in the data which should be viewed with discretion. The species with large variations in the include the bank swallow, canyon wren (*Catherpes mexicanus*), and cliff swallow. The uneven distribution of these species accounts for the wide variation in the trend data. The rock wren (*Salpinctes obsoletus*) has sufficient data to provide reliable estimates of population trends and declines within the stratum are estimated at -9.7 percent. While the trend is declining, this species is relatively abundant. The rock wren is closely associated with relatively open habitats nearly anywhere there is exposed rock and associated crevices, and open habitats are often maintained or created by disturbance.

The plan area contains many either regional or Idaho-endemic mollusk species that use substrate habitats. Many of these species have been identified as G1 and G2 by NatureServe because of their restricted ranges and limited distribution. Most of these rare mollusks are dependent upon substrate habitats. Some, like the Selway forestsnail, occur in mesic forested habitats in the Selway and Lochsa River corridors and use habitats like rocks, logs, and leaf litter often found in riparian habitats. Other species with similar conservation status and attributes include the nimapuna disc, marbled jumping slug (*Hemphillia danielsi*), thin-lipped tightcoil (*Pristiloma idahoense*), lyre mantleslug (*Udosarx lyrata*), and humped coin (*Polygyrella polygyrella*). Many unique, rare, or endemic mountain snails and Oregonians occur in the lower Salmon River canyon or the Lochsa and Selway River canyons and are associated with specific rock outcrops or rocks with calcareous lithologies. These include the lyrate mountainsnail (*Oreohelix haydeni*), boulder pile mountainsnail, marbled disc, and Seven Devils mountainsnail.

There are a few things to note about the above-mentioned species. Taxonomy is difficult with these species leading to problematic taxonomic classification even by experts. Recent genetic studies were unable to sort out some of the taxonomic relationships (Linscott et al. 2020). These species tend to be understudied as well. Some recent studies in northern Idaho have found that snail and slug species, which were previously thought rare or limited in distribution, are common and more widespread (Baumgardt and Sauder 2012, Lucid et al. 2016).

It is possible that some of the G-ranked species will be found more common than currently thought. While the species mentioned above have been detected in the plan area, some others included in the list of species have not actually been detected in the plan area but were within a half mile of the boundary and were included. Some of the rare land snails may not actually occur within the boundaries of the Nez Perce-Clearwater. A list of species, their habitat descriptions, and the habitat group they were assigned to can be found in Appendix C.

Threats and Stressors

Substrate habitats in the plan area have little that affects them. However, there are some activities that can affect them. Some rock outcrops and cliff habitats are quarried by the public or by the Forest Service for road-base in support of timber harvest. Rock quarrying within the Lower Salmon River area can impact many endemic and rare snail species. The Nez Perce-Clearwater has only a few known caves. Papoose Cave is identified as a nationally significant cave and is gated for protection of the feature that made it recognized. Use is allowed through a permit system and only people who have vertical caving skills can effectively explore it because of vertical passages. There are few visits made each year.

Habitats under rocks are quite stable and persistent and largely unaffected by management, except in the case of road building. However, the amount of downed wood can be influenced by forest and fuels management. The Nez Perce-Clearwater has abundant downed wood and the 1987 Plans, as well as the Land Management Plan, have measures to retain downed woody debris after timber harvest. Cliff and rock outcrops can be affected by rock climbing recreation, but this is not prevalent on this forest. Burrowing habitats can be impacted by soil impairment, usually because of timber harvest or wildfire suppression efforts. Roosting habitats can include a wide variety of features that are not often impacted; however, impacts can include mine closures, rock climbing, loss of snags, and quarrying. Mines are a man-made feature that poses hazards to both humans and bats. While it is important to protect these populations, human safety concerns must also be considered. Some of the substrate habitats, especially those in non-forested settings, could be vulnerable to invasive plant species. Some of these species may be affected by invasive plant species while others may not.

Existing Conditions

These habitats are largely intact in the plan area. Some rock quarries have affected some rock outcrops. Downed wood is largely unmanaged in wilderness and roadless areas, which make up most of the Nez Perce-Clearwater. Rock climbing is uncommon in the plan area. Invasive plant species are prevalent on dry sites, such as in the Lower Salmon River canyon, and substrate habitats may be affected there. High elevation talus and cliff habitat is abundant in roadless and wilderness areas.

Restoration activities

There are no restoration activities for substrate habitats. However, retaining downed wood as a forestry practice can ensure these features remain after timber harvest. Soils can be repaired to functioning condition after ground disturbing activities. Treating invasive plant species can restore some adjacent habitats.

Plan Direction

The plan contains direction for the conservation of substrate habitats aimed at conserving rare snails. See the Land Management Plan for plan components that pertain to terrestrial ecosystems. Many biophysical features plan components support substrate habitats, including caves and rock outcrops. FW-GDL-WL-02 addresses closures of mines to prevent harm to bats. In the Salmon River Geographic Area, GA-DC-SR-

03 is a desired condition that habitat for endemic terrestrial snails is available. This section also includes a prohibition on the impact to these resources if they have species rated as globally imperiled by NatureServe. The plan contains desired condition FW-DC-TE-02 and standard FW-GDL-TE-01 to protect these habitats and species.

Forestlands plan direction the Land Management Plan will help maintain or provide for species that use habitats under rocks, logs, or litter. FW-DC-GS-06 provides habitats for burrowing soils for some wildlife.

Invasive species plan components the Land Management Plan will help reduce the impact from invasive plant species for species that use substrate habitats. Soils Resources plan components will provide for, maintain, or restore soil resources species that many species in the substrate habitat group use.

FW-DC-WL-05 addresses bighorn sheep habitat, which is identified as areas of native, high protein grass and forbs near rugged escape cover. In general, we assume that substrate habitats will be present and provide habitat for wildlife as a natural component of the landscape. Threats to some substrate habitats are few so they are not in danger of impacts in most cases. Impacts to substrate habitats can occur from mineral extraction, forestry activities that do not retain snags or downed wood or are disturbed by recreational activities such as caving or rock climbing. Overall, however, there is little evidence that substate habitats are limiting in most cases. Plan components that provide for substrate habitats include those in the Cave and Karst section of the plan, the Forestlands section that addresses coarse woody debris, and snags, and those in the across the landscape section of the plan. Plan components in the Soils Resources section of the plan provide for the conservation of soils. Plan components for substrate habitats include FW-DC-TE-01, FW-DC-TE-02, FW-GDL-TE-01, FW-DC-CAVE-01, FW-DC-CAVE-04, FW-STD-CAVE-01, FW-GDL-CAVE-01, MA2 and MA3-GDL-FOR-01, MA2 and MA3-GDL-FOR-02, MA2 and MA3-GDL-FOR-05, MA3-GDL-FOR-06, MA3-GDL-FOR-07, FW-DC-SOIL-01, FW-DC-SOIL-02, FW-STD-SOIL-01, FW-STD-SOIL-02, FW-GDL-SOIL-02, MA2 and MA3-GDL-SOIL-02, and FW-GDL-WL-02. A list of species, their habitat descriptions, and the habitat group they were assigned to can be found in Appendix C. Also See Appendix C for a crosswalk of plan components that contribute to substrate habitats.

Environmental Consequences

Environmental consequences to substrate habitats from plan direction are summarized in Table 181.

Table 181. Environmental consequences to substrate habitats from plan direction

Resource Area	Environmental Consequences	Explanation
Terrestrial Ecosystems	No	No consequences
Cave and Karst Features	Yes	Plan direction in this section addresses impacts to caves and other substrate habitats.
Forestlands	Yes	Plan direction for forested lands requires retaining coarse woody debris which could provide substrate habitats for species that use downed wood as shelter. Additionally, the forestland plan components include measures to retain snags which can fall and provide shelter for species that use substrate habitats. These plan components mitigate impacts to substrate habitats from activities like timber harvest.
Carbon Storage and Sequestration	No	No consequences

Resource Area	Environmental Consequences	Explanation
Meadow, Grassland, and Shrubland	No	No consequences
Fire Management	No	No consequences
Invasive Species	Yes	Invasive species can affect the vegetation characteristics around substrate habitats. Plan direction should help address this threat.
Soil Resources	Yes	Plan direction could facilitate management of soil resources which could prevent impacts and restore habitats for soil dwelling wildlife.
Aquatic Ecosystems	No	No consequences
Water and Aquatic Resources	No	No consequences
Conservation Watershed Network	No	No consequences
Infrastructure (Aquatics and Riparian)	No	No consequences or beneficial consequences.
Riparian Management Zones	No	No consequences
Lands and Special Uses (Aquatics and Riparian)	No	No consequences
Energy and Minerals (Aquatic and Riparian)	No	No consequences
Livestock Grazing (Aquatics and Riparian)	No	No consequences
Recreation (Aquatics and Riparian)	No	No consequences
Recreation	No	No consequences
Wildlife	No	No consequences
Multiple Use Wildlife	No	No consequences
Air Quality	No	No consequences
Tribal Trust	No	No consequences
Cultural Resources	No	No consequences
Municipal Watersheds	No	No consequences
Sustainable Recreation	No	No consequences
Scenery	No	No consequences
Public Information, Interpretation, and Education	No	No consequences
Infrastructure	Yes	Quarrying for road base is one of the primary threats to rock outcrops used by many rare and endemic snails. Plan direction provides guidance on the management of gravel pits that are generally permissive. Plan direction for infrastructure, especially road maintenance, requires the use of locally sourced gravel. Desired conditions such as FW-DC-INF-01 and FW-OBJ-INF-02 would encourage a high level of maintenance activities which might facilitate an increase in the number of gravel pits or their footprint. However, FW-DC-TE-01 and FW-GDL-TE-01 should prevent these plan components from impacting important

Resource Area	Environmental Consequences	Explanation
		habitats for rare or uncommon species that rely upon substrate habitats.
Land Ownership and Land Uses	No	No consequences
Timber	Yes	This activity may compact soils and result in loss of woody debris and snags which serves as habitat for species that use substrate habitats. However, plan components such as MA2 and MA3-GDL-FOR-01 should in most cases require leaving downed wood to provide for species that use substrate habitats.
Energy and Minerals	Yes	This plan direction may facilitate impacts to substrate habitats from these activities. Mining and quarrying have the potential to affect rock outcrops.
Livestock Grazing	Yes	Livestock grazing around rock outcrop features can impact vegetation required by species that use substrate habitats.
Special Forest and Botanical Products	No	No consequences
Designated Wilderness	No	No consequences
Wild and Scenic Rivers	No	No consequences
Lolo Trail National Landmark	No	No consequences
Recommended Wilderness	No	No consequences
Idaho Roadless Rule Areas	No	No consequences
Research Natural Areas	No	No consequences
Geographic Areas	No	No consequences
Gospel-Hump	No	No consequences
Lower Salmon	No	No consequences
Pilot Knob	No	No consequences
Special Interest Areas	No	No consequences
Suitability	Yes	Suitability plan components identify areas where different uses are suitable or not. Including timber production, timber harvest, road construction, prescribed fire, livestock grazing, the different types of mineral extraction, construction of buildings, motorized travel, mechanized travel, and use of airstrips. Many of these activities can affect the amount and distribution of substrate habitats. Activities such as road construction or road maintenance can facilitate extraction of gravel which may impact substrate habitats. Activities such as mineral extraction can also impact substrate habitats. Identifying lands suitable for these activities can cause localized impacts to some substrate habitats. However, in most cases substrate habitats are common and widespread such that impacts to some of these habitats are inconsequential to the status of the species in the plan area. Furthermore, plan components such as, FW-DC-TE-01 and FW-GDL-TE-01 should prevent these plan components from impacting important uncommon habitat elements of rare or uncommon species that rely upon substrate habitats.

Effects Common to All Alternatives

Habitat restoration is one of the main outcomes of the direction in the Land Management Plan and provides for the restoration of habitat for native wildlife species. The Land Management Plan provides more flexibility in the tools available to accomplish this habitat restoration in the long-term. This is particularly true regarding fire and natural disturbance processes. Under the Land Management Plan there is more emphasis and flexibility to utilize wildland fire and natural disturbance processes to trend the habitat towards the desired conditions for vegetation. Those desired conditions account for both historic conditions and potential warmer-drier climate conditions, both of which consider natural disturbance. By allowing natural disturbance to function nearer to historic conditions, the approximate quantity, quality, and pattern of wildlife habitat across the Nez Perce-Clearwater would be nearer to what the native species evolved with in this part of their range. By moving towards the conditions, they evolved with, ecological conditions to provide species viability would be maintained. Active restoration through mechanical treatments can help in moving towards the desired conditions. The tool that has the best chance of success is wildland fire and natural disturbance, including both active and passive restoration. Natural disturbance has a greater influence over the rate at which the Nez Perce-Clearwater trends towards the desired conditions. However, the plan provides for ample opportunity to affect change with tools like timber harvest, prescribed wildland fire, and mechanical treatments.

Cumulative Effects on the Diversity and Abundance of Wildlife

The current Forest Plans are generally consistent with Idaho Department of Fish and Game's management plans and will serve to increase populations of many species of interest to the public for hunting. The current Forest Plans conserve habitat for a broad variety of wildlife, generally consistent with the Idaho Statewide Wildlife Action Plan, which emphasizes the conservation of habitats as a primary goal for conserving species. The plan is also consistent with the plans for the management of natural resources produced by local counties.

Conclusions: Abundance and Diversity of Wildlife

The plan was designed to provide for a variety of habitat conditions to support the broad diversity of wildlife species that occur within the plan area. Furthermore, the plan's desired conditions were designed to provide ecological integrity, a basic requirement of the 2012 Planning Rule. The alternatives do not vary the plan's desired conditions, rather they vary the pace at which the plan achieves the desired conditions. Instead, the plan designed the desired conditions based upon the natural range of variation to provide for ecosystem integrity. Therefore, the effects of the alternatives are similar to each other, and the modeled outcomes are similar between the alternatives. The prevailing theme of the plan is an increase in disturbance that would reduce, but not eliminate late seral forested habitats, and increase habitats dependent upon disturbance. A variety of habitats and wildlife species depend in part or wholly on disturbance. Habitat groups that rely on disturbance include burned forest, broad-leaved or deciduous forest, open forest, and non-forested and early seral habitats. Disturbance also provides variety in aquatic and riparian habitats. Regional trends of migratory bird populations substantiate the importance of disturbance, as many species within disturbance dependent habitats have declined over the past 13 years of data collected by the Integrated Monitoring in Bird Conservation Region bird surveys. Yet, species that use mature open or closed forest show largely stable population trends. The plan will shift the balance of habitats more towards those maintained or created by disturbance, and away from mature or undisturbed forests. The change will happen over time as a result of plan direction and the response of Forest Service management to direction in the plan. While the trend in the plan's projected outcome is towards early seral and disturbance dependent habitats, the plan's desired conditions also provide for adequate conditions for species that use mature forest habitats. Thus, the **plan by will provide for the diversity and abundance of wildlife in the plan area by providing for ecosystem integrity and diversity in habitat conditions through plan components based on the natural range of variation. The plan will**

provide for the diversity and abundance of wildlife under all alternatives including the Preferred Alternative. While managing for a broad diversity in habitat conditions will provide for most species in the plan area, some individual species may require additional analysis and consideration to ensure that the plan provides for at-risk species. While at risk species were also evaluated within the diversity and abundance of wildlife, additional analysis is provided below to ensure that the plan provides the ecological conditions to contribute to recovery, provide for long term persistence, or conservation of at-risk species.

Species of Conservation Concern

Identification of Species of Conservation Concern

The Nez Perce-Clearwater began the Land Management Plan process and conducted the assessment prior to the finalization of the Final Directives for the 2012 Planning Rule. Prior to that, the Nez Perce-Clearwater had prepared the 2014 Assessment (U.S. Department of Agriculture 2014k) and the regional forester had issued a letter identifying Species of Conservation Concern (SCC). Upon release of the Final Directives, the identification of SCC needed an update to be consistent with the Final Directives. The first shortcoming was that the 2014 Assessment did not properly document a thorough review of all species that, according to the directives, should be considered. More specifically, the assessment documented rational for adding several species but did not explain why other species were not included. Second, the criteria for determining SCC may not have been applied as directed by the Final Directives. Third, the 2014 Assessment relied upon the Idaho Statewide Wildlife Action Plan as the best available scientific information to draw conclusions. In 2017, the State of Idaho released their revised Statewide Wildlife Action Plan (Idaho Department of Fish and Game 2017b), which contained updates to the conservation status of many species, leaving the first SCC list reliant upon outdated science.

To update the SCC list, the Land Management Plan interdisciplinary team used the Idaho Species Conservation Database to screen all species present in the plan area according to the categories of species to consider, as outlined in the final planning directives in Forest Service Handbook 1909.12, Chapter 10, Section 12.52, thereby removing some common species that did not fit the criteria. From there, the regional forester, in coordination with the Nez Perce-Clearwater, evaluated each of the remaining species for consideration as SCC in accordance to the directives. As part of the process, the regional forester reviewed a species list recommended by the Nez Perce Tribe as SCC. In order to facilitate plan development and analysis, the Regional Office staff provided a preliminary SCC list, with the intent to provide a fully documented evaluation of potential SCC to be provided at the release of the Final Environmental Impact Statement. For further information, see the Northern Region's website for information regarding the process used to identify SCC.

At-Risk Species Evaluation and Plan Development

In order to develop plan components, the species of conservation concern (SCC) identified in the 2014 Assessment (U.S. Department of Agriculture 2014k) and species identified through the updated efforts were evaluated for key ecological requirements, key ecosystem characteristics, and habitats. Threats and stressors were evaluated through the NatureServe method, as described below, for identifying threats. Plan components were then developed to address these threats and stressors. When ecological conditions were insufficient to provide for the long-term persistence of SCC, the Land Management Plan interdisciplinary team identified and developed species-specific plan components, as appropriate. The plan components included consideration of desired conditions, goals, objectives, suitability, management area specific direction, standards, and guidelines. The evaluation of threats and stressors to these species can be found in Appendix C.

In many cases, coarse filter ecosystem plan components were all that were needed to provide for Species of Conservation Concern (SCC). Examples of ecosystem plan components include, but are not limited to, those for Ponderosa pine systems associated with SCC, such as the white-headed woodpecker; mesic mixed conifer forests used by fisher; forests in cool moist and cold potential vegetation types for lynx; lower elevation riparian habitats in the Lower Salmon River for mountain quail; and snags and leave tree measures for many species. Species specific plan components were developed for some species when coarse filter ecosystem plan components were thought to be insufficient to provide for the long-term persistence of at-risk species. Examples include measures to reduce disease transmission to bighorn sheep, adopting the Northern Rockies Lynx Management Direction for lynx, and species-specific desired conditions for fisher that describe how fisher select habitat at multiple scales.

Bighorn Sheep

An in-depth evaluation of bighorn sheep was provided in the Multiple Use and Ecosystem Services portion of the 2014 Assessment (U.S. Department of Agriculture 2014k). The Assessment also outlined the economic and social contributions of bighorn sheep. A summary is provided here, as well as new information about this species. The Assessment outlines bighorn sheep populations, distribution, trends, biology, and threats. In Idaho, bighorn sheep exist in both small, isolated populations and in interconnected metapopulations. The largest native population of Rocky Mountain bighorn sheep in Idaho resides in the Salmon River drainage within the Salmon River breaklands and is shared with the Payette National Forest. Bighorn sheep habitat on the Nez Perce-Clearwater is generally associated with the Idaho Batholith breaklands in the Salmon and Selway River basins. Bighorn sheep also occur within the Snake River canyon and may be found in the plan area between the Snake River over from Hells Canyon and the lower Salmon River canyon, though most sheep there tend to remain on the Wallowa-Whitman administered lands. No other portions of the Nez Perce-Clearwater are known to have bighorn sheep populations at this time. However, modeled habitat produced by the Payette National Forest (O'Brien et al. 2014, Carpenter et al. 2014) indicates that other portions of the national forest contains habitat similar to that used by bighorn sheep that is unoccupied.

Bighorn sheep are analyzed below in the multiple use wildlife section. This species is both a game species and a SCC. The most important factors for the persistence of bighorn sheep include the threat from disease transmission from domestic sheep, lesser impacts to habitat from invasive plant species invasion, and forest succession. The Land Management Plan eliminates the only remaining sheep allotment, names the allotment unsuitable for sheep grazing in the plan area and provides active management to restore habitats for bighorn sheep lost through succession. The Land Management Plan clarifies that pack goat use is not restricted as a use by the public in the plan area, including within bighorn sheep habitats, because, while there is some risk, the probability of pathogen transmission from pack goats to bighorn sheep is likely lower than from sheep grazing. The risk is reduced for multiple reasons having to do with differences in how pack goats are handled and cared for and because the numbers of pack goat users is low. In addition, some evidence suggests pathogens from goats may not be as dangerous to bighorn sheep compared to those from domestic sheep. However, there are examples where goat pathogens were identified as responsible for die-offs within the Hells Canyon herd, a herd from which some individuals that use the plan area originated. While the risk is low or even very low, the potential consequences could be high. A contact between pack goats and sheep could occur in the event a pack goat escapes from ownership control. Goats, including pack goats, have the potential to carry pathogens that are known to affect bighorn sheep. Such a contact has the potential to cause transmission of pathogens that cause pneumonia in bighorn sheep, which could potentially impact a large portion of the herd, causing long term chronic effects on the population growth. The conclusion was that the bighorn sheep would persist long-term on the Nez Perce-Clearwater because the plan would find the last sheep grazing allotment unsuitable for sheep grazing in combination with a standard that prohibits any authorization of new sheep allotments within 16 miles of the bighorn sheep core herd home range.

The analysis on the coarse filter components above placed sheep in the substrate habitat group and identified steep terrain as the subgrouping because the key requirement of bighorn sheep is steep country for refuge from predators. These habitats have been affected by forest succession and invasive plant species invasion. Few other factors threaten their habitats. Therefore, the plan area provides the ecological conditions to provide for the long-term persistence of bighorn sheep.

Bighorn sheep typically inhabit rugged, rocky grasslands and open forests from low elevation river canyons to alpine areas. Although elevational migrations are generally common with bighorn sheep, most bighorns in the planning area remain in the river canyons year-round, except for the bighorns in the Selway drainage. The primary limiting factor for Rocky Mountain bighorn sheep in the plan area is disease. Domestic sheep, goats, and other exotic relatives of bighorn sheep can carry pathogens that can be lethal to bighorns and can have lasting effects on population performance through lower lamb survival. Bighorn sheep in the Salmon River and Hells Canyon population management units experienced high rates of mortality in pneumonia outbreaks in the 1980s and 1990s, likely originating from contact with domestic sheep. Those populations have not recovered to previous population levels, and bighorn populations are currently limited by low lamb survival primarily due to pneumonia-caused mortality (Idaho Department of Fish and Game 2010). Disease transmission to bighorn sheep can be controlled by maintaining separation between bighorn sheep and domestic sheep and goats. Additional discussion and cited literature are presented below.

Although disease is currently thought to be the primary reason for low bighorn sheep numbers, other factors may contribute, including vegetation changes caused by fire suppression and increases in noxious weeds. Frequent fires have had beneficial effects by reducing conifer encroachment and rejuvenating grasses and forbs; however, fire and other disturbances may also have the negative impact of facilitating the invasion of noxious weeds. Other than the threat of disease transmission, the largest threat to bighorn sheep are invasive plans which act as habitat agent of habitat change for bighorn sheep populations in the plan area, though the effects of noxious weeds on bighorns have not been well studied. Bighorn sheep are discussed as a potential Species of Conservation Concern in the 2014 Assessment (U.S. Department of Agriculture 2014k), with the primary concern being pathogen transmission.

Between 2007 and 2013, bighorn sheep in the lower Salmon River canyon were studied using radio telemetry to assess the population status of bighorn sheep along the Salmon River in central Idaho (Mack et al. 2017). The conclusions of this study follow. First, the study found that the Salmon River bighorn sheep populations have undergone previous assumed pneumonia-caused die-offs and are thought to be disease limited. Habitat modeling identified continuous bighorn sheep habitat within the project area and the larger Salmon River drainage, which provides well for habitat connectivity. Habitat distribution was dendritic, closely associated with the rugged canyon breaks of the Salmon River and its main tributaries. Lesser amounts of more fragmented potential habitat were identified at higher elevations associated with mountain and ridge tops. Bighorn sheep within the Lower Salmon River population were distributed within an estimated 990 square kilometer population range encompassing an 84-kilometer reach of the main stem Salmon River and the lower 21-kilometer reach of the South Fork Salmon River. Bighorn sheep appear to use the same locations throughout the year but may make elevational changes during winter. Reductions in bighorn sheep connectivity within the plan area is not a concern because the occupied bighorn sheep areas on the Nez Perce-Clearwater are generally within protected areas, such as wilderness, wild and scenic river corridors, or roadless rule areas.

The population consisted of five female and four male social groups. Female groups used discrete use areas that were distributed sequentially and continuously along the Salmon River main stem and South Fork Salmon and either shared or slightly overlapped adjacent group boundaries. Female groups did not display seasonal space use, such as summer versus winter or lambing versus non-lambing and used the same general area year-round. Female and male groups displayed strong site and group fidelity. Male groups were also distributed sequentially and continuously within the project area. Male use areas were discrete and disjunct during the non-rut season but overlapped extensively during the rut season. Spatial analysis and probability modeling established a high level of connectivity among main stem groups, primarily through male movements during the rut season. During the rut season, males along the main stem abandoned site and group fidelity and traveled long distances in search of female groups, resulting in a high level of connectivity as they interacted with multiple female and male groups.

The proximity of domestic sheep in the western portion of the project area, coupled with a high degree of connectivity among bighorn sheep groups, raised concerns over potential pathogen transmission throughout the population. Summer lamb survival and recruitment were low but increasing trends in these parameters and population counts provided evidence for a growing population during the term of the project. Adult survival and annual female reproductive rates remained consistent through the project period and were within the ranges reported for stable to declining populations. The annual summer lamb survival rate was low, indicative of a pneumonic population. Recruitment rates were low from biological years 2000 to 2012 and were in line with those estimated for declining populations. Pneumonia was manifested through lamb mortality. Population counts accounted for substantially more bighorn sheep (250 percent) than previously estimated. The maximum count of 347 bighorn sheep should provide for a greater degree of resiliency against demographic and environmental stochasticity than previously thought.

The project evaluated the risk of contact with domestic sheep both before and after the decision prior to the 2010 Forest Plan amendment of the Payette National Forest and estimated bighorn sheep in the Lower Salmon River population had a high probability (100 percent) of annual contact with active allotments and a high probability (37 to 100 percent) of extirpation. The evaluation was based upon models or the risk of contact from forays and risk of disease transmission coupled with estimated habitat (Carpenter et al. 2014, O'Brien et al. 2014). The 2010 Record of Decision (U.S. Department of Agriculture 2010d) finalized the Forest Plan amendment for the Payette National Forest and implemented new management direction for domestic sheep grazing. The Payette National Forest projected their new management direction would decrease the risk of contact to 4 percent and the probability of extirpation between 2 to 29 percent. The Nez Perce National Forest has potential for contact and disease transmission from one (currently vacant) sheep allotment located within the Lower Salmon River within the core home range of this bighorn sheep herd. This sheep allotment has been vacant for several years at this point. This sheep allotment would be unsuitable for domestic sheep use in the Land Management Plan by Standard FW-STD-WL-02. The current threat of new disease transmission at this point originates mostly from private sheep and goat operations off of federal lands and outside of Forest Service authority. The risk of contact model-based risk of contact solely on movements of bighorn sheep contacting domestic sheep but did not account for movements of stray domestic sheep coming into contact with bighorn sheep (Mack et al. 2017). However, the herds in the Salmon River are carriers of pathogens from previous exposures and which still affect lamb survival.

The science is clear from pen comingling studies and empirical evidence in the field that pathogens transmitted from domesticated sheep to bighorn sheep results in pneumonia that has a high lethality rate to bighorn sheep. The Payette National Forest concluded the Lower Salmon River population would have a low probability of persistence without a regional effort to address the risk of contact across Bureau of Land Management (BLM), Nez Perce-Clearwater, and Payette National Forest administered allotments.

The BLM Cottonwood, Idaho office conducted a similar analysis while amending their management plan. Under grazing management conditions prior to the amendment process, their analysis predicted a high chance of annual contact between bighorn sheep on at least one of four BLM allotments analyzed, primarily due to the close proximity between the occupied bighorn sheep range and the Partridge Creek allotment. The amended management plan was adopted in 2017, which resulted in an extremely low probability of contact from livestock grazing on the subject BLM lands because of the closure of domestic sheep allotments.

In addition to the infectious risk from domestic sheep mentioned above, bighorn sheep are susceptible to infections from pathogens carried by domestic goats. Pneumonic infections in bighorn sheep are polymicrobial, meaning that more than one pathogen results in the expression of symptoms. Several bacteria have been implicated as the causative agent of pneumonic outbreaks in bighorn sheep and often multiple pathogens are present in pneumonic sheep. *Mycoplasma ovipneumoniae* is the primary pathogen thought to initiate the disease in bighorn sheep (Besser et al. 2012, Besser et al. 2008, Besser et al. 2013). It is not well understood how these different bacterial complexes interact, but they appear to contribute to, or are present, during pneumonic outbreaks.

The scientific literature often discusses the effects of pathogens on sheep and goats together without considering them separately. However, there appears to be some scientific evidence that suggests the effects may differ. It has been demonstrated that domesticated goats can be carriers of *M. ovipneumoniae* and can transmit it to bighorn sheep. A controlled experiment where *M. ovipneumoniae* naïve bighorn sheep were penned with *M. ovipneumoniae* positive domestic goats demonstrated transmission from domestic goats to bighorn sheep (Besser et al. 2017). It should be noted that the study showed the transmission of a milder strain of the bacterium than seen in previous experiments conducted with domestic sheep, leading to sub-lethal pneumonic symptoms.

In another example, Foreyt et al. (1994) conducted a study where penned bighorn sheep were exposed to llamas, domestic goats, mountain goats, cattle, and mouflon sheep. Foreyt (1994) found that bighorn sheep remained clinically healthy during and after contact with llamas, cattle, mountain goats, and domestic goats, but all bighorn sheep died from acute bronchopneumonia after contact with domestic sheep and mouflon sheep.

There have been two reports of pathogen transmission between goats and bighorn sheep in Hells Canyon (Rudolph et al. 2003, Cassirer et al. 2017). Rudolph et al. (2003) document that a feral goat was observed within a herd of bighorn sheep near the Snake River. The goat, a bighorn ram, and a bighorn ewe were seen broken off from the main group, with the ewe showing signs of pneumonia. The goat and two bighorn sheep were euthanized and tested for pathogens, and it was found that the three shared strains of *Pasteurella* species. While Pasteurella is not thought to be the primary causative agent, it has often been found concurrently in lung tissues of pneumonic sheep and has been suspected to contribute to morbidity. The author states:

"Because samples were not obtained from the animals prior to contact, the direction of transmission could not be ascertained with certainty. The fact that identical strains of Pasteurella, particularly biovariant 1 P. haemolytica, were isolated from both goats and bighorn sheep is suggestive of transmission of the organisms from goats to bighorn sheep. However, because both the biovariant 1 and ToxA 1 organisms were limited to the three animals shot on 29 November 1995 and were not isolated from any of the other bighorn sheep in groups A and B, there is no evidence that those organisms were associated with subsequent disease or deaths. Although we know of no other information regarding transfer of potentially lethal Pasteurella spp. between domestic goats and free-ranging bighorn sheep, we believe that goats can serve as a reservoir. Thus, interactions

between the two species should be avoided to prevent Pasteurella transmission that could negatively impact the health of bighorn sheep populations. Pack goats have gained popularity for use on public and private lands. We recommend that individuals with pack goats have total control of their animals when in or near bighorn sheep habitat, both while on the trail and at the campsite. Likewise, we recommend that any bighorn sheep should be driven away from goats to prevent nose-to-nose contact and that any bighorn sheep that does come into direct contact should be removed from the herd to prevent potential transmission of disease-causing organisms to other bighorn sheep."

Phylogenetic analysis of a *M. ovipneumoniae* strain that recently caused 33 percent mortality in adult bighorn sheep within the Hells Canyon region indicated this strain was most likely of domestic goat origin (Cassirer et al. 2017). This suggests that some domestic goats could carry more serious strains of *M. ovipneumoniae* than captive commingling studies have indicated to date.

Evidence from the Hells Canyon population suggests that infection from one strain of *Mycoplasma ovipneumoniae* does not appear to provide immunity from other strains (Cassirer et al. 2017). This study found that introduction of a new genotype (strain) of *M. ovipneumoniae* into a chronically infected bighorn sheep population in the Hells Canyon region of Washington and Oregon was accompanied by adult morbidity (100 percent) and pneumonia-induced mortality (33 percent), similar to that reported in epizootics following exposure of naive bighorn sheep. This suggests an immune mismatch occurred that led to ineffective cross-strain protection. Phylogenetic analysis showed that the strain associated with the outbreak observed in Hells Canyon was likely of domestic goat origin, whereas strains from other recent disease outbreaks probably originated in domestic sheep. Cassirer et al. (2017) concluded that the lack of cross-strain immunity in the face of recurrent spillovers from reservoir hosts may account for a significant proportion of the disease outbreaks in bighorn sheep that continue to happen regularly despite a century of exposure to domestic sheep and goats. Pneumonic disease mortality is high across all age classes. Bighorn sheep lamb mortality is demonstrably higher, causing failure of herd recovery following a pneumonia die off event. "The presence of domestic sheep and goats within and adjacent to bighorn sheep ranges presents a constant and substantial risk of another major epizootic" (Washington Department of Fish and Wildife 2014).

There is currently a dearth of studies directly demonstrating the effects of incidental contact between pack goats and bighorn sheep leading to a pneumonia outbreak. There has also not been an incident reported in the literature demonstrating transmission from pack goats to bighorn sheep. Rising recreational uses of pack goats into rugged, remote areas such as those used by bighorn sheep may increase contact between pack goats and bighorn sheep that would otherwise be isolated from domestic goat herds. When examined from a risk assessment perspective, there would be an unlikely to rare probability of disease transmission coupled with potentially serious to catastrophic consequences to bighorn sheep populations in the area in the event of a contact. Demonstrated connectivity of bighorn sheep groups can exacerbate the risk to the greater population due to incidental exposure from goats (Mack et al. 2017). Many studies have shown that domestic sheep and goats can carry pneumonia pathogens without being sick or showing symptoms of pneumonia, making it difficult to determine the potential for infection prior to an epizootic outbreak (Besser et al. 2019, Heinse et al. 2016).

There are some characteristics of pack goat use that could present a lower risk of contact to bighorn sheep populations. First, pack goat users typically keep close tabs on their goats. Pack goat users often tie their animals to pack strings while traveling, and pack goats naturally tend to follow their owners because of herding behavior. The distribution of bighorn sheep is limited within the plan area and vast areas of the Nez Perce-Clearwater could be used safely without risk of contact. However, pack goat use within bighorn sheep core herd home ranges would present some risk of contact in the event a pack goat is separated from its owner. Perhaps the biggest risk is at night, where pack goats could get spooked by predators and become separated from their owners. Most owners are aware of this possibility and take measures to prevent that by tying their goats up at night rather than allowing them to range freely. In the event they become separated, owners would likely try to find and retrieve their animals, which could help reduce the risk of contact with bighorns. Pack goats tend to try to return to their owners in the event they become separated and pack goat users suggest that pack goats tend to seek humans out rather than to gravitate towards other animals when lost. While the practice is growing, current pack goat recreational use is conducted by relatively few forest visitors. For example, The North American Pack Goat Association, which is the largest organization associated with pack goat use, currently has only 289 members total in all North America. It is estimated that only a proportion of these members live near and use the Nez Perce-Clearwater. Less extensive surveys of domestic goats reported 37.5–88 percent of flocks to be Polymerase Chain Reaction positive on nasal swabs, and larger flocks were more likely to be positive for carriage (Heinse et al. 2016). In contrast, pack goat owners usually keep small flocks with greater attention to goat health so the risk for positive carriage could be lower. However there are no published studies evaluating pathogens in pack goats specifically.

Within the Nez Perce-Clearwater Land Management Plan, two actions were proposed to address the threats to the lower Salmon River bighorn sheep populations. First, the Nez Perce-Clearwater only has one remaining sheep allotment (the Allison-Berg allotment) across the whole planning area, which is located within the heart of the Lower Salmon River bighorn sheep home range area where separation from domestic sheep and bighorn sheep is not possible. This allotment is vacated currently. This allotment is proposed to be unsuitable for sheep grazing and would be closed under the plan after site specific decisions on range authorizations. Second, in the event that any new sheep allotments are initiated within the Nez Perce-Clearwater under the plan, a standard was adopted to disallow domestic sheep grazing within 16 miles of core herd home ranges, which is the same distance to those identified in the 2010 Payette National Forest's decision to maintain a low risk of contact (U.S. Department of Agriculture 2010d). Associated scientific publications were produced in conjuction with the Payette National forest that describes the models and evaluation(Carpenter et al. 2014, O'Brien et al. 2014). This distance was determined based on the Payette analysis to present a low risk of contact, though there is still some risk, while still allowing sheep grazing. In addition, this distance is thought sufficient because the last sheep allotement in the plan area would be identified as unsuitable for sheep grazing in the plan. Therefore this distance should present a low risk of contact when considering new sheep allotments. These measures should reduce the chances that new disease transmission events will occur from Forest Service allotments.

The effects of finding the Allison-Berg allotment not suitable for sheep grazing would be to eliminate all existing sources of pathogen transmission between bighorn sheep and domestic sheep from authorized sheep within the Forest Service authority. Additionally, any new sheep authorizations within the plan area would undergo a site-specific, detailed analysis and determination of effects to bighorn sheep before authorization. While new sheep allotments are possible under the plan, no new sheep allotments are anticipated in the future at this time. Sheep grazing operations exist outside of Nez Perce-Clearwater lands and may continue to pose a threat of disease transmission to the bighorn sheep populations within the plan area. These operations are outside of the Forest Service's control.

Bighorn sheep in the plan area are provided for through plan components for ungulates. FW-DC-WLMU-03 emphasizes that the habitats in the plan area provide for ungulate species that meets their life history requirements in both summer and winter. As noxious weeds are a challenge throughout the west and in the plan area, FW-DC-WLMU-03 has language desiring that big game habitats are composed of native vegetation. Plan components in the invasive section of the document also serve to provide for bighorn sheep habitats. Fire plan components and those for forested vegetation would also help increase disturbance that would decrease encroachment of forested habitats into bighorn sheep habitats. FW-GDL-WLMU-03 restricts disturbing activities on winter ranges, which will serve to protect these species during this challenging time.

As pathogens are the primary concern for bighorn sheep, FW-STD-WL-02 addresses the need for separation of domestic sheep, goats, and bighorn sheep. The distance identified in this standard was based upon the extensive analysis completed on the Payette National Forest under their Forest Plan amendment, which shares the same herd in the Lower Salmon River as the Nez Perce-Clearwater(U.S. Department of Agriculture 2010d land and resource management plan). In the Payette Forest Plan amendment decision, it was determined that 16 miles of separation was an adequate distance to reduce the risk of contact and thus pathogen transmission to an acceptable level. This analysis relies on the risk of contact modeling that the Payette National Forest conducted to identify the distance at which sheep grazing would not be suitable on the Nez Perce-Clearwater. Furthermore, since there is only one sheep allotment within the plan area which would be found unsuitable for sheep grazing in the Land Management Plan this would not be consistent with FW-STD-WL-02 and could not be reauthorized for grazing. This distance would be adequate to protect bighorn sheep long-term. The assumption is that this distance is adequate to reduce the risk of contact in the event that a new allotment for sheep grazing is authorized in the future under the plan. However, there are no current plans to authorize any new sheep allotments in the future and any new allotment would require site-specific analysis that would be analyzed for adequate separation.

Pack goats within bighorn sheep occupied core herd home ranges are specifically excluded from FW-STD-WL-02. This would allow pack goat use forestwide, including within bighorn sheep areas. The modification was made after considering the risks posed to bighorn sheep from potential contact and pathogen transmission. While there does appear to be some risks of goat to bighorn sheep pathogen transmission, the risk was considered low because the controlled circumstances under which pack goats are used reduces the probability that a pack goat would come into contact with bighorn sheep. While the risk is low, there is still a risk of contact between pack goats and bighorn that could result in a pneumonic event that could affect a substantial proportion of the herd and lower population recovery long term. FW-GL-WL-03 serves to minimize this risk through education about best management practices for pack goat owners. FW-DGL-WL-04 ensures that permits for goat packing include provisions to minimize the risk of disease transmission.

The bighorn sheep herds in the Salmon River Canyon mostly falls within the designated Gospel-Hump, Frank Church-River of No Return, and Selway Bitterroot wilderness areas and as such is protected by plan components that emphasize managing lands consistent with their designation. Suitability plan components associated with designated wildernss management found in the Land Management Plan identifies those lands as unsuitable for timber harvest, timber production, road construction, motorized travel, construction of buildings, and mechanized travel and not suitable within wilderness areas. Therefore these activities would not be allowed. Livestock grazing and mineral extraction activities are only suitable provided they are consistent with enabling legislation or wilderness plans, which essentially was only those existing prior to designation. Therefore additional or new livestock or mineral leases would not be allowed. These constraints will protect much of the bighorn sheep habitat in the plan area from alteration and disturbance.

Additionally, much of the Salmon River is designated as a wild and scenic river while other portions are included as a suitable wild and scenic river in the Preferred Alternative. Plan direction for wild and scenic rivers would be applied to the river and the one-quarter mile river cooridor which includes bighorn sheep habitat areas. These plan components emphasize managing free-flowing condition, water quality, and the outstandingly remarkable values for which the river was designated. Suitability plan components found in

Table 28 of the Land Management Plan identifies the activities that are and are not suitable within the different classifications of designated wild and scenic rivers. The Salmon River is designated as a wild classification which is more constrainging than scenic or recreational rivers. Designated wild and scenic rivers within the wild classification, except for allowences within enabling legislation, Wild and Scenic River Act or Wild and Scenic River Plan, are not suitable for timber production, timber harvest, road construction, mineral activities, motorized travel, and mechanized travel. These activities would not be suitable within the river cooridor providing protections for bighorn sheep habitats that occur there.

Similar suitability plan components found in Table 32 of the Land Management Plan apply to suitable wild and scenic rivers evaluated in the alternatives. The Salmon River outside of the designated wild and scenic river area would be suitable for inclusion in the wild and scenic river system and would be managed as a Recreational class river. Suitability plan components constrain timber production hydroelectric power facilities, and utility lines and facilities. Activites like vegetation management and timber harvest, road construction and reconstruction, mineral extraction activities, water resource protection construction, building construction, recreational vehicle travel are conditionally suitable if those activities are consistent with Forest Service Handbook direction and provided they are also consistent with standards and guidelines in the Eligible and Suitable Wild and Scenic River section of the Land Management Plan. While this direction is less constraining than in Wild segments, they still provide constraints that will ensure these activities are conducted in a manner that would protect the river and its resources. These suitability plan components would constrain or limit such activities to help protect bighorn sheep habitat within the lower Salmon River Canyon within the river cooridor in the 23 miles of river outside of designated wilderness areas and designated wild and scenic rivers.

Collectively, the plan will provide for the long-term persistence of bighorn sheep because it contains measures to reduce threats and protect habitat of bighorn sheep. Species-specific plan components would limit the exposure to pathogens carried by livestock, which is the primary threat to bighorn sheep in the plan area. It would conserve habitat because plan components to address the threat of invasive species would help limit the spread of weeds in bighorn sheep habitat and seek to reduce existing invasions. Lastly, the plan would provide land allocations and associated management that would constrain or prohibit many human activities and development from altering bighorn sheep habitat.

Fisher

Fisher are a medium-sized mesocarnivore in the weasel family (*Mustelidae*). A generalist predator, fisher hunt along the forest floor as well as within the canopy (Spahr et al. 1991). Noted for eating porcupines, prey includes snowshoe hare, other small mammals, reptiles, amphibians, bird eggs, fish, fruit, and carrion (Heinemeyer and Jones 1994, Roy 1991, Ruggiero et al. 1994b).

Fishers are limited to North America and are broadly distributed across the boreal forests of Canada with disjunct populations in the Pacific Northwest south into California, New England and the Mid-Atlantic, the Great Lakes Region, and the Northern Rockies. Fishers in the Southern Sierra Nevada of California are federally listed as threatened. In the northern Rockies fisher occur on at least eight forests in the Forest Service Northern Region (Cushman et al. 2008, Olson et al. 2014, Sauder and Rachlow 2014, Schwartz 2007, Schwartz et al. 2013, Krohner 2020), with the plan area providing a substantial portion of the available habitat (Olson et al. 2014) and known occupancy (Sauder and Rachlow 2014, Krohner 2020).

Distribution

The fisher was once found throughout northern forests of North America south into the Appalachian Mountains in the Eastern United States and along the Cascade Mountains into the Sierra Nevada

Mountains of California in the west. Fishers declined or were extirpated in most of the United States and much of Canada between 1800 and 1940 because of over trapping and habitat alteration via timber extraction. Fishers declined down to 43 percent of their historic range but recovered to occupy 68 percent of their former range primarily through reintroductions, but also after trapping seasons closed, and habitat recovery programs were implemented. (Powell and Zielinski 1994). Fishers were re-established through 38 translocations in the United States and Canada.

In the Northern Rockies, the situation was similar. Fishers were erroneously presumed extirpated in the Northern Rockies by the 1930s. (Powell and Zielinski 1994). For example, the Idaho Species Diversity Database (accessed January 2023) does not contain fisher observations between 1916 and 1970. Five translocations in the Northern Rockies were conducted from 1959 to 1991 (Lucid et al. 2019).

Genetic studies of fishers in the Northern Rockies indicate that a remanent population of fishers escaped extirpation. These studies indicate that fisher genetics in the Northern Rockies include individuals with genetics matching types from translocation sources such as British Columbia and the Midwest, but also from a native source. Genetic testing in the Northern Rockies identified a unique genetic haplotype found nowhere else in the fisher range which matched the genetics of fisher specimens collected in Idaho in the late 1800s, indicating that remanent population escaped extirpation (Vinkey 2003, Vinkey et al. 2006, Schwartz 2007) (U.S. Department of the Interior 2017d). The unique genetic signature of this Northern Rockies population also likely indicates that fishers were isolated from populations outside the region by distance, small population number, or both, for some time before the influences that led to the presumed extirpation in the early 20th century (Vinkey 2003). The U. S. Fish and Wildlife Service determined that the population of fisher in the Northern Rockies fit the criteria as distinct population segment because they have markedly different genetic characteristics relative to the rest of the taxon, and because they are isolated from populations in Canada, the eastern United States, and those in the Cascades and Sierra Nevada Mountains (U.S. Department of the Interior 2011a). The implications are that the Northern Rockies population of the fisher could be evaluated for federal listing if it meets the definition of threatened or endangered based on the five factor criteria outlined in the Endangered Species Act regardless of the status of other fisher populations in North America.

As a result of reintroductions, fishers have dispersed and reoccupied areas across North Idaho, North Central Idaho, and Western Montana (Vinkey 2003, Vinkey et al. 2006, Schwartz 2007, U.S. Department of the Interior 2017d, Krohner et al. 2022). Contemporary fisher observations have been made on the Lolo, Bitterroot, Idaho Panhandle, Kootanai, Beaverhead Deerlodge, Payette, Salmon-Chalis, Flathead and throughout the Nez Perce-Clearwater National Forest (U.S. Department of the Interior 2017d).

While fishers have distributed widely in the Northern Rockies, occupancy and genetic studies suggest that the Nez Perce-Clearwater provides much of the high-quality fisher habitat regionally (Sauder 2014, Idaho Department of Fish and Game 2017b, Krohner et al. 2022). Furthermore, the Nez Perce-Clearwater contains most of the areas with the highest occupancy rates of fishers in the Northern Rockies with habitats in much of Montana but other parts of Idaho having low occupancy rates (Krohner et al. 2022). Save for the Cabinet Mountains, the probability of occupancy in Montana and other parts of Idaho south of the Salmon River are less than or equal to half that of those on Nez Perce-Clearwater. For example, probability of occupancy rates of 7.5 km^2 cells across the Northern Rockies was 0.14 overall, with most of dryer forest in western Montana estimated at less than 0.10, but within the Nez Perce-Clearwater, the probability of occupancy was estimated between 0.3 to 0.5 (Krohner et al. 2022). Even in high quality habitat within Idaho, the species occurs at very low densities of approximately one female per 20 square miles (Idaho Department of Fish and Game 2017b). Covariate analysis found that fisher occupancy was higher in wet forest stratum versus dry forests across the region, with dry forests negatively associated with fisher occupancy. Generally speaking, wet forest stratum occurs in Idaho north of the Salmon River, whereas dry forest stratum occurs in limited parts of Montana and in Idaho in areas north of the Salmon River (Krohner et al. 2022).

Habitat models display the distribution of fisher habitats in the plan area (See Sauder and Olson Models in Appendix A of this Final Environmental Impact Statement). Unlike other at-risk species analyzed in the plan whose habitats are located eastward in the plan area at higher elevation, fisher habitats tend to be at lower elevations in mesic habitats. These models suggest fisher habitat is concentrated in the western portions of the Nez Perce-Clearwater. Furthermore, fisher habitat is more contiguous in the western portion of the national forest and more fragmented within the eastern portion of the national forest. Furthermore, the amount and distribution of Sauder's "high quality habitat" is concentrated within the western portion of the plan area. Also, within the eastern portions of the plan area, fisher habitats exist mostly at lower elevations within river canyons. The distribution of fisher habitat has implications for land allocations and uses. A substantial portion of fisher habitats occur within areas proposed for multiple uses management, where they would be subject to more intensive land use, including timber production, vegetation restoration to meet desired conditions, and fuels treatments compared to Idaho Roadless Rule Areas, Wilderness Areas, and Recommended Wilderness Areas that compose the eastern portions of the Nez Perce-Clearwater. Fisher habitats farther west outside of the plan area are composed mostly of lands managed for industrial timber harvest on private and state lands, wherein a higher percentage of the land is in early seral conditions.

Conservation Status

Fishers have garnered conservation attention in many areas in the western United States. NatureServe identifies fishers as G5 globally secure but S2 imperiled in Idaho and S3 vulnerable in Montana. Fishers are identified as a species of greatest conservation need by the states of Idaho and Montana. They are identified as an Oregon Conservation Strategy Species by the Oregon Department of Fish and Wildlife. The fisher is listed as endangered by the State of Washington but is not federally listed there. Fishers are a Regional Forester Sensitive Species (RFSS) in several national forests in the west in the Northern Region, the Pacific Northwest Region, the Intermountain Region, and the Pacific Southwest Region of the Forest Service. Fishers are federally listed as endangered in the Southern Sierra Nevada distinct population in California, but not in Northern California. The species was identified as a Species of Conservation Concern for the Nez Perce-Clearwater National Forest.

There have been limited population estimates for the population of fisher in the Northern Rockies (Lucid et al. 2019). Lucid et al. (2019) studied fisher populations in the Idaho within the Selkirk, Purcell, West Cabinet, and St. Joe and Coeur D'Alene areas and estimated population size through genetic testing. Lucid et al. (2019) found that fishers appear to have been effectively extirpated from both the Selkirk and Purcell Mountain Ranges, while populations in the St. Joe and Coeur D'Alene were small and suffer from inbreeding. Lucid et al. (2019) also found a slightly larger population in the West Cabinets which is isolated from other populations with minimal genetic evidence of migration. Population estimates range from 52–300 fisher in the West Cabinets and 13–88 fisher in the St. Joe and Coeur D'Alene mountains for a total estimate of 65–388 fisher in the North Idaho study area (Lucid et al. 2019). Coltrane and Inman (2021) studied fishers on the Montana side of the Cabinet Mountains and found they exist there in very low abundance and all detections were male fishers. No reliable population estimates have been made for the Nez Perce-Clearwater portion of Idaho.

The fisher was petitioned for listing under the Endangered Species Act in 2013 and in 2016. The U.S. Fish and Wildlife Service published a 90-day finding that announced there was substantial information that listing the Northern Rocky Mountain fisher may be warranted. Based on the best scientific and commercial information available, the U.S. Fish and Wildlife Service found that the Northern Rocky Mountain fisher is genetically different from other fisher populations and qualifies as a distinct population segment under the Endangered Species Act. On October 5, 2017, the U.S Fish and Wildlife Service published a 12-month finding which determined the Northern Rocky Mountain fisher is not in danger of extinction and does not need protection under the Endangered Species Act.

The following reasons form the basis for the finding:

- That the distribution of the Northern Rocky Mountain fisher includes forested areas of western Montana, north-central Idaho, and possibly northeastern Washington.
- The Northern Rocky Mountain fisher was found across most of its historic range.
- Distribution and quantity of modeled habitat across the Northern Rocky Mountains appears adequate to support the Northern Rocky Mountain fisher and is resistant to localized fire and drought.
- The potential stressors of climate change, development, forestry, fire, trapping, poisoning, and predation were evaluated, with no evidence of significant impacts to the Northern Rocky Mountain fisher.

Habitat

The fisher generally occur in areas with wetter, milder climates that limit snow accumulation, and topography in the form of drainages or valleys (Olson et al. 2014, Jones 1991b, Raine 1983, Arthur et al. 1989, Krohn et al. 1995, Krohn et al. 1997, Aubry and Houston 1992, Heinemeyer 1993, Ruggiero et al. 1994b). Throughout their range, fisher are associated with forested habitats with high canopy closure, complex vertical and horizontal structure, plentiful snags, and an abundant prey base (Heinemeyer and Jones 1994, Powell and Zielinski 1994, Raley et al. 2012, Aubry et al. 2013, Schwartz et al. 2013, Olson et al. 2014, Ruggiero et al. 1994a).

Fishers are found in a variety of forest types and use a variety of age classes if adequate canopy cover, large structures for denning and resting are present, vertical and horizontal cover, and prey is present. Fishers avoided drier forest types such as Ponderosa pine, Douglas-fir, and lodgepole pine (Jones 1991b, Schwartz et al. 2013). Modeled fisher habitat in the plan area occurs within the more mesic types within the warm-dry, the mesic cool moist types, and most prominently within the warm moist broad potential vegetation types.

Den sites are often located within the largest trees. In the Northern Rockies, fisher occupancy is closely tied to mature stands of mesic forest types (Olson et al. 2014, Krohner 2020, Schwartz et al. 2013, Sauder and Rachlow 2014) and riparian areas with sufficient cover (Vinkey 2003, Jones 1991b, Raley et al. 2012). Moist forested habitats with continuous overhead cover and riparian zones are frequently used (Vinkey 2003) and stream courses may be used as travel corridors (Jones 1991b).

Lofroth et al. (2010) compared fisher habitat across multiple studies. The strongest and most consistent habitat association observed across many fisher studies is the use of cavities in live and dead trees by reproductive females with kits. Fisher kits are born during late winter to early spring when weather conditions are still cold and wet and are completely vulnerable until weaned at about 10 weeks of age. Tree cavities provide both thermal insulation and security from potential predators. Kits are still vulnerable after weaning and dependent on their mother until they can hunt on their own.

Trees used by reproductive females for denning are typically large to very large in size. The average diameter at breast from a meta-analysis of fisher habitat across multiple studies was 36 inches, with a range of averages reported of between 18 and 72 inches (Lofroth et al. 2010). In all studies that analyzed den tree selection, den trees were on average 1.7 to 2.8 times the diameter of other available trees within the vicinity of the den. The relatively large size of trees and snags used for denning is most likely related to tree age and the time required for heartwood decay to develop and form cavities and the size of cavities needed to accommodate an adult female and kits (Lofroth et al. 2010). These features represent key ecological features for fisher habitats.

Fishers select habitat characteristics at multiple scales for different activities or purposes including selection for home ranges, habitat characteristics within home ranges, and specific resources within those habitats (Raley et al. 2012, Lofroth et al. 2011, Powell and Zielinski 1994). (Sauder and Rachlow 2014, Weir and Corbould 2010).

When selecting home ranges, fishers select areas with a higher proportion of high canopy cover, higher amounts of mature forest, and a lower percentage of open areas. Home ranges are characterized by a mosaic of seral stages, including young forests (8.5- to 13.5-inch diameter at breast height as defined by Jones 1991 and Jones and Garton "year") which appear to provide important winter habitat (Jones and Garton 1994, Jones 1991b, Roy 1991), but in general, fisher tend to occupy areas with a high proportion of mid- to late-seral forest and little open or non-forested habitat (Raley et al. 2012, Schwartz et al. 2013, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015, Jones 1991b, Weir and Corbould 2010, Lewis et al. 2016, Zielinski et al. 2004b).

Within home ranges, the mosaic of forest conditions that typify fisher habitat provides the vegetative and structural heterogeneity necessary to support fisher, including high canopy cover, large diameter trees and snags for dens, multilayered canopies to protect against predation, downed wood for denning and resting, and coarse woody debris that supports prey (Jones 1991b, Heinemeyer 1993 habitat use, activity, and spacing of reintroduced fishers in northwestern Montana, Powell and Zielinski 1994, Jones and Garton 1994, Ruggiero et al. 1994a, Weir and Harestad 2003, Weir et al. 2011, Sauder and Rachlow 2015, Schwartz et al. 2013, Lofroth et al. 2010, U.S. Department of the Interior 2010). Fishers are known to hunt in both mature and younger forests but are widely reported to avoid non-forested areas and pole-sapling forest (Jones and Garton 1994, Raley et al. 2012, Weir and Corbould 2010, Zielinski et al. 2004a, Self and Kerns 2001) (Aubry and Raley 2006) Although fisher appear adaptable to a variety of forest structural conditions, they are less likely to use areas with limited cover (Buskirk and Powell 1994, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015), which may limit occupancy and dispersal in fragmented landscapes (Carroll et al. 2001, Zielinski et al. 2013).

Within their home ranges, they rest and den in mature and old stands. Female fisher use large diameter live trees and snags with cavities for denning and rearing of young and have been reported to use a wide variety of tree species (Raley et al. 2012). A key feature of these trees is that they are large diameter dead or partially dead trees often reported to have cavities and heart rot, suggesting that damage and decay play critical roles in the suitability of habitat for reproduction. Thus, retaining and promoting ecological processes that result in the recruitment of trees with these features is important to the conservation of reproductive habitat for fisher (Raley et al. 2012). Fishers selects areas with higher amounts of coarse woody debris, large downed trees, and standing large diameter live trees or snags with cavities which are used for resting, denning, refuge from predators, and thermal regulation, (Jones 1991b, Heinemeyer 1993, Jones and Garton 1994, Weir and Harestad 2003, Weir et al. 2011)(Raley et al. 2012). Several studies have suggested that the abundance of these structures to potentially be a limiting factor for fishers (Zielinski et al. 2004b, Powell and Zielinski 1994, U.S. Department of the Interior 2011a, Spencer et al. 2008). Even when using younger forests in winter, studies note the importance and use of large diameter trees, snags, and downed wood (Jones and Garton 1994). Fishers forage in both mature and younger forests and are more tolerant of early seral conditions while foraging but are widely reported to avoid openings. Moist forested habitats with continuous overhead cover and riparian zones are frequently used (Vinkey 2003) and stream courses may be used as travel corridors (Jones 1991b).

Home Range and Space Use

Home ranges for fishers in the Northern Rockies are among the largest in their range. Home ranges are large, with males having larger home ranges than females and male home ranges overlap one or more female home ranges. However, fishers maintain relatively exclusive intra-sexual home ranges which contributes to low densities. Fisher home ranges vary in size across North America and range from 16 to 122 square kilometers (4.7 to 36 square miles) for males and from 4 to 53 square kilometers (1.2 to 15.5 square miles) for females. Within the plan area average "year-long" estimates of intra-sexually exclusive home range size were 40.8 and 82.6 square kilometers for females and males, respectively (Jones 1991a). Sauder and Rachlow reported average home ranges of 98.4 km^2 for males and 49.3 km^2 for females. The large home ranges and exclusive inter-sexual home ranges contribute to the low densities of the species. These homerange characteristics informed queries to model outcomes of the Forest Plan as described below. In addition to home ranges, researchers have also reported core use areas that are smaller than fisher home ranges. Sauder reported core use areas were estimated at 6,795 acres (or 27.5 km^2) for males, while female core use areas were 4,596 acres (or 18.6 km^2). Sauder (2014) suggested female home ranges overlapped by 21.3 percent, and female core areas overlapped by 8.1 percent. Male home ranges overlapped 15.3 percent, and male core areas overlapped by about 3.3 percent.

Natural Processes that Contribute to Fisher Habitat

Several natural ecological processes contribute to habitat conditions that support fishers including forest succession, fire, and tree diseases. As stands age, trees become larger, and factors that affect tree health become more prevalent. These conditions contribute to the development of larger trees with cavities that provide denning habitat. Insects and diseases affect forest health conditions and the amount of denning and resting structures present. Insects and disease include mountain pine beetles, Douglas-fir beetle, spruce beetle, fir engraver, balsam woolly adelgid, western hemlock looper, western spruce budworm, root diseases like armillaria, laminated root rot, annosus root disease, schweinitzii root and butt rot, Indian paint fungus and White pine blister rust. Generally speaking, these pests and pathogens affect mature trees more readily than younger trees. Root disease is the leading cause of tree mortality on the Nez Perce National Forest. Insects and disease can affect stand densities, proportion of live and dead trees, tree condition, and stand composition. Insects and tree diseases and subsequent excavation by woodpeckers create the conditions in mature forests that support fisher denning, resting and thermal cover such as tree trunks with hollow cavities in live and dead trees. Female fishers are among the largest obligate-tree cavity users in North America, and trees used as dens need to be large enough to provide a cavity that has an inside diameter of nearly 12 inches or larger. Once dead trees fall to the forest floor, they create woody debris that support fisher habitat and their prey. While most insect and diseases are endemic, trends and projections suggest that many of these insects and diseases are currently operating at higher than endemic levels and trending higher through time as a result of increases in forest age, climate conditions, and increased dominance of tree species that are susceptible to these pathogens. Forest insect and diseases are important processes that contribute to structural diversity that wildlife like fishers depend on. These are disturbance factors that operate within a natural range of variability to support important features for wildlife. An in-depth discussion about insects and diseases is provided in the Forestlands section of this Final Environmental Impact Statement.

An especially important process that contributes to fisher denning and resting structure is heart rot. Indian paint fungus causes decayed heartwood and hollow stems in living small-size and larger true fir and hemlock trees. Hollow stems are created during advanced stages of decay, when cylinders of rotted heartwood detach from surrounding sapwood and collapse, causing formation of a hollow chamber.

Heartwood weakened by this fungus provides a substrate suitable for cavity excavation, while hollow stems provide ready-made cavities for nesting, roosting, resting, and denning. Decayed and hollow stems also provide areas of weakness where stem breakage may occur. Broken tops may provide points of entry to hollow stems, or, in conjunction with green limbs remaining near breaks, may provide structures useful for denning. Stem breakage contributes to the formation of canopy gaps, increasing structural diversity, and adds decayed wood elements to the forest floor.

Windborne Indian paint spores infect new host trees, usually when the trees are small and growing in the understory, through tiny (less than 2 mm) dead branchlet stubs. Spores germinate and mycelia grow within the branchlet until it is overgrown by healthy tissue. The fungus then enters a dormant phase as a resting spore, surviving for 50 years or more until activated by a tree wounding injury that allows air into the trunk interior near the resting spore. Once activated, decay develops rapidly in the heartwood. Fruiting bodies (conks) form on the tree bole after extensive decay has developed and typically produce spores for several years. Suppressed, slow-growing trees are more likely to be infected by Indian paint fungus than fast growing trees, because they tend to have more shade-killed branchlets and to overgrow dead branchlet stubs more slowly, providing increased opportunities for infection. Thus, Indian paint fungus is most common in stands that developed from dense, suppressed, trees growing under infected overstories, especially on sites where tree vigor is low. Cool, moist sites such as those found near water, on north aspects, on lower slopes, and under dense shade, as well as uneven-aged stand structures favor spread and infection by this fungus. Wounds that activate dormant infections are commonly caused by mechanical injuries to the tree bole, frost cracks, or the breaking of a large-diameter branch close to the tree bole. Stands containing host trees, especially grand fir or white fir, that are managed on long rotations of 120 years or longer are likely to develop decay that provides useful structures for wildlife sheltering, nesting and denning.

Several forest types used by fishers burn with a mixed severity fire regime. Mixed fire regimes naturally result in fire mosaics that consist of a mix of fire severities including low burn severity, unburned fire skips, and live trees within burned areas that live into the next stand generation. A critical outcome of this heterogeneity is the formation of fire refugia—unburned or lightly burned areas in the burned matrix that are functionally unaltered by fire. The variable nature of mixed fire regimes results in older and larger diameter trees, and islands of large trees present within a burn perimeter that later grow to provide denning and resting habitat for fishers. Many factors influence burn severity, including fuel characteristics, climate, weather conditions, topography, vegetation characteristics, and elevation. Fuel conditions can affect the rate of spread, shift fire behavior from surface fire to crown fire and influence fire severity. High severity fire has been reported to be avoided by fishers and has the capacity to destroy large swaths of suitable habitat, but areas that burned at low and medium intensity or were left unburned maintain fisher use, and forest structural characteristics predictive of den presence were found in areas that burned at low to moderate severity. Uncharacteristic high intensity fire has been identified as a threat to fishers in the Southern Sierra Nevada Mountains and contributed to federal listing of the Sierra Nevada population. Wildfire has been, and will be, the greatest driver of vegetation change on the Nez Perce-Clearwater. Efforts to promote a sustainable low- to mixed-severity fire regime that creates habitat heterogeneity and forest resiliency can support fisher conservation and facilitate habitat connectivity for fishers.

During timber harvest, Jones and Garton (1994) emphasized retaining an abundance of cull grand fir for future dens, retaining 54 but no more than 109 metric tons of large diameter logs, and retaining decks of cull logs and a few slash piles would recover fisher habitat faster after clearcutting. They also maintained that uneven harvest management would better maintain fisher habitat at the stand level. They suggested that fisher habitat management may require a landscape-based approach to maintain the integrity of ecological systems. Applying such an approach would require land managers to adopt long-term, large-scale plans that would mimic natural landscape patterns and processes. Such an approach would keep a certain proportion of forests in various successional stages, together with a specific frequency distribution of various patch size and linkage areas across the landscape. Such an approach would help ensure the viability of fisher populations within a managed landscape (Jones and Garton 1994).

Harris (1984) suggested that fisher habitat management must involve management of a system of mature forests, as opposed to management of individual stands. Sauder and Rachlow (2015) published two studies on fisher from data they collected from radio collared individuals within the plan area and on adjacent lands. Sauder and Rachlow (2015) found that fisher selected habitat at different scales and identified key ecological features of fisher habitat. Landscapes, defined as 50 to 100 square kilometers that had greater than or equal to 55.8 percent mature forests arranged in connected complex shapes with few isolated patches and open areas comprising less than 5 percent of the landscape characterized a forest pattern selected by fisher. Mature forests, identified as trees 25 to 50 meters tall, were important to fisher ecology at the landscape scale. Open canopy cover was defined by Sauder and Rachlow (2014) as the percent of the of landscape with canopy cover less than 10 percent and canopy height categories were defined as nonforested or open, 0–4.9 m, 5–9.9 m, 10–24.9 m, and 25–50 m. Per a personal conservation with Joel Sauder on September 11, 2019, tall forests were a surrogate for characteristics that contribute to fisher habitat such as snags live trees with heart rot, or large diameter trees, but some younger stands can reach 25 to 50 meters tall yet lack some of the characteristics that provide for fisher, such as snags, live trees with heart rot, and larger diameter trees. The top model included a landscape configuration and a landscape composition metric. The configuration metric was the proximity among mature forest patches representing the connectedness of mature forest patches within a landscape and the composition metric included the percentage of the landscape classified as open area. The proximity index distinguishes sparse distributions of small habitat patches from configurations where the habitat forms a complex cluster of larger patches. The proximity index among mature forest patches was the most supported habitat variable influencing habitat selection by fishers for home ranges at the landscape level and was 40 times more plausible than the amount of open area as best explaining landscape-level habitat selection by fishers. The percentage of the landscape with open areas was selected against by fishers. Landscapes with greater than five percent open area display pronounced decreases in the probability of use. With 10 percent open area on the landscape, the probability of occupancy drops 39 percent when compared to the 5 percent area mentioned previously (Sauder 2014). The rapid falloff of occupancy probability is indicative of the fisher's high degree of sensitivity to open areas on the landscape. Thus, the connectivity of mature forest is a key ecosystem characteristic of landscapes selected by fishers as home ranges.

Sauder and Rachlow (2014) compared areas with different management histories in relation to how they would provide for fisher habitat. Based on these findings, Sauder and Rachlow (2014) concluded that landscapes managed primarily for industrial timber production and lands managed as roadless and wilderness had significantly more open areas, less mature forest, and a reduced proximity of mature forest patches than occupied fisher home ranges. Sauder and Rachlow (2014) defined industrial forest (that is, state, corporate, and privately owned forested lands managed primarily for timber production), roadless forest (that is, federally owned and designated roadless or wilderness areas), and multiple use forest (that is, the remainder of federally owned lands). This seemingly suggests that the amount of disturbance in the multiple use forest areas prior to 2014 supports fisher occupancy at higher levels than industrial or roadless forest.

Similarly, Weir and Corbould (2010) examined factors affecting the probability of a potential home range being occupied in British Colombia with data from 10 radio tagged resident fisher in the Sub-Boreal Spruce bio geoclimatic zone between 1996 and 2000. They reported that the percentage of a home range in open areas, defined as wetlands and recently logged areas within the past 12 years, best predicted the likelihood of occupancy by fishers. The probability of a home range area being occupied by a resident fisher decreased with increasing amounts of wetlands and recent logging present in the area. They estimated that a 5 percent increase in open areas decreased the relative probability of occupancy of a potential home range by 50 percent. Logging 5 percent of their area equated to approximately 591 acres within a female home range of 11,786 acres in a 12-year period.

Two researchers have developed habitat models for fisher on the Nez Perce-Clearwater:

- Olson et al. (Olson et al. 2014) modeled fisher habitat based upon using a suite of vegetative, topographic, and climatic variables. Olson found the probability of current fisher occurrence was highest given the presence of mesic forest types with tall trees, high annual precipitation, and mid-range winter temperatures. From this study, Olson produced a model across the Northern Rockies that predicts the probability of occurrence. Olson's model suggests that the Nez Perce-Clearwater contains much of the core fisher habitat in the Northern Rockies. The Olson model suggests that the warm moist potential vegetation type group composes most of the fisher habitat in the plan area.
- Sauder (2014) refined the Olson model by including landscape scale variables for connectivity of mature forest and the amount of open habitat. The Sauder model is a probability surface that combines the climate only model of fisher habitat from Olson et al. (2014) with two other published models of fisher habitat at the landscape (Sauder 2014) and home range (Sauder and Rachlow 2015) scales. Sauder's model is more specific for the Nez Perce-Clearwater for fisher because it was developed from radio-collared fishers on the Nez Perce National Forest and represents the habitat preferences of fishers. The model displays relative probabilities of occurrence, but not absolute probabilities of occurrence. The model applies a threshold to the continuous probabilities to define "probable and not probable" fisher habitat that maximizes the sensitivity (that is, correctly predicting fisher presence) and specificity (that is, correctly predicting fisher absence) of the habitat model. This approach puts equal importance on correctly predicting presence and absence. Thresholds used for probable habitat are at minimum specificity levels of 80 percent and 95 percent, meaning that the probability of incorrectly predicting fisher habitat to be present when it was less than or equal to 20 percent or less than or equal to 5 percent, respectively. Sauder (2014) used these levels to identify "probable" and "high quality" habitat. For this analysis we applied the threshold for "probable" habitat because it is inclusive of high-quality habitat and also includes many areas that are likely occupied by fishers. Sauder's model is the best available scientific information for fisher habitat in the plan area. The analysis of the effects of management area allocation on fisher is informed by the distribution of Sauder's probable fisher habitat.

See Appendix A for maps of the Olson and Sauder fisher habitat models.

Essentially both the Olson model and the Sauder model suggest that the core of fisher habitat in the Northern Rockies habitat exists within the Nez Perce-Clearwater and the Cabinet Mountain range. They also showed that fisher habitat was more fragmented and of lesser amounts in other areas of Idaho and Montana.

Key Threats and Stressors

Threats were assessed using the NatureServe method for threat identification. The method uses a combination of the scope and severity of threats to derive the overall impact. The threats assessment for fisher using this method can be found within Appendix C. The threats assessment identified several medium level threats, but no high or severe threats. According to the threats assessment, threats include past livestock grazing, illegal harvest (such as incidental trapping), past timber management, regeneration harvest, pathogens, fire suppression, uncharacteristic wildfire, habitat shifting, and alteration as a result of climate change. Some of these threats are identified as medium level threats because the severity, scope or both are unknown, such as for past livestock grazing or introduced genetic material, and the method treats uncertainty with caution by increasing the resulting threat level. However, these are indirect threats that could have altered habitat, but are not likely to affect habitat in the future, and effects are likely to diminish with time. Therefore, they are not analyzed in detail. Threats that could alter fisher habitat or populations in the future are discussed in more detail below.

Stressors to this species group that are outside the control of Forest Service management may include:

- Global warming—Increased and prolonged summer temperatures and drought conditions, and the increased risk of fire, duration of fire, or increased intensity of burning that may impact forest cover and downed wood. May also result in a northward shift in habitat, changes in tree species composition, and habitat fragmentation.
- Private land development—Developments to support increased human populations that may impact suitable forest cover on non-public lands and impact connectivity between public lands.
- Over-harvesting by trappers—Incidental trapping may be an important source of mortality, particularly where populations are small and fragmented. Idaho prohibits trapping of fisher so all mortality of fishers from trapping is through incidental captures in pursuit of other species or illegal trapping.
- Habitat loss and degradation—Loss of forested habitat, particularly late-successional forests, to fire and timber harvest results in the reduction and fragmentation of suitable habitat. Loss of habitat cover and structure near streams and loss of downed woody material near streams.
- Small, isolated populations—May lose genetic diversity and have a higher probability of extinction. It is unknown if a sufficient number of individuals exist to sustain the populations across the full range of environmental and demographic stochasticity (Vinkey 2003). Stressors may cause loss of habitat, displacement, or mortality. Genetic diversity in the Northern Rockies may be higher than other areas within the fisher's distribution because populations here are composed of individuals with native genetics and individuals from populations in the Midwest and British Columbia.

The following Forest Service management activities may have direct or indirect effects on forested and riparian habitats:

- Timber Harvest and Vegetation Treatments—Changes in mature and late-successional forest stand composition and structure affecting canopy cover, large and very large live and dead trees, hollow trees, downed trees, and forest composition. In addition to timber harvest, this category includes prescribed fire, fuels treatments, habitat restoration, wildlife habitat treatments (for big game for example), and other vegetation treatments. The magnitude of this threat depends upon the scale, intensity, and manner of timber and vegetation management activities.
- Wildfire patterns—This would include fire patterns that are either lacking due to fire exclusion or are more intense and larger in scale than was typical historically, resulting in widespread habitat changes and landscape patterns. This category includes fire exclusion, uncharacteristic wildfire, and the interaction of wildfire and climate change.

For fisher, as with all wildlife on the Nez Perce-Clearwater in general, wildfire, insects and disease, in-growth, and stand succession largely determine the amount and pattern of habitat on the Nez Perce-Clearwater for this species rather than management activities (Ecosystem Research Group 2019).

However, forest management could be in part additive to natural disturbance, and climate change could alter the intensity, timing, and frequency of disturbances, and the distribution and condition of habitat.

Methodology

The analysis focused on the Plan Area, except for cumulative effects, which were considered at larger spatial scales to reflect activities occurring on non-National Forest System lands. The analysis at a minimum considered the anticipated life of the plan (15 years), but changes in vegetation were considered over longer periods to reflect the effects treatments have on forest conditions. The alternatives were designed to achieve desired conditions at different rates (No Action Alternative at the current pace of management, Alternative W within 20 years, Alternative X within 30 years, Alternative Y within 50 years, Alternative Z within 100 years, and the Preferred Alternative within 40 years), and thus were compared at 10-year timesteps to highlight the effects of different rates of implementation. The No Action Alternative was set to achieve the desired conditions at the current pace of vegetation management. However, all alternatives, including the No Action Alternative, are moving towards a common set of desired conditions that do not vary. Each alternative is expected to achieve results at different rates relative to forest cover type, size class, and density distributions. All alternatives, including the No Action Alternative, are expected to have different trajectories and effects related to the pace of achieving desired conditions.

In addition to the coarse filter ecosystem analysis for mature closed forest habitats analyzed above, the analysis of the effects of the Land Management Plan specific to fishers involves two parts:

1. A spatial analysis of fisher habitat overlaid with Land Management Plan alternatives for land allocations to evaluate how much fisher habitat would be subject to, or protected from, a variety of potential land uses as a result of suitability plan components;
2. the vegetation modeling outcomes for fisher habitat using the SIMPPLLE model that implements the plan's integrated plan components. Plan direction influences the trend and condition of fisher habitats. Fisher were analyzed with coarse filter ecosystem components in mind. The analysis of vegetation conditions and the effects of coarse filter ecosystem plan components were modeled in SIMPPLLE to determine the outcomes for fisher habitat under the alternatives. See the Forestlands section for more information on vegetation modeling.

Spatial Overlays

The spatial overlays use the Sauder model of probable fisher habitat overlaid with land allocation alternatives. Variations between the alternatives that could affect fisher habitat include the amount of fisher habitat within management areas, recommended wilderness, suitable and eligible wild and scenic rivers, the recreation opportunity spectrum, timber suitability, and geographic areas. The various land allocations and their associated suitability plan components would determine where and which types of activities would potentially occur within those lands.

In addition, suitability plan components in designated land allocations provide protections as well which includes designated wilderness, Idaho Roadless Rule Areas, designated wild and scenic rivers, the Lolo Trail National Historic Landmark, and designated research natural areas. A variety of activities that could affect fisher are not suitable or are conditionally suitable within these land allocation types and so would not be subject to unsuitable activities and would have limited amounts of these activities when conditionally suitable within these lands. For example, these land allocations constrain vegetation management and timber harvest, which could be detrimental to fisher habitat. Instead, they include the use of wildland fire to trend towards land management plan desired conditions and objectives, which provide natural ecosystem processes that promote diversity in habitat structure that fisher require. The Idaho Roadless Rule constrains timber harvest, road building, and mining activities to various extents depending on the Roadless Rule theme and directs the purposes for which vegetation treatments may be conducted. Idaho Roadless Rule areas allow vegetation treatments but must be conducted based on the allowances within Idaho Roadless Rule themes.

The most widespread influence on fisher habitat is land use allocations, such as those for wilderness, Idaho Roadless Rule, or multiple use areas (see Effects Alternatives of Land Allocations). Important decisions made in Forest Plans are the allocation of lands proposed for designation, their different uses, and their broad management direction. Examples of land allocation decisions that will be made in this plan are management areas; the summer and winter recreation opportunity spectrum classifications which identify areas suitable for motorized uses; areas suitable for timber; areas recommended as wilderness; rivers eligible or suitable for inclusion into the wild and scenic river system; and areas proposed for research natural areas. In addition, the plan sets prevailing direction for the different land allocations. Furthermore, the plan's land management area allocations and associated suitability plan components will determine which activities are suitable to occur on those lands. Fisher habitat within the various land allocations will be managed under the direction established by the plan's desired conditions. Furthermore, uses suitable within the different land allocations would potentially occur within fisher habitat on those lands.

Important decisions made in Forest Plans are the allocation of lands proposed for designation, their different uses, and their broad management direction (Table 186). Table 182 shows the amount and percent of fisher habitat within the different types of designated and multiple use land allocations types. These land allocations combined make up the majority of the national forest's land allocations. Designated Wilderness, designated wild and scenic rivers, the national historic landmark, and Idaho Roadless Rule areas are lands designated by congress or were established by rule by the Idaho Roadless Rule. General multiple use lands are areas of the national forest not already designated.

Table 182. Acres and percent of fisher habitat by land allocation type in the No Action Alternative

Management Area	Acres	Percent
Designated Wilderness	232,914	11.7
Idaho Roadless Rule	799,152	40.1
General Multiple Use Forest	900,846	45.2
Lolo Trail National Historic Landmark	26,858	1.3
Designated Wild and Scenic Rivers	34,468	1.7
Grand Total	**1,994,238**	**100**

Management in designated wilderness emphasizes maintaining wilderness character and prohibits actions like road building, building structures, timber harvest, and mechanized travel. Fires from natural ignitions are generally allowed to burn if they do not threaten any critical values at risk near towns and communities. Grazing and mineral activities that existed before designation of wilderness areas were allowed to continue, but new grazing and mineral activities were withdrawn. The management paradigm in wilderness is protective of fisher habitat except for the limited exceptions and all allowed activities must be consistent with maintaining wilderness character. Natural fire ignitions within designated wilderness are generally allowed to burn, which could affect fisher habitat.

Designated Wild and Scenic Rivers are focused on the protection of the rivers, but management constraints apply to uplands within one-quarter mile of the river corridor. While these areas make up limited amounts of fisher habitat (see Table 182 for acres and percent), actions within these river corridors must protect or enhance the river's free-flowing character, water quality, and outstandingly remarkable values. The Middle Fork Clearwater River provides 33,889 acres, the Rapid River offers 255 acres, and the Saint Joe River includes 2 acres of fisher habitat. Generally speaking, wild rivers allow fewer activities than recreational or scenic rivers. These lands are generally protective of fisher habitat but with exceptions that must follow the river management plan, Forest Service Manual policy, the Wild and Scenic Rivers Act, designating legislation, or mining laws. Suitability of uses depends on whether the river is wild or recreational, with wild rivers having more restrictions than recreational rivers. The suitability of uses within wild and scenic rivers can be found in the Designated Wild and Scenic Rivers section of the plan. While only a low percent of habitat occurs within these areas (Table 183), they contribute to fisher conservation because riparian habitats are known to be used by fisher.

Table 183. Sauder model fisher habitat by designated wild and scenic river theme

Designated Wild and Scenic River Theme	Acres	Percent
Recreational	29451	1.5
Wild	5016	Less than 1

Data Source: Sauder model overlaid with designated wild and scenic river spatial layers representing a one-quarter mile river corridor.

The Lolo Trail National Historic Landmark contains a relatively small percentage of fisher habitat, but timber harvest and timber production are both unsuitable. Natural processes like wildfire are encouraged, and activities within the landmark should maintain National Register integrity. These lands are generally protective of fisher habitat.

Designated and Idaho Roadless Rule lands do not change as a result of the Forest Plan. Only the broad direction for these lands and suitability plan components are influenced by the Forest Plan. Combined, designated wilderness, designated wild and scenic rivers, and Idaho Roadless Rule Areas constrain or prohibit activities like timber harvest that alter fisher habitat. Thus, approximately 54.8 percent of fisher habitat is protected from these activities. Wildland fire is the primary agents of habitat change for fisher on these lands. Prescribed fire is usually conducted with lower severity burns that recovery faster from disturbance and could still be used by fishers.

A number of recommended land allocations vary by alternative and decisions in the Forest Plan. They include eligible and suitable wild and scenic rivers, recommended wilderness, and proposed research natural areas. These land allocations establish the variation in area within the three broad management areas shown in Table 186. In most cases, recommended areas overlap either Management Area 1 or 2 lands. In addition, the plan makes decisions about the suitability of motorized uses via the winter and summer Recreation Opportunity Spectrum and identifies timber suitability for the different land allocations. These are analyzed in more detail below. In many cases, these would direct where forest management activities occur or are restricted. Designated wilderness areas are the most restrictive, Idaho Roadless Rule Areas are intermediate, and multiple use areas are the least restrictive for management activities. They direct where and for what reasons timber harvest or production are allowed, how fires are managed, and how much motorized access there is generally. The most permissive are the multiple use areas, which would undergo the most timber production, and fuels treatments and would have the most motorized access. The least permissive are wilderness areas (Table 184), recommended wilderness is slightly less restrictive, and depending roadless rule areas constrain road building, timber harvest, and some mineral uses depending on roadless rule theme. The overlays provide a quantitative evaluation of the amount and percent of total fisher habitat that would potentially be subject to the types of activities that would occur under the plan. Thus, spatial analysis provides an indication of the distribution and scope of potential activities that could occur. Results and analysis are presented below.

Table 184. Acres and percent of fisher habitat in designated wilderness areas

Designated Wilderness Area	Acres	Percent
Frank Church-River of No Return Wilderness	11,487	0.6
Gospel-Hump Wilderness	23,685	1.2
Non-Wilderness	1,761,323	88.3
Selway-Bitterroot Wilderness	197,742	9.9

Vegetation modeling

See the Forestlands section for more information on vegetation modeling.

SIMPPLLE was used to estimate the natural range of variability of fisher habitat by modeling vegetation conditions backwards into the past for 100 decadal time steps simulating vegetation conditions over a thousand-year period. The natural range of variation (NRV) simulations incorporated climate models to simulate how variation in climate conditions changes in fisher habitat over time. Climate models simulate both warmer-drier and cooler-moister periods which in turn affect the amount of disturbance forests experience in the model and ultimately determine the condition of fisher habitat in outputs. Simulations are run 30 times and the NRV ranges are the averages of the simulations. Future projected outcomes of the alternatives are evaluated relative to the lower and upper ranges of the NRV, with the assumption that fishers have persisted in habitat conditions that operated within that variation. See the Forestlands section for more information on vegetation modeling. The natural range of variation provides a frame of reference for ecological integrity and resilience. It reflects the conditions that have sustained the current complement of wildlife and plant species and provides context for understanding the natural diversity of vegetation and the processes that sustain it. Since the mid-1800s, human presence and activities have increased dramatically in the plan area. The NRV estimates provide a reference to conditions that might have occurred prior to these impacts.

The analysis of the NRV was a primary element that informed desired conditions, but desired conditions depart from the NRV in some cases, recognizing that future climates necessitates changes to forests to ensure resiliency. The intent of using the NRV to inform desired conditions is not to return precisely to conditions that occurred at a single point in time but to understand the full range of conditions that were supported prior to substantial human influence. Desired conditions are framed within the variability associated with the natural range of variation to provide context for management objectives.

The analysis focused on key threats and stressors that may affect the ecological conditions necessary to maintain a viable population of fisher within the plan area. The analysis included a qualitative assessment based on the best available science and information, and when available and appropriate, additional quantitative analyses were added to further elucidate the relationships between stressors and the ecological conditions that support fisher populations. Specifically, the analysis included two quantitative models to estimate the effects of the alternatives on 1) the availability of fisher habitat (that is, acres of mature, mesic forest) and 2) the suitability of available fisher habitat to support a preferred fisher home range based the spatial arrangement of preferred fisher home ranges (proportion of mature, mesic forests and open or sparse vegetation).

Fisher Habitat Availability Model

The availability of suitable habitat can limit the distribution of species, including fisher (Olson et al. 2014). For fisher, the presence of mature, mesic forests is one of the primary predictors of occupancy and distribution (Krohner 2020, Jones 1991a, Jones 1991b, Jones and Garton 1994, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015, Schwartz et al. 2013, Olson et al. 2014). The availability of mature, mesic forests was modeled using the SIMulating Patterns and Processes at Landscape scaLEs (SIMPPLLE) model and compared among alternatives and against the estimated natural range of variation (NRV) to identify major departures from historic conditions (see Timber section for NRV methodology). The alternatives were modeled to meet the desired conditions for forest composition and size classes, as described in the revised Forest Plan. The alternatives were constrained by other resource factors (for example, riparian area direction, Northern Rockies Lynx Direction), known operational or logistical limitations, and management area direction. Outside of such constraints, treatments were assigned randomly with respect to their distribution. Based on the best available science, a query within the SIMPPLLE model was created to approximate the mature, mesic forest types that fisher tend to occupy.

A query was created to estimate fisher habitat for SIMPPLLE modeling. We reviewed published literature to identify habitat types to include in the model which included Jones (1991), Jones (1994), Schwartz 2013, Olson 2014, Sauder and Rachlow (2014 and 2015). Aspects of the fisher habitat informed by these publications were size classes, canopy cover, and habitat types. To identify broad potential vegetation types (PVT) to include as fisher habitat, the modeling compared broad potential vegetation with fisher observation data. To more closely compare to a locally derived fisher-habitat model (Sauder 2014), the query was adjusted between the draft and final analysis to include additional warm dry forests habitat types that fisher may occupy (Krohner 2020); however, Ponderosa and lodgepole pine habitat types were excluded as they are largely unused by fisher (Schwartz et al. 2013). The updated query also added forest types in some of the cool-moist broad PVTs, most notably some of the mesic, spruce-fir habitat types (Jones 1991b, Jones 1991a, Jones and Garton 1994). Finally, assumptions regarding fire intensity and scale were modified to better replicate the Nez Perce-Clearwater historic fire patterns more closely.

These habitat preferences led to the identification of the query below and suggest that fisher habitats align with those in the warm moist, some warm dry, and some cool moist broad PVTs. The habitat query included separate queries for denning habitat and foraging habitat. Denning and foraging habitat used the same cover types, but denning habitat was trees at least 15-inch diameter at breast height (DBH) while foraging habitat was trees at least 10-inch DBH. Details on the modeling parameters are available in the project record.

Denning Habitat

- Mature—qualifies as part of the 55.8 percent within a home range
- Cover type: Unless specified below, all cover types are included
    - Habitat groups and cover types:
        - A2—all cover types except pure Ponderosa pine
        - B2—all cover types except pure Ponderosa pine
        - C1A—all covertypes except pure lodgepole pine, Ponderosa pine, Engelmann spruce, lodgepole pine-grand fir
        - C1B—all covertypes except Ponderosa pine
        - C2—all covertypes except Ponderosa pine
        - C3—all covertypes

  - D1—all covertypes
  - D3—all covertypes except lodgepole pine, Engelmann spruce, subalpine fir, Engelmann spruce-subalpine fir, subalpine fir-Engelmann spruce-mountain hemlock, lodgepole pine-subalpine fir
  - E1—all covertypes, including Engelmann spruce, subalpine fir, Engelmann spruce-alpine fir
  - E2—all covertypes except Engelmann spruce, alpine fir, Engelmann spruce-subalpine fir-lodgepole pine; lodgepole pine IS included
- Habitat 15 inches and larger is denning habitat while habitat 10 inches and larger is foraging habitat. Foraging habitat includes denning habitat.
  - 10-14.9 inches
  - 15–19.9-inches
  - greater than 20-inches
- Fisher habitat was identified as canopy cover greater than 10 percent and includes:
  - 10-39 percent
  - 40–69.9 percent
  - 70–100 percent

Modeling for both the natural range of variation and the future outcomes are run forestwide 30 times with all forest stands receiving a treatments schedule in PRISM while natural disturbances are simulated by SIMPPLLE. Each run produces an estimate of the outcome, and the 30 runs are each averaged together to produce the outputs presented below. The fisher query, as informed by the best available scientific information, is a subset of the forestwide vegetation outcomes from the query above which is a set of criteria that are indicative of fisher habitat. The SIMPPLLE model query for fisher habitat identifies the relative amounts of the denning and foraging habitat by alternative over time and allows for a comparison between alternatives.

The final queries approximate fisher habitat, but they are not based on actual fisher occupancy data. Rather the queries represent general vegetation characteristics indicative of fisher habitat as derived from published literature (Krohner 2020, Jones 1991a, Jones 1991b, Jones and Garton 1994, Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015, Schwartz et al. 2013, Olson et al. 2014). See the description of the query below for additional information.

While the query has similarities to those of Sauder and Rachlow (2014), there are some distinctive differences that must be understood. First, the data that Sauder and Rachlow (2014) used was Landfire data, which used 30-meter pixels and included tree height data. SIMPPLLE modeling used a broad potential vegetation type layer and the Northern Region VMap product as the vegetation layers. Neither of these layers contain tree height data, but tree height and tree diameter are correlated. Landfire did not have diameters, so tree height is correlated with both canopy cover and diameter. A threshold of 10 inches diameter at breast height (DBH) was determined to be the diameter that corresponds best to trees greater than or equal to 25 meters within the size class breaks of VMap data and within the vegetation types queries in the model. Furthermore, 10 inches DBH was the size class within our habitat breaks that corresponded to habitats described by Jones 1991 and Jones and Garton (1994) as “young forest,” which they describe as 8.5-to-13.5-inch DBH, conditions that showed habitat use in summer and preferred use in winter. VMap is a vegetation map derived mainly from remotely sensed data calibrated with on-the-ground sample data. Forest Inventory and Analysis (FIA) data was used to corroborate the VMap assignments and to help add vertical structure to stands according to cover type and size. This layer contains the dominance type, size, and density information needed by the SIMPPLLE model. The size of the pixels for this analysis was 150 meters.

While every effort was made to ensure the model would be as accurate as possible, uncertainty associated with the fit of the fisher species-habitat relationships in the literature to those used in the SIMPPLLE model may affect the absolute accuracy of the resulting outputs (that is, acres of habitat); however, as the assumptions were consistent across all model runs, any inherent errors or biases were also likely consistent. Thus, while there should be some caution when considering the effects generated by the modeling exercise (that is, acres of habitat created or lost), comparisons among alternatives can provide some insight into the relative effects and overall trends of fisher habitat.

Ecosystem Research Group analysis (2022) compiled and presented SIMPPLLE and PRISM model outputs projecting future vegetation changes projected over the next 50 years as a result of managing towards desired conditions. All alternatives are projected for 50 years. The context for comparison of alternative outcomes is the natural range of variation of fisher habitat under natural disturbance. PRISM analysis models were run for 150 years to assess the stability of vegetation communities following proposed silviculture treatments and natural disturbance regimes. PRISM selects the appropriate set of treatments to achieve the desired conditions while SIMPPLLE concurrently simulates natural disturbances like fire and insects and diseases. The results are presented below.

The No Action Alternative represents the amount of treatments currently conducted under the 1987 Forest Plans as the “current pace of treatment” scenario. However, an important note is that the model is still trying to achieve the desired vegetation conditions proposed in the revised plan. This was done for comparison purposes and to put management under the 1987 Forest Plans into context. The action alternatives represent a treatment schedule needed to produce vegetation conditions to achieve the common set of desired vegetation conditions, with Alternative W within 20 years, Alternative X within 30 years, Alternative Y within 50 years, Alternative Z within 100 years, and the Preferred Alternative within 40 years.

Modeling considered a warmer, drier climate over the next five decades to anticipate the effects of the plan under future climates. Model outcomes were conducted with the assumption of warmer, drier climate conditions that were estimated from a subset of the full natural range of variation range that included only the warmest and driest decades. These scenarios also considered that the current level of fire suppression would continue, and the acres burned over time due to a warmer, drier climate and increased fuel loads would increase in the future.

Fisher Home Range Habitat Suitability Model or Spatial Model

In addition to the absolute availability of habitat, the relative degree of habitat fragmentation may also act to limit habitat suitability (Fahrig 2003). Although the presence of mature, mesic forests is one of the strongest and most consistent predictors of fisher habitat suitability (Raley et al. 2012), the juxtaposition of different vegetative communities ultimately affects fisher distribution (Olson et al. 2014, Krohner 2020) and habitat use (Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015). Heterogeneous forest conditions likely provide access to a greater diversity and abundance of prey species while still retaining access to habitat features that are important to reproduction and thermoregulation (Raley et al. 2012). Despite being associated with a diverse vegetative community, fisher tend not to use areas of open or sparse vegetation (Sauder and Rachlow 2014, Sauder 2014, Sauder and Rachlow 2015, Buskirk and Powell 1994, Powell and Zielinski 1994, Weir and Corbould 2010, Zielinski et al. 2004a) , with potential consequences for occupancy and dispersal (Olson et al. 2014, Krohner 2020). Regeneration harvests, for example, may significantly reduce fisher use of an area until trees of sufficient size are regrown (Jones and Garton 1994). Similarly, fisher are also less likely to use areas that experience high intensity wildfire, although fisher continue to use areas that experience less intensive fires where the structural characteristics that fisher prefer are often retained (Jones and Garton 1994, Sweitzer et al. 2016, Blomdahl et al. 2019).

Sauder (2014) reported that occupied fisher home ranges contained a median of 55.8 percent mature forest with an interquartile range of 39.5 to 64.8 percent and a median of 5.4 percent open with an interquartile range of 4.5 to 8.2 percent. Areas with these characteristics were found to have a high probability of occupancy (estimated at 0.7) (Suader and Rachlow 2014). To address the potential for the spatial relationships of vegetative communities, including fragmentation, to affect fisher home ranges, outputs from the SIMPPLLE model were further evaluated using a spatially explicit moving windows analysis that considered the effect of areas of both the composition of mature and open or sparse vegetation on the likelihood that an area may provide the components that support a female fisher home range. Using a window of 49.3 square kilometers, a size representative of an average female fisher home range (Jones and Garton 1994, Sauder and Rachlow 2014), individual pixels (of 5 acres) were categorized as supporting a female fisher home range if the surrounding window exceeded two habitat thresholds. First, the window must include at least 55.8 percent mature forest using the same definition of as outlined above (that is, mesic forest with greater than 40 percent canopy cover for trees 10 inches dbh or greater). Second, the area of open or sparse vegetation (that is, areas with less than 10 percent canopy cover or trees less than 4.5 inches in DBH) would be less than or equal to 10 percent of the window. The 10 percent threshold was selected because it is a level at which there was a reasonable probability that that an area would be occupied (Weir and Corbould 2010, Sauder and Rachlow 2014). The threshold of 10 percent open (or sparse vegetation) is the point at which the probability of occupancy is estimated at roughly to 0.40 or higher. Amounts of open (or sparse habitat) higher than 10 percent correspond to a lower probability of occupancy by fishers as estimated in Sauder and Rachlow (2014) but could still be occupied at lower occupancy rates. The spatial query essentially asks, how much of the fisher habitat has the characteristics of a female fisher home range with a probability of occupancy of 0.40 or higher at each time step. The spatial query was run into the past over a 100 time steps to estimate the natural range of variability for the spatial pattern of fisher habitat and for the future projections to determine the effects of the alternatives. The resulting spatial query is presented below:

- Habitat type groups same as fisher foraging habitat presented above.
- Mature was defined as tree size classes at least 10-inch DBH and canopy cover greater than 10 percent
- Open Habitat is defined as habitat with less than or equal to 10 percent canopy cover as well as all non-forested habitats, and forested habitats in grass, shrub, and seedling stage or 0- to 4.9-inch sapling size.

During the development of the methodology, thresholds of 5.3 and 10 percent were tested. Thresholds of 5.3 percent resulted in erratic disparities in the natural range of variation (NRV) outcomes for spatially relevant fisher habitat. The 10 percent threshold in the model was selected because this is a level at which fisher still have a reasonable probability of occupancy (Sauder and Rachlow 2014) and better reflects the percent of open habitats under natural disturbance. Furthermore, a 5.3 percent threshold was also not selected because of the erratic behavior the model at this level. Habitats with 10 percent or less include habitats that meet the 5.3 percent threshold identified by Sauder and Rachlow (2014). Ultimately, the outputs generated a spatially relevant NRV for fisher habitat from both a spatial and non-spatial standpoint, the results of which are analyzed below. The planning team worked with Joel Sauder and researchers from the Rocky Mountain Research Station in the development of the model.

As with the analysis of mature, mesic forest availability, the moving windows analysis approximates selected fisher home ranges as reported in Sauder and Rachlow (2014) but are not based on actual fisher occupancy data. While size of the moving window was determined by the average size of fisher home ranges as published in literature, it is important to recognize that there is a distribution of home range sizes around the average, with some being larger and some being smaller than the average. Like the findings from the trend of total fisher habitat, the findings from the spatial analysis have value in understanding the relative effects of the various alternatives on fisher habitat suitability, but it is important to consider the findings in the context of the uncertainty inherent to the models. The spatial query estimates the spatial arrangement of mature and open forests which could indicate the suitability of habitat to support an occupied female home range.

Affected Environment

Of the Nez Perce-Clearwater's approximately 3.9 million acres, 1.99 million acres, or a little over half, is considered probable fisher habitat based on the Sauder Model. Table 182 displays the amounts of fisher habitat in the different land allocation types. Combined, Idaho Roadless Rule areas and designated wilderness areas contain about 54.8 percent of the fisher habitat within the plan area compared to 46 percent in general multiple use forest (see Table 182).

There have been broad scale changes in forest composition in the plan area since the late 1800s. Historically, western white pine was a more widespread dominance type in northern Idaho, occupying the region's cooler moister sites in elevations between 2,000 and 5,500 feet (Haig 1932) which today make up a substantial portion of fisher habitats. White pine dominance has declined greatly as a result of historic harvest, blister rust, and lack of disturbance. Instead, shade tolerant species like grand fir, Douglas-fir, and Western hemlock have supplanted western white pine (Fins et al. 2001). Site specific observations in the project area verify these general observations made by Fins et al. (2001). In the stands proposed for vegetation management, the most abundant species are shade tolerant species rather than long-lived early seral species, such as western white pine, Ponderosa pine, or western larch. Grand fir and western red cedar are important species for fisher. It is assumed that white pine was also an important species for fisher because of its prevalence historically and because it attained a large size capable of providing habitat features used by fishers. Furthermore, western white pine was often dominant or codominant with grand fir on white pine habitat types, and western redcedar and Englemann spruce was often present in white pine stands. As such, it was a prevalent species within areas occupied by fishers today. However, these assumptions have not been tested in the science due to lack of existing mature western white pines currently due to blister rust. Restoration of western white pine is emphasized in the plan at various intensities within the alternatives. Changing grand fir types back into white pine dominance types may impact fisher habitat over in the short term, at least until white pine stands provide large tree structure usable by fisher.

The warm moist group includes some of the most productive forest sites on the Nez Perce-Clearwater. The warm moist group is nearly fully contained within the Sauder probable fisher habitat model. Grand fir types within the warm dry type also have substantial overlap with the Sauder model. On drier sites, grand fir is the dominant climax species north of the Northfork Clearwater River. Western hemlock dominates the wetter end of this group, with western redcedar dominating on cooler and wetter sites south of the Northfork Clearwater River. This setting occurs on mid-to-high elevation sites across all aspects. Historically, western white pine is the most common seral species dominant within the warm moist group, along with grand fir, western larch, and Douglas-fir. An important part of the productivity of the plan area that is extremely relevant to fishers is the capability to grow very large trees that provide large cavities for denning. All of these tree species mentioned are capable of providing cavities large enough to support denning fisher.

The cool moist group comprises the most productive subalpine fir and Engelmann spruce sites on the Nez Perce-Clearwater. Moist mountain hemlock and lodgepole pine habitat types are in this group, along with subalpine fir and spruce habitat types. This setting occurs on mid-to-high elevation sites across all aspects. Lodgepole pine and Engelmann spruce are the most common seral species. Engelmann spruce was reported by Jones and Garton (1994) to provide for fisher denning habitat. However, lodgepole pine has been identified as avoided by fishers. The Nez Perce-Clearwater has undergone ongoing disturbance through time. Disturbance like wildfire, insects and diseases, and other disturbances are a natural part of forest ecosystems. In addition, timber harvest is also part of the current management regime and influenced the habitat conditions seen today. The amount of disturbance in fisher habitat through time provides context for the analysis below.

To quantify the amount of human disturbance, an overlay of Sauder's probable fisher habitat with the Forest Service's Facts Activities spatial layer (accessed 8-30-2023) was conducted to evaluate how much fisher habitat has been treated in the past 80 years. Since it is assumed that forest stands become preferred fisher habitat at about 80 years or more, and because records of timber activities in the Facts Activities layer become less reliable as you go back in time, we evaluated the amount of timber harvest over the past 80 years or since 1943.

According to the overlay, there are 2,030,514 acres of fisher probable habitat including on private inholdings (36,277 acres) within the administrative boundary. Excluding private inholdings, we estimate there are 1,994,237 acres of fisher probable habitat within lands controlled by the Nez Perce-Clearwater.

Modeled fisher habitat has experienced approximately 361,312 acres of footprint treated with timber activities as recorded within the Facts Activities layer since 1943, which represents approximately 18.1 percent of modeled fisher habitat treated. There are approximately 1,621,856 acres of modeled habitat that has not been treated since 1943. Over that time, treatments in modeled fisher habitat averaged 5,667 acres per year or about 0.28 percent of fisher habitat per year. There is variation in how much was actually treated in a given year as demonstrated by the following graph (Figure 64). Note that the year 2024 represents acres planned but not yet implemented and those acres will likely be implemented over multiple years. Also note that these numbers only display the amount of timber activities within fisher habitat and does not include timber activities outside of modeled fisher habitat.

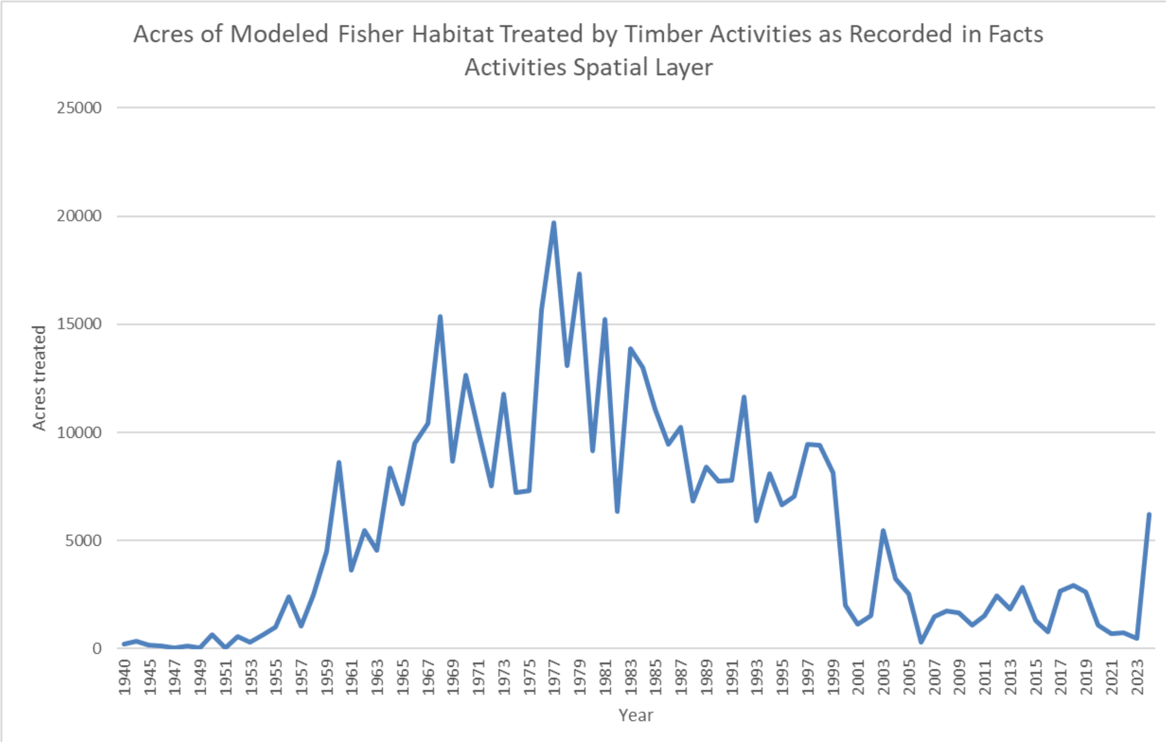


Figure 64. Acres of modeled fisher habitat treated by timber activities as recorded in Facts Activities Spatial Layer. Note that acres for 2024 are acres planned but will probably be implemented over multiple years.

The average amount of fisher habitat acres treated per decade is presented below in Figure 65. These were calculated by averaging the amounts within each decade. For example, the average for the 1970s was the average calculated from the amounts of timber harvest from 1970 to 1979 in fisher habitat. The most intensive decades of treatments were recorded in the 1960s to the 1990s. As the Sauder Model is in part a condition-based model that takes into account the connectivity of mature forest and the amounts of open habitat, it takes into account areas treated within the model's distribution as inclusive of fisher habitat, which suggests fisher habitat has been sustained over time under these levels of timber harvest. The alternatives explore the effects of the pace of restoration or acres of treatment needed to achieve desired conditions. The average amount of timber harvest per decade within probable fisher habitat in the past is comparable to the amounts of total timber harvest explored in the alternatives.

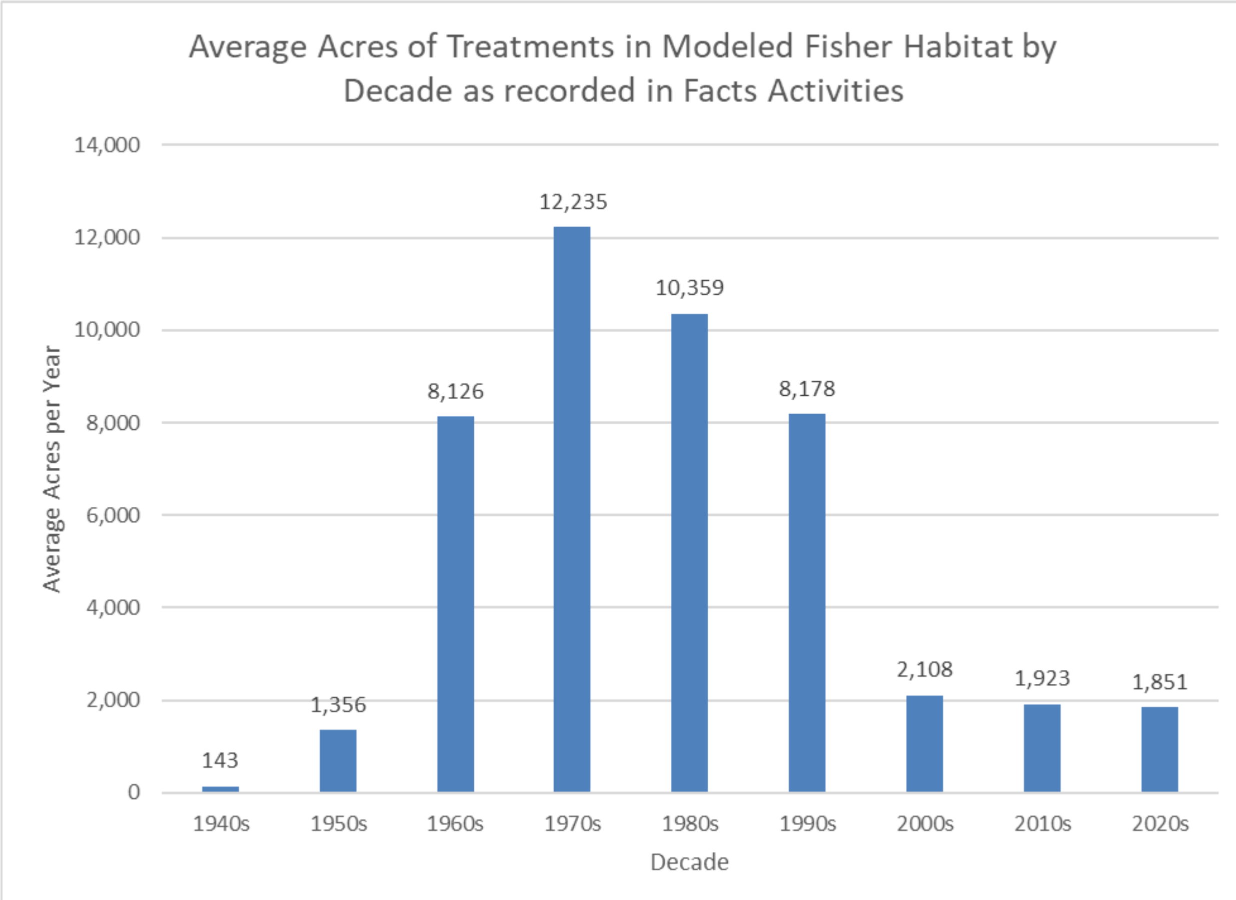


Figure 65. The average acres treated with timber activities per year by decade within probable fisher habitat. Note that 2020s data includes actual treated acres and acres of planned timber activities

The treatment types that occurred in the past in modeled fisher habitat are presented in Table 185 below. Note that this table contains more treatments than the total acres treated identified above because some of the treatments were multiple entries. The alternatives propose treatment schedules and types of treatments needed to achieve the desired vegetation conditions, which might differ substantially from the treatments used in the past. The different types of timber activities have potential to result in different effects on fisher habitat. For example, even-aged harvests result in a regenerating stand that would lack denning structures until the stand is in advanced seral stages. By contrast, two-aged treatments allow legacy features like live trees that survive long into the next generation and would allow older trees that potentially provide denning structures to remain within younger, regenerating stand. Thinning treatments result in short-term simplification of stand structure but increase tree vigor and growth rate that over time promotes larger trees that are preferred by fishers in shorter time periods. Uneven aged treatments promote stand age diversity, creating a multi-age and multi-size class stand at finer scales, but also requires a more intensive road network for timber access. Different treatment types can be used to favor different tree species, change species composition, affect density, and affect size class distribution. A detailed description of the timber harvest systems, and resulting outcomes is presented in the Forestlands section of the Final Environmental Impact Statement and specific amounts of the types of timber harvest systems needed to achieve desired conditions are presented in Appendix B.

To make the treatments easier to understand, the treatments have been condensed into categories that better describe whether the treatment is an intermediate treatment like thinning, an even-aged treatment, an uneven-aged treatment, or a two-aged treatment. The amounts of each category are shown below in (Figure 66).

Table 185. The types of timber harvest treatments within modeled fisher habitat, the category of treatments, acres of treatment since, and the percent of the total acres of treatment since 1943

Type of Timber Management Activity	Category of Treatment	Acres Since 1943	Percent of total treatment
Commercial Thin	Intermediate	21,276	4.7%
Group Selection Cut (UA/RH/FH)	Uneven Aged System	3,199	0.7%
Harvest Without Restocking	Even Aged	3,141	0.7%
Improvement Cut	Intermediate	14,182	3.1%
Liberation Cut	Intermediate	17,345	3.8%
Natural Changes (excludes fire)	Natural Change	6,725	1.5%
Overstory Removal Cut (from advanced regeneration) (EA/RH/FH)	Even Aged	75	0.0%
Patch Clearcut (EA/RH/FH)	Even Aged	3,969	0.9%
Patch Clearcut (w/ leave trees) (EA/RH/FH)	Two Aged	17	0.0%
Permanent Land Clearing	Non-Forest	261	0.1%
Salvage Cut (intermediate treatment, not regeneration)	Intermediate	95,724	21.0%
Sanitation Cut	Intermediate	96	0.0%
Seed-tree Final Cut (EA/NRH/FH)	Even Aged	7,906	1.7%
Seed-tree Preparatory Cut (EA/NRH/NFH)	Even Aged	512	0.1%
Seed-tree Removal Cut (w/ leave trees) (EA/NRH/FH)	Two Aged	2,565	0.6%
Seed-tree Seed Cut (with and without leave trees) (EA/RH/NFH)	Even Aged	37,087	8.1%
Shelterwood Establishment Cut (with or without leave trees) (EA/RH/NFH)	Even Aged	42,481	9.3%
Shelterwood Preparatory Cut (EA/NRH/NFH)	Even Aged	3,640	0.8%
Shelterwood Removal Cut (EA/NRH/FH)	Even Aged	8,623	1.9%
Shelterwood Staged Removal Cut (EA/NRH/NFH)	Even Aged	5,373	1.2%
Single-tree Selection Cut (UA/RH/FH)	Uneven Aged System	12,875	2.8%
Special Products Removal	Non-Silvicultural	634	0.1%
Stand Clearcut (EA/RH/FH)	Even Aged	132,250	29.0%
Stand Clearcut (w/ leave trees) (EA/RH/FH)	Two Aged	23,425	5.1%
Two-aged Coppice Cut (w/res) (2A/RH/FH)	Two Aged	661	0.1%
Two-aged Preparatory Cut (w/res) (2A/NRH/NFH)	Two Aged	7	0.0%
Two-aged Seed-tree Seed and Removal Cut (w/res) (2A/RH/FH)	Two Aged	4,171	0.9%
Two-aged Shelterwood Establishment and Removal Cut (w/ res) (2A/RH/FH)	Two Aged	2,348	0.5%
Two-aged Shelterwood Establishment Cut (w/res) (2A/RH/NFH)	Two Aged	230	0.1%
Two-aged Shelterwood Final Removal Cut (w/res) (2A/NRH/FH)	Two Aged	3,596	0.8%

Type of Timber Management Activity	Category of Treatment	Acres Since 1943	Percent of total treatment
Two-aged Stand Clearcut (w/res) (2A/RH/FH)	Two Aged	1,156	0.3%

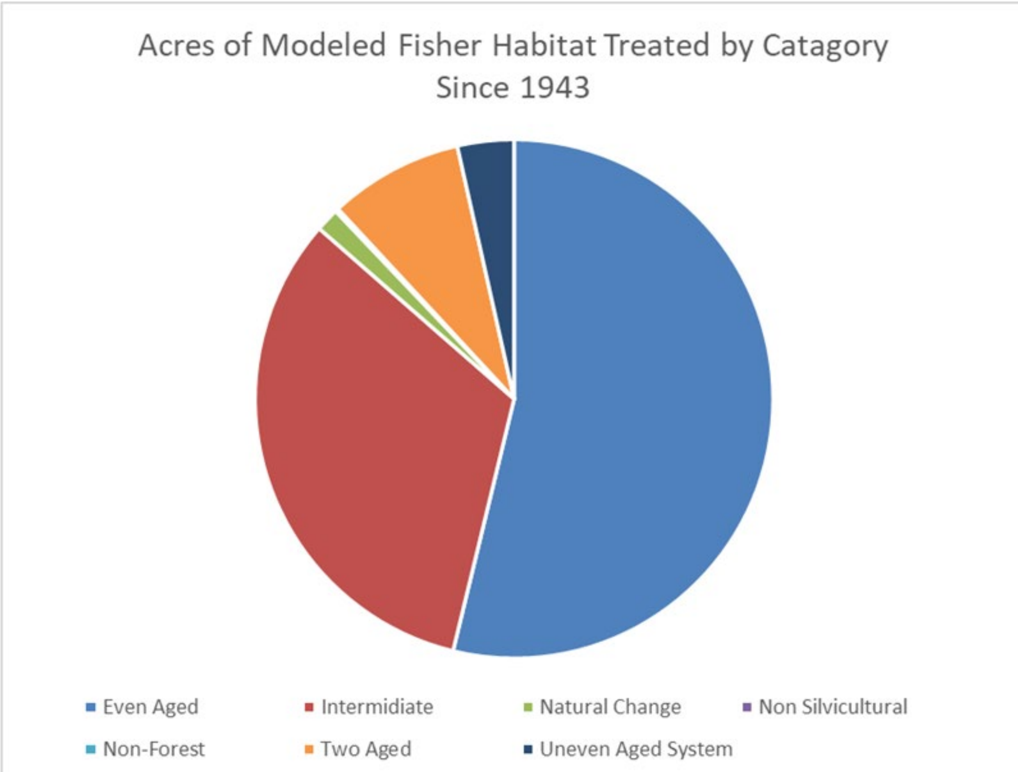


Figure 66. The categories of timber treatments within modeled fisher habitat

Fisher habitat has also experienced fire disturbance through time as an agent of change. Disturbance from fire in the past was estimated by overlaying the Forest Service's fire perimeters layer with modeled fisher probable habitat. Once again, we used an 80-year threshold for evaluating effects of past fire disturbance because this age is assumed to be long enough for stands to grow into habitat used by fishers. Also, fire data are less reliable the farther back in time they are. Note that the fire perimeter layers do not record fires that were less than 10 acres. Also, keep in mind that fires burn at various intensities with a fire perimeter, so some areas experience no or light intensity fire, other areas burning at moderate intensities, and other areas burning at high intensity. The Wildfire History and Recent Trends subsection of the Final Environmental Impact Statement describes the variation in fire burn intensity within different potential vegetation types (PVTs).

Fire intensity influences the effects on fisher habitat, and the majority of fire that burns fisher habitat operates at as a mixed and low severity intensities. Fire severity has often been described in categories as high, mixed, or low severity. Low severity fire burns at ground level and does not typically kill most trees. High fire severity or stand replacing fire is characterized by mortality of most or all the vegetation. Mixed severity fires are a highly complex disturbance regime that produces unique patch dynamics and ecosystem responses. Characteristics of mixed-severity fire include widely varying fire intervals and combinations of surface, torching, and crown fire behavior both within and between fires, resulting in intermixed patches of live and dead understory and overstory vegetation. A majority of fisher habitat is in the warm moist PVT group, and fire regime group III makes up approximately 82 percent the warm moist broad PVT. Some fisher habitat is also present within some cool moist broad PVTs. The cool moist PVT group is composed of only 28 percent of Fire Regime Group III which included white pine dominated sites that are now dominated by mixed conifer, grand fir, or Douglas-fir. Thus, a substantial portion of fisher habitat is within Fire Regime Group III, which is characterized as a mixed and low severity fire regime.

The total acres of fisher habitat within fire perimeters over the last 80 years (since 1943) was 323,583 acres which represents approximately 16.2 percent of fisher habitat that has burned. This is a very low amount of fire compared to estimates of fire under natural disturbance patterns and fires recorded in 1910s and 1920s. Lawler et al. (2012) found that moderate to high frequencies of low- and moderate-severity fire create and maintain snags and coarse woody debris over the long term. Note that fires smaller than 10 acres are not recorded in the fire perimeters spatial data. Fire suppression efforts to protect the timber resources in the managed front contribute to the relatively lower amounts of fire over time. The long-term lack of fire as a natural disturbance process, combined with historical selective removal of large, fire-resistant trees, have led to increased fuel loads so fisher habitat could be prone to more high intensity fires.

Fire and timber treatments overlap spatially in some cases. For example, some timber harvests later burned, while some burned areas received subsequent treatments. Therefore, the total amount of disturbance cannot be derived from adding the fire and timber treatments. As the fisher habitat model is in part a condition-based model, this amount and intensity of fire has sustained fisher probable habitat through time.

This information provides the context to the amount of disturbance that has occurred through time for the fisher analysis. Disturbance from timber harvest, fire, insects and disease, and forest growth or succession is dynamic and overlaps through time. Therefore, not all the disturbance factors can be quantified through overlays like this. The SIMPPLLE model takes into account these factors and simulates disturbance and tree growth to project future trends in fisher habitat through time as a result of Forest Plan alternatives, objectives, and desired conditions.

Environmental Consequences

Land Allocations

General forest management is the most permissive land type which allows most activities so long as they are consistent with the Forest Plan. These lands are suitable for timber production, road building, motorized recreation, livestock grazing, mechanized travel, and more. Within these lands, fisher habitat could potentially be subjected to these activities. These areas make up Management Area 3.

Management Area 2 consists of lands composed of backcountry areas with moderately restrictive management because they are either proposed for designation, roadless areas, or were set aside legislatively as restrictive land management types. Management Area 2 consists of Idaho Roadless Rule Areas; proposed areas such as recommended wilderness or rivers proposed as suitable or eligible for congressional consideration as wild and scenic rivers; designated and proposed Research Natural Areas, and the Gospel-Hump Multi-Purpose area. The Gospel-Hump Multi-Purpose Area was established by legislation for specific management when the Gospel-Hump Wilderness was established. Management Area 2 is composed mostly of lands within Idaho Roadless Areas, but depending upon alternative, also includes significant acreage of recommended wilderness areas, and smaller amounts of eligible and suitable wild and scenic rivers, proposed and designated research natural areas, and the Gospel-Hump Geographic Area.

Management Area 2 is made up of relatively large areas, generally without roads, few motorized trails, and provides a variety of recreation opportunities. A variety of different constraints apply to these lands depending upon allocation. Revised Forest Plan direction for Management Area 2 would apply to projects within any and all land allocation types they occurred in. In many areas, more than one set of set of plan direction would apply. For example, if a project fell within a sub-management area that had Idaho Roadless Rule areas, suitable Wild and Scenic river corridor, and established Research Natural Area, then all of the plan direction including suitability from each sub-management area would apply to that project. In recommended wilderness, both Idaho Roadless Rule area restrictions apply, and recommended wilderness area restrictions apply. If conflicting plan guidance is discovered, or a project is located within more than one overlapping land allocation, the direction from the more restrictive management area would apply. Idaho Roadless Rule areas constrains, or allow under only limited conditions, timber production, timber harvest, some mineral activities and road building. This management protects or reduces the impacts on fisher habitat from these activities. Other activities would be suitable, such as grazing, prescribed fire, motorized recreation.

Management Area 1 is composed of three areas designated by congress for specific uses and that have restrictions or special management direction prescribed by law. These include designated wilderness, designated wild and scenic rivers, and the congressionally designated Lolo Trail National Historic Landmark. These designations offer high levels of land protections against developments. Plan components or direction specific to these areas in the plan are labeled with MA1. Management direction for these lands do not vary by alternative.

The largest land allocation types are the three broad Management Areas. The three Management areas are composed of lands with similar management profiles. Management area 1 is composed of designated areas, Management area 2 is composed of areas proposed for designation as well as Idaho Roadless Rule Areas, and Management area 3 is composed of areas managed as general forest managed for multiple uses. The Forest Plan groups these different land allocations into three broad management areas which vary by alternative as shown in Table 186.

Table 186. Acres and percent of fisher habitat by management area (MA) and alternative

Management Area	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
	Acres %	Acres %	Acres %	Acres %	Acres %	Acres %
MA1	294,459 15	294,459 15	294,459 15	294,459 15	294,459 15	294,459 15
MA2	798,932 40	783,378 39	781,377 39	798,809 40	787,043 39	782,041 39
MA3	900,846 45	916,401 46	918,402 46	900,969 45	912,736 46	917,737 46

General forest management is the most permissive land type which allows most activities so long as they are consistent with the Forest Plan. These lands are suitable for timber production, road building, motorized recreation, livestock grazing, mechanized travel and more. Within these lands fisher habitat could potentially be subjected to these activities. These areas make up Management Area 3.

Management Area 2 consists of lands composed of backcountry areas with moderately restrictive management because they are either proposed for designation, roadless areas, or were set aside legislatively as restrictive land management types. Management Area 2 consists of Idaho Roadless Rule Areas; proposed areas such as recommended wilderness, or rivers proposed as suitable or eligible for congressional consideration as wild and scenic rivers; designated and proposed Research Natural Areas, and the Gospel-Hump Multi-Purpose area. The Gospel-Hump Multi-Purpose Area was established by legislation for specific management when the Gospel-Hump Wilderness was established. Management Area 2 is composed mostly of lands within Idaho Roadless Areas, but depending upon alternative, also includes significant acreage of recommended wilderness areas, and smaller amounts of eligible and suitable wild and scenic rivers, proposed and designated research natural areas, and the Gospel-Hump Geographic Area.

Management Area 2 is made up of relatively large areas, generally without roads, few motorized trails, and provides a variety of recreation opportunities. A variety of different constraints apply to these lands depending upon allocation. Revised Forest Plan direction for Management Area 2 would apply to project within any and all land allocation types they occurred in. In many areas, more than one set of set of plan direction would apply. For example, if a project fell within a sub-management area that had Idaho Roadless Rule areas, suitable Wild and Scenic river corridor, and established Research Natural Area, then all of the plan direction including suitability from each sub-management area would apply to that project. In recommended wilderness, both Idaho Roadless Rule Area restrictions apply, and recommended wilderness area restrictions apply. If conflicting plan guidance is discovered, or a project is located within more than one overlapping land allocation, the direction from the more restrictive management area would apply. Idaho Roadless Rule areas constrains, or allow under only limited conditions, timber production, timber harvest, some mineral activities and road building. This management protects or reduces the impacts on fisher habitat from these activities. Other activities would be suitable, such as grazing, prescribed fire, motorized recreation.

Management Area 1 is composed of three areas designated by congress for specific uses and that have restrictions or special management direction prescribed by law. These include designated wilderness, designated wild and scenic rivers, and the congressionally designated Lolo Trail National Historic Landmark. These designations offer high levels of land protections against developments. Plan components or direction specific to these areas in the plan are labeled with MA1. Management direction for these lands do not vary by alternative.

Recommended Wilderness

The alternatives propose different amounts of recommended wilderness which captures different amounts of fisher habitat. Alternatives with more recommended wilderness generally capture more fisher habitat. Alternative W has the most fisher habitat, with Alternative X having none. The No Action Alternative has the second least amount of fisher habitat and the Preferred Alternative captures the second least, with 94,290 acres of fisher habitat or about 94,270 acres. These lands are generally protective of fisher habitat and are not suitable for timber production, and timber harvest is very constrained.

The primary consideration with recommended wilderness is that natural ignitions would generally not be suppressed. The benefit of wilderness management to fisher has been questioned because fire management within wilderness or recommended wilderness is thought to create higher amounts of open area resulting in a lower probability of occupancy (Sauder 2014). However, wilderness areas and recommended wilderness areas are among the most protected areas from timber harvest, and they are unsuitable for timber production. They allow prescribed burning and wildfire to achieve land management plan objectives. The amount of fisher habitat by alternative is shown in Table 187. The most protective alternatives for fisher habitat are the alternatives that include more recommended wilderness and occur in the following order with Alternative W being highest, and Alternative Z, Alternative Y, the Preferred Alternative, and the No Action Alternative having the lowest amount.

Table 187. Acres of fisher habitat within recommended wilderness by alternative

Recommended Wilderness	No Action Alternative	Alternative W	Alternative X[1]	Alternative Y	Alternative Z	Preferred Alternative
Bighorn—Weitas	n/a[2]	166,890.4	n/a	n/a	n/a	n/a
East Meadow Creek	n/a	40,238.1	n/a	40,238.1	40,284.5	n/a
Hoodoo	23,528.5	38,496.0	n/a	26,991.9	34,800.7	29,888.2
Mallard-Larkins	20,395.1	39,967.3	n/a	39,971.6	29,237.2	28,143.2
Meadow Creek	n/a	n/a	n/a	n/a	n/a	36,258.6
Meadow Creek—Upper North Fork	n/a	29,364.1	n/a	n/a	28,639.9	n/a
Moose Mountain	n/a	5,715.0	n/a	n/a		n/a
North Fork Spruce—White Sand	1,880.9	17,417.9	n/a	n/a	4,514.5	n/a
North Lochsa Slope	n/a	89,495.6	n/a	n/a	n/a	n/a
Pot Mountain	n/a	n/a	n/a	n/a	38,743.2	n/a
Rapid River	n/a	378.2	n/a	378.2	378.2	n/a
Rawhide	n/a	n/a	n/a	n/a	2,490.5	n/a
Sneakfoot Meadows	76.3	2,522.6	n/a	n/a	1,072.0	n/a
West Meadow Creek	n/a	n/a	n/a	n/a	47,514.4	n/a
Grand Total	45,880.8	430,485.2	n/a	107,579.8	227,675.1	94,290.0

1 - Alternative X has no recommended wilderness.
2 - n/a = not applicable

Recreation Opportunity Spectrum

The recreation opportunity spectrum (ROS) identifies the expected recreational experience users should expect to experience in different areas of the Nez Perce-Clearwater. The Forest Plan also uses ROS as a mechanism to identify areas suitable for motorized uses as a land allocation. Settings suitable for motorized uses include Rural, Roaded Natural, and Semi-primitive Motorized. Settings not suitable for motorized uses include Primitive and Semi-primitive Non-motorized. The amount of fisher habitat within the various ROS classes is shown in Table 188 and Table 189. The descriptions of the ROS categories can be found in the Sustainable Recreation section of the Final Environmental Impact Statement.

Vehicle strikes have been identified as a source of mortality for fishers and linear features like highways have been identified as potentially affecting connectivity in California (USFWS 2016, USFWS 2019). In areas suitable for motorized uses, future motorized routes could be constructed after a site-specific analysis which could lead to a loss of habitat from the footprint of the road, or habitat fragmentation could occur. Otherwise, roads or motorized route concerns are not prevalent within scientific publications on fishers suggesting that roads and motorized routes are not a concern from a fisher conservation standpoint.

Effects of winter recreation on fishers has not been studied, however oversnow motorized vehicle use does not typically occur in the dense forest habitats preferred by fisher. The ROS classes could influence where new development of motorized areas could occur in the future and the level of future recreational developments. These could impact some fisher habitat if roads are constructed in motorized settings in the future by loss of habitat as a result of the footprint of new roads. Winter motorized travel could disturb fisher and could influence where trapping might be more likely to occur, although trapping of fisher is currently not allowed by the Idaho Department of Fish and Game. It should be noted that the 1987 plans did not apply ROS as suitability for motorized uses. The No Action numbers in these comparisons were contrived from policy direction that provided guidance as to how to identify the different recreational settings. The existing condition was that prior to travel planning in the Clearwater portion of the national forest was open to motorized travel unless closed by a site-specific decision. The Nez Perce national forest has not yet undergone travel planning, so it is currently open to motorized uses unless areas are closed by a specific closure order. There were different mechanisms in the 1987 plans and a variety of other factors that influenced decisions on the travel system such as elk habitat effectiveness, management area emphasis, and other considerations. The proposed plan and all alternatives will newly establish the ROS settings as a suitability plan component in the plan.

The amount of impacts to fisher habitat from motorized uses and the different levels of recreation experience are described from the amount of habitat within the different spectrum settings, with the assumption that more habitat in non-motorized settings would be more beneficial to fishers than habitats in motorize settings. Alternatives that would have the most fisher habitat in non-motorized settings are listed from the highest amount to the lowest amount in the following order: Alternative Z would have 41 percent in non-motorized, followed by Alternative Y with 39 percent, Alternative W with 36 percent, the Preferred Alternative with 27 percent and last Alternative X with 23 percent.

Table 188. Acres and percent of fisher habitat by summer recreation opportunity spectrum (ROS) class and alternative

Summer ROS Class	No Action Alternative		Alternative W		Alternative X		Alternative Y		Alternative Z		Preferred Alternative	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Rural	3,531	0	112,833	6	112,833	6	112,833	6	112,833	6	98,751	5
RN	623,175	31	560,615	28	604,979	30	590,983	30	581,781	29	785,026	39
SPM	523,024	26	594,447	30	813,614	41	505,587	25	481,086	24	577,805	29
SPNM	642,842	32	478,091	24	214,561	11	526,240	26	559,944	28	299,742	15
Primitive	201,666	10	248,251	12	248,251	12	258,594	13	258,594	13	232,915	12

ROS = recreation opportunity spectrum; SPNM = semi-primitive non-motorized; SPM = semi-primitive motorized; RN = roaded natural. ROS classes listed in order of least to most restrictive.

Table 189. Acres and percent of fisher habitat by the winter recreation opportunity spectrum (ROS) class and alternative

Winter ROS Class	No Action Alternative		Alternative W		Alternative X		Alternative Y		Alternative Z		Preferred Alternative	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Rural	1,320	0	635	0	635	0	635	0	635	0	2,302	0
RN	670,970	34	178,524	9	201,293	10	195,921	10	201,293	10	185,120	9
SPM	353,804	18	1,123,386	56	1,530,847	77	1,428,956	72	1,530,836	77	1,358,074	68
SPNM	741,419	37	458,778	23	28,548	1	135,811	7	28,559	1	215,828	11
Primitive	226,725	11	232,915	12	232,915	12	232,915	12	232,915	12	232,915	12

ROS = recreation opportunity spectrum; SPNM = semi-primitive non-motorized; SPM = semi-primitive motorized; RN = roaded natural. ROS classes listed in order of least to most restrictive.

Eligible and Suitable Wild and Scenic Rivers

Designated wild and scenic rivers are designated by Congress and will not be changing in the Land Management Plan. However, the plan identifies rivers suitable or eligible for inclusion within the wild and scenic river system as part of the alternatives. Table 190 shows the amount of fisher habitat within the different classifications of eligible or suitable wild and scenic rivers considered in the alternatives. Table 191 shows the acres of fisher habitat for each river considered as eligible or suitable for inclusion into the wild and scenic river system.

The number of rivers and river corridors as suitable or eligible wild and scenic rivers varies by alternative. The total acres of fisher habitat within a quarter mile of suitable wild and scenic rivers by alternative and classification are shown in Table 190 below. Also, some rivers contain more fisher habitat than others as shown in Table 191.

Table 190 The acres of modeled fisher habitat within the one-quarter mile river corridor of suitable or eligible wild and scenic rivers by alternative

Type	Classification	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Eligible	Recreational	33,431	0	0	0	0
Eligible	Scenic	9,175	657	0	0	0
Eligible	Wild	56,265	0	0	0	0
Suitable	Recreational	0	2,275	2,275	28,827	6,590
Suitable	Scenic	0	21,083	17,996	17,953	22,433
Suitable	Wild	0	22,715	27,141	29,569	59,633
	Grand Total	98,872	46,730	47,413	76,349	88,656

Table 191 The acres of modeled fisher habitat within rivers considered as eligible or suitable wild and scenic rivers by alternative and river

River Name	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Bargamin Creek	3,552	0	0	0	3,552
Bear Creek	1,306	0	0	0	1,306
Big Sand Creek	0	0	0	0	74
Bostonian Creek	0	0	0	0	1,491
Boundary Creek	0	0	0	0	641
Brushy Fork Creek	895	0	0	0	895
Buck Lake Creek	0	0	0	0	2,171
Caledonia Creek	0	0	0	0	111
Cayuse Creek	9,175	9,226	9,226	9,226	0
Colt Killed Creek	3,744	4,109	0	0	4,109
Crooked Fork	0	0	0	0	3,380
Cub Creek	2,848	0	0	0	2,848
East Fork Meadow Creek	0	0	0	0	1,289
East Fork Moose Creek	5,715	0	0	0	5,715
Fish Creek	1,354	5,943	5,943	5,943	5,943
Graves Creek	0	0	0	0	256

River Name	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Hungery Creek	3,962	3,962	3,962	3,962	3,962
Johns Creek	4,792	0	4,792	4,792	4,793
Kelly Creek	5,498	5,498	5,498	5,498	5,498
Lake Creek	636	0	0	0	0
Little North Fork Clearwater River	657	657	657	657	657
Lochsa River (Upper)	0	0	0	0	423
Meadow Creek (Selway)	8,486	8,486	8,486	8,486	8,486
Middle Fork Kelly Creek	0	96	96	96	96
Moose Creek	1,008	0	0	0	1,008
North Fork Clearwater River	17,683	0	0	22,347	0
North Fork Kelly Creek	0	516	516	516	516
North Fork Moose Creek	5,703	0	0	0	5,703
Paradise Creek	2,075	0	0	0	
Rhoda Creek	1,865	0	0	0	1,865
Running Creek	3,296	0	0	0	3,296
Sabe Creek	0	0	0	0	626
Silver Creek	0	0	0	0	3,219
Slate Creek	3,205	0	0	0	
South Fork Clearwater River	6,719	0	0	6,633	
South Fork Kelly Creek	0	12	12	12	12
Storm Creek	0	0	0	0	2,543
Three Links Creek	1,911	0	0	0	0
Weitas Creek	0	8,226	8,226	8,182	8,226
West Fork Three Links Creek	814	0	0	0	0
West Moose Creek	1,972	0	0	0	1,974
Wounded Doe Creek	0	0	0	0	1,970
Grand Total	98,872	46,730	47,413	76,349	88,656

Those alternatives with more probable fisher habitat within the quarter mile river corridors would benefit fisher more than the alternatives with less. The No Action Alternative does not include any suitable rivers and only contains eligible rivers. The Preferred Alternative would include 46,730 acres of fisher habitat in suitable wild and scenic rivers, which is the second lowest of any alternative and about half of what was identified as eligible under the No Action Alternative. The No Action Alternative has the highest amount of eligible wild and scenic rivers (and comparably more acres of habitat identified for inclusion to the wild and scenic river system), followed relatively by Alternative Z and Y. Alternative W has slightly more than the Preferred Alternative. In terms of benefits to fishers, the alternatives with higher amounts of fisher habitat within suitable (or eligible) river corridors would be better because they would be managed with more constraints on alteration of fisher habitat.

Timber Suitability

Timber suitability under the plan falls into three classes: areas suitable for timber production, areas not suitable for production but suitable for harvest to meet other resource objectives, and areas not suitable for harvest nor production. Timber suitability does not authorize any activities. Instead, it identifies where such uses are suitable after site-specific National Environmental Policy Act analysis and consultation. While timber suitability does not authorize specific actions, it identifies the types of suitable activities that could be expected to occur. Suitability plan components act as a constraint on activities on lands where they are unsuitable.

The distribution of the different timber suitability types was influenced by alternatives for other land allocations. For example, designated wilderness, recommended wilderness, and the Lolo Trail National Historic Landmark are not suitable for timber production nor timber harvest. Idaho Roadless Rule Areas are not suitable for timber production, but some limited areas are suitable for timber harvest, typically only along roads where timber could be accessed and within the appropriate Idaho Roadless Rule Theme. However, when conducting timber harvest activities, Idaho Roadless Rule provisions outlined in 36 CFR 294.24(a) and (b) would need to be followed. Many other Idaho Roadless Rule areas are not suitable for timber production nor harvest. Both designated and suitable Wild and Scenic Rivers are not suitable for timber production, and neither timber harvest nor timber production are suitable within the wild classification, but timber harvest to meet other resource objectives is suitable within recreational and scenic rivers. Riparian areas are not suitable for timber production but are suitable for timber harvest to meet other resource objectives.

Management Area 3 is primarily an area suitable for timber production. However, there are areas within Management Area 3 that are not suitable for timber production. Some portions of riparian areas for example are suitable for harvest but not production. While the land allocations influenced the identification of timber suitability classes, the timber suitability layer establishes where timber activities are or are not suitable.

The timber suitability allocation also identifies where different types of activities would be suitable. Timber production activities are timber activities where the primary goal is to produce marketable timber. Timber production activities include commercial and pre-commercial thinning, and a variety of timber cuts designed to produce lumber. These activities often require roads for access and transportation of the lumber. Infrastructure associated with timber production should be expected within areas suitable for timber production. Harvests typically include reforestation efforts.

Areas suitable for timber harvest to meet other resource objectives would be suitable for activities that may or may not produce marketable timber, but where the purpose of the project is to meet other resource objectives like vegetation desired conditions, wildlife habitat objectives, hazardous fuel reduction, habitat restoration, riparian area restoration, and more. Areas that are suitable for timber harvest to meet other resource objectives are typically within access distance to existing motorized routes, so they would not be associated with transportation developments in most cases. In some cases, the actions to treat vegetation would be similar to those for timber production, but in other cases, the actions would use other methods that might result in more retained legacy features, be more variable in distribution, or be actions that do not produce marketable timber. These treatments may or may not include reforestation depending upon the objectives.

Areas not suitable for timber harvest are areas where timber harvest treatments are not suitable uses of the lands. Timber harvest would not be allowed in these areas. Projects designed to meet vegetation desired conditions will rely mostly on natural or prescribed fire or mechanical treatments that do not result in lumber. Areas not suitable for harvest nor production would serve to protect fisher habitat from timber harvest and production activities. However, it would not protect habitat from wildfire loss.

Generally speaking, timber harvest or production activities may alter fisher habitat. Within stands at smaller scales, timber activities can alter seral stages, stand densities, tree species composition, amount of overhead canopy, reduce habitat complexity, reduce den structures, change understory conditions, and change amounts of coarse woody debris. As fishers mostly use mature forest with high canopy cover, the changes affect fisher habitat use until stands regrow to the point where they provide foraging conditions or resting or denning structures.

At larger scales, timber activities can change landscape patterns that can influence fisher use. The changes in landscape patterns can both increase habitat heterogeneity and diversity (defined by Sauder and Rachlow (2014) as intermediate abundances of high canopy forest and landscape edge density) selected for within home ranges by fishers. Similarly, timber activities can also create conditions that result in a lower probability of a fisher establishing a home range if the amount of open habitat is too high at the landscape scale.

The duration and intensity of effects depend on how timber activities are conducted. Timber activities that result in a complete regeneration without retention of legacy trees, snags, or downed wood result in effects that last longer and are more severe. Fishers typically avoid areas with low canopy cover, large forest openings, clearcuts, and other cleared areas (Buck et al. 1983, Arthur et al. 1989b, Powell 1993, Buskirk and Powell 1994, Jones and Garton 1994, Weir 1995). Regenerated stands are avoided until they regrow sufficiently. Early and mid-successional even-aged forests likely do not provide the same prey resources, rest sites, and den sites as more mature forests (Powell and Zielinski 1994). Early seral stages like 4.9- to 10-inch size classes, might be used for foraging, travel or connectivity. Regenerating stands may be used in winter or for foraging once they become 8.5 to 13.38 inches in diameter (young forest as defined by Jones 1991, and Jones and Garton 1994). Because denning structures can take more than 100 years to develop, regeneration cuts without reserves, or retained legacy features result in an even aged stand without denning structures until the trees grow to large diameter and become infected with tree diseases that result in hollow trunks (heart rot), cavities, snags, and coarse woody debris. Jones and Garton (1994) provided an estimate of the timeline for habitat recovery following regeneration harvest. They suggested that fisher would avoid regeneration harvest for at least 50 years, use them occasionally for another 60 to 100 years, and likely would not preferentially select them until trees were 120 to 160 years in mixed conifer forest (Jones and Garton 1994).

On the other hand, timber activities that result in two-aged or uneven-aged harvest systems, or that reserve live trees, result in stands that have size class diversity, and retain or develop characteristics of denning structures earlier in their regrowth. In these cases, younger aged stands contain or develop denning structures over time.

Intermediate treatment, such as thinning, reduces the density and complexity of the stand in the short-term but recover more quickly and may still be used by fisher soon after treatment. Intermediate treatments can reduce wildfire risk and increase the growth rate and vigor of remaining trees so that they reach larger sizes sooner to provide large tree habitat. Thinning also releases the understory vegetation to the benefit of fisher prey. Smith (2021) concluded that fishers would use recently thinned habitat as long as sufficient overhead cover (at least 50 percent) and high-valued resources (for example, den sites) were retained within their home range.

A number of measures can reduce the effects timber harvest has on fisher habitat, such as retention of legacy features like snags, live trees, and coarse woody debris. Weir and Harestad (2003) and Zeilinsky

(2004) suggested that the maintenance of large structural elements at small scales may mitigate for the negative effects of large-scale alterations of forests. Jones and Garton (1994) recommended retaining equal to or greater than 5 grand fir trees per acre for future dens with the objective to have these trees to be at least 18 inches DBH that would begin to fall 80 to 100 years after logging.

Measures to retain coarse woody debris can help maintain habitat features important to fisher after timber activities have occurred. Jones and Garton (1994) recommended retaining between 21 and 44 tons per acres of large diameter logs to provide for fisher prey and retain decks of cull logs and a few slash piles for potential fisher resting sites. Plan direction for retention of live trees is three per acre and requirements to retain downed woody debris requires logs 3 inches and greater and preferably 12 inches in diameter. The amount varies by broad potential vegetation type (PVT) and includes 7 to 15 tons per acres in the warm dry, 17 to 33 tons per acre in the warm moist, and 9 to 18 tons per acre in the cool moist, by comparison. The plan does provide plan components to retain these features in a limited way when conducting timber harvest. MA2 and MA3-GDL-FOR-01 establishing minimum amounts of coarse woody debris retainment within the warm moist broad PVT mostly overlaps Jones and Garton's recommendation, though on the low side, whereas the cool moist amount is wholly below the recommendation. The amount of coarse woody debris affects ground dwelling prey species availability, which are a portion of the fisher's diet, and used as denning and resting sites by fishers.

However, vegetation treatments like timber harvest or production provides the diversity of stand conditions that provide for fisher prey. Evidence suggests fishers select home ranges that include a diverse array of forest conditions resulting in access to a greater diversity and abundance of prey species while still attaining habitat features important for reproduction and thermoregulation. Sauder and Rachlow (2014) suggested a variety of habitat patches within a matrix of well-connected mature forest was a forest pattern favored by fishers. Light harvests, or small patch cuts, may increase habitat diversity thus prey diversity and have little negative impact on fishers where adequate late-successional forest are available (Arthur et al. 1989b, Jones and Garton 1994).

Lands managed for timber have been documented to support fisher populations. Fishers in southwestern Oregon are found in in uneven-aged, intensively managed forests containing many roads and selectively harvested stands but snags, logs, and cavity trees were relatively abundant (Mathew and Stinton 1998). Powell (2019) documented reproduction and consistent population growth from reintroduced fishers from and to lands managed for timber production in California. Powell (2019) noted that reproduction and survival appear not to be limited by logging and other forest management activities. Fishers tolerate some clearcuts in their home ranges, though the mean proportion tends to be below 25 percent of their home-range area (Powell et al. 2019). Niblett (2017) documented fishers denning habitat occurring on mostly industrial timberland in Northern California. Niblett (2017) observed denning in areas where as much as 24 percent of the area near the den sites is in openings. In addition, female fishers selected areas that contain large trees, even when the landscape is not a continuous canopy covered mature to late seral forest, and the density of such stands is high enough to support movement between suitable denning sites. Fishers continue to persist in actively managed landscapes in California and Oregon on Green Diamond Resource Company owned lands. Mathews (2013) documented fisher denning within the 89,400-acre Hoopa Valley Indian Reservation where timber is actively managed. Mathew (2013) emphasized the importance of retention of legacy features such as green tree and snag retention to retain breeding habitat for fishers. They recommended conserving patches of existing mature forest, maintaining larger numbers and a diversity of structural elements in project areas, and promote tree growth, damage (for example, low-intensity surface fires), disease, and decay that recruit fisher reproductive habitat. The U.S. Fish and Wildlife Service after reviewing several studies of fishers on lands managed for timber production on industrial timber lands concluded that fishers occupy managed landscapes and stands where timber harvest and other vegetation management activities occur and the degree to which fishers tend to be found in these areas often depends on a multitude of factors, including the scale, intensity, and rate of activities; the composition and configuration of suitable habitat; and the amount and type of retained legacy structures (USFWS 2020). Each of these studies emphasized that logging activities in these areas retained legacy features like live trees, snags, and downed wood, to ensure that regenerated stands exist over time that have a number of suitable denning and resting structures.

Timber management is likely to continue on non-National Forest Service lands. If done in moist forest types with dense canopies, then fisher habitat may be altered. Snags, large trees, and downed wood may be reduced, particularly on private lands. The focus on private lands may not be on restoration, historic conditions, and creating resilient stands but on monetary factors.

The prevailing method to manage vegetation in areas not suitable for production nor harvest, would be managed primarily through prescribed fire or wildfire. Jones 1991 suggested that while fishers used young stands (4.9- to 13.5-inch DBH) more in winter, these stands had regenerated following fire and had a higher availability of large diameter trees, snags, and downed wood present. It should be noted that stands regenerated after fire usually retain structural characteristics that allow fisher use, such as a few residual large diameter live trees, snags, and downed wood or logs (Jones and Garton 1994). While wildfire leaves a more variable pattern of biological legacies, it can also be unpredictable and burn large amounts of fisher habitat in a single disturbance resulting in habitat loss. Like timber activities, these effects last until vegetation regrows into used or preferred fisher habitat. Prescribed fire is typically conducted within a burn window where weather conditions promote lower fire intensities and results in less change to fisher habitat compared to wildfire. Compared to timber harvest, prescribed fire and wildfire managed for resource benefits can be more challenging to conduct because it requires a burn window and requires complicated logistics to organize the personnel required to conduct a prescribed fire. These factors might result in fewer opportunities to pull off burns, a delay that might risk a higher intensity fire event where more fisher habitat is lost. Thus, long term areas not suitable for timber production nor harvest are more likely to change as a result of wildfire.

The amount of fisher habitat within the three different timber suitability types varies by alternative. Table 192 provides the acres and percent of fisher habitat suitable for the various timber suitability types under the plan alternatives. The amount of fisher habitat suitable for timber production is roughly the same across all alternatives, only varying by less than 1 percent. Areas suitable for harvest for other resource objectives and areas not suitable vary more by alternative, mostly due to variations in the areas identified as recommended wilderness or wild and scenic river eligibility or suitability. The Preferred Alternative would have 38.4 percent of fisher habitat in the plan area suitable for timber production, 18 percent not suitable for production but suitable for harvest to reach other resource objectives, and 43 percent would be not suitable. This essentially would allow 56.8 percent of fisher habitat in the plan area to be suitable for either harvest or production, while 43 percent would not be suitable. The most beneficial alternative for fisher habitat would be Alternative W because it has the most habitat in areas not suitable and less habitat suitable for harvest for other resource objectives compared to the other alternatives. Alternative X would include the most fisher habitat within one of the suitable categories, with approximately 57.3 percent of fisher habitat in either suitable for production or suitable for harvest for other resource objectives. More areas suitable for timber harvest and production could result in more impacts to fisher habitats under the plan. While these are suitable uses, it does not mean that these activities would occur on all acres, only that those acres would be suitable for that use. Suitable uses would only be conducted after a site-specific analysis to evaluate the effects of a potential project.

Table 192. Acres and precent of fisher habitat by timber suitability type and alternative

Timber Type Suitability	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Not suitable for harvest nor production	931,027 acres 47%	994,527 acres 50%	850,676 acres 43%	871,553 acres 44%	896,336 acres 45%	862,427 acres 43%
Suitable for timber harvest for other resource objectives	308,654 acres 16%	235,820 acres 12%	378,396 acres 19%	367,998 acres 19%	336,615 acres 17%	366,996 acres 18%
Suitable for Timber Production	754,556 acres 38%	763,892 acres 38%	765,166 acres 38%	754,687 acres 38%	761,286 acres 38%	764,815 acres 38%

Fishers evolved in habitats that are dynamic and experience disturbance. Timber suitability delineates the areas where timber activities are suitable or could occur. In addition to timber activities, fisher habitat is also likely to be altered by natural disturbances like insects and tree disease, wildfire, and fuel reduction activities. Past timber harvest, fuels reduction, and fire have intermixed to result in the amount and pattern of fisher habitat on National Forest System lands today. Ultimately the overall impacts from these factors will depend on the pace, scale and distribution of habitat alterations which will determine the overall amount distribution, and trend of fisher habitat long term in the future under the plan. Of more importance than timber suitability is the overall pace of treatments, coupled with natural disturbances which will ultimately result in the landscape scale effects to fisher habitat conditions over the long term. The pace the alternatives for the rate at which desired conditions are achieved vary by alternative as well and determine the amount of change fisher habitats would undergo. The amount of timber production and the number of treatments to restore vegetation are shown in Chapter 2 of the Final Environmental Impact Statement. To determine the overall long-term trend fisher habitat was modeled in SIMPPLLE to take into account the pace of restoration, simulate natural disturbance, and tree growth and are analyzed below. These represent both short- and long-term impacts.

Snag Retention

Fishers are dependent upon hollow trees and snags for reproduction, protection from predators, and shelter. They are known to prefer areas with more large trees, increased snags, and more downed wood. The Forest Plan provides plan components for retention of snags which vary by alternative. MA2 and MA3-GDL-FOR-05 identify the amount and distribution of snags required to be retained when managing forested habitats. The amount of snags differs by broad potential vegetation type (PVT) as specified by size and overall number of snags retained. Snags are required to be retained within the project area but not necessarily within the treatment units. If existing snags are not sufficient, then additional live leave trees are required. The guideline is informed by average number of snags found in Forest Inventory and Analysis data as published in Bolenbacher (2009).

MA3-GDL-FOR-05 varies by alternative in that Alternative Z requires retention of snags at least 10 inches as specified by Bolenbacher (2009). The other alternatives require snag retention of snags at least 15 inches but does not require retention of snags smaller than this size. The average number of snags at least 10 inches is much higher than the number of snags at least 15 inches. For example, in the warm moist broad PVT, the number of snags 15 inches and greater including snags 20 inches and more totals 19 combined, whereas if snags at least 10 inches were required to be retained in addition, it would add 16 additional snags per acre. These additional snags would better provide for more potential denning sites and coarse woody debris to support fisher habitat after timber activities than alternatives that the require only retention of snags 15 inches or greater. Retention of snags and live retention trees are a factor in the effects that timber activities have on fisher habitat and the speed at which these habitats recover and whether an area harvested by timber activities continue to support fisher habitat use as described above for effects of Timber Suitability. The Preferred Alternative does not require retention of snags 10 inches and greater. Desired conditions for snags are focused on managing the current and future snag pool to promote snag retention by considering spatial distribution, snag density, size class distribution, snag species, and safety. The targets for snag retention for each broad PVT group are intended to be applied at the project level. Individual stand level snag densities may contribute to project level targets. The intent is not to normalize snag retention and recruitment at the per acre level but to achieve a project level target which reflects natural disturbance patterns. In addition, the plan has desired conditions that encourage large diameter living trees be present, such as MA3-DC-FOR-02, FW-DC-FOR-08, MA3-DC-FOR-04, MA3-DC-FOR-06, that encourage live tree retention and can contribute to future snags. Alternatives that retain more snags would be better for fisher than those with less, but all alternatives should retain snags at the project level at levels similar to the averages found within each broad potential vegetation type (Bolenbacher 2009). The retention of snags, live leave trees, and downed wood would help provide for fisher habitat in project areas managed by timber activities.

Suitability of Uses Within Recommended Wilderness

The alternatives vary by which activities are suitable within recommended wilderness. If actions are unsuitable, they would not be allowed. The actions that vary include whether motorized travel in winter would be a suitable use, whether mechanized travel would be suitable, whether public use of motorized and mechanized tools would be suitable, whether administrative use of motorized and mechanized tools would be suitable, whether recreational aircraft landing would be suitable, and whether aircraft landings for administrative uses would be suitable. Additionally, there are other suitability plan components for recommended wilderness that do not vary by alternative. This section analyzes only the effects of the suitability that vary by alternative.

Alternatives that include administrative use of mechanized and motorized tools in recommended wilderness would have minor consequences because they are expected to be limited in extent and relatively infrequent. Furthermore, they would mostly be used to maintain trails. These plan components and alternatives would have at most, minor consequences to fisher habitat in most circumstances. While these activities could occur and could remove some features like downed wood or live or dead trees, they would not likely impact fisher habitat to an extent and severity to reduce fisher use of an area. Motorized and mechanized tools used by the public would be similar but less regulated. The Preferred Alternative does not allow motorized tool use by the public but would allow administrative use of motorized and mechanized tools.

Winter motorized uses would bring motorized oversnow travel into fisher habitat, which might have disturbance effects. However, fishers primarily use forested habitats consisting of older or larger trees with high canopy cover and larger amounts of coarse woody debris and snags. While Jones (1991) and Jones and Garton (1994) described fishers using “young forests,” they defined those as trees 8.5- to 13.5-inch diameter at breast height with higher tree density, which are conditions where winter motorized users avoid. So, there is a lack of overlap in space use between fisher and the preferences of winter motorized users. Some new types of oversnow vehicles like snow bikes can navigate forested habitats but these users are mostly passing through forests to open areas suited for winter motorized uses. The most likely consequence could be in some additional access by trappers, which could expose some individual fisher to incidental trapping while trapping for other species. Incidental non-target trapping of fisher is uncommon, and the Idaho Department of Fish and Game currently does not allow trapping of fisher currently under law. Winter motorized uses do not alter fisher habitat directly, and forestwide, only 4.7

percent of modeled fisher habitat occurs within recommended wilderness under the Preferred Alternative. The Preferred Alternative does not allow winter motorized use in recommended wilderness.

Mechanized travel, for example on bicycles, would have disturbance effects. The amount distribution of this disturbance would be limited to where existing or future trails would occur. Fisher response to mechanized travel is not studied but potentially could result in disturbance or displacement. The trails needed to support mechanized travel could cross through fisher habitat. Fisher habitat would not be altered more than the required trail system. In general infrastructure development represents a minimal threat to fisher because the development of roads or trails typically occurs at relatively small spatial scales in forested areas, and vehicular related mortalities are rare (Naney et al. 2012). Fisher do prefer areas that have limited human development and use (Kordosky et al. 2021), but fisher occupancy is largely insensitive to the presence of roads (Carroll et al. 2001), and presumably human activity in and around roads. The differences in overall effects to fisher are likely minimal if allowed. The Preferred Alternative does not allow mechanized travel in recommended wilderness.

Alternatives that find these activities suitable in recommended wilderness are slightly better for fisher than those that allow these activities, but either way the difference is not generally impactful such that it would cause a population decline or significant change in distribution.

Modeling Results

Total Fisher Habitat Availability

The most influential factor that determines the trend in fisher habitat is the rate or pace of combined disturbance over time (both natural and human produced), while taking into account tree growth. Examples of disturbance include the amount of timber production, vegetation treatments for restoration, fuels treatments, wildfire, and insects and diseases. The treatments, fires, and insects and disease can overlap in space over time and interact with each and trees regrow after disturbance. The best way to evaluate the alternatives under such complexity is through computer modeling that simulates forest growth, treatments schedules and stochastic events like fire or insects and disease. The context of the comparison is whether the amount and distribution of treatments operates within or similar to the natural range of variation. Both were estimated within the SIMPPLLE and PRISM model as described above.

The alternatives propose variation in the pace of disturbance to achieve a common set of desired vegetation conditions. The common set of desired vegetation conditions are based on the range of conditions present when climatic conditions were at the warmer-drier range of the natural range of variability (NRV). Natural range of variation modeling indicates that fisher habitat trends lower when climatic conditions in the model are within the warmer-drier range of the NRV because these conditions result in an increase in the amount and frequency of disturbance like wildfire and insects and disease. Over time, warmer-drier conditions tend to result in a lower proportion of larger tree sizes, more early seral size classes, and can shift dominance types towards shade intolerant or fire tolerant tree species such as western larch, Ponderosa pine, lodgepole pine, Douglas-fir, or white pine rather than shade tolerant or fire intolerant tree species such as grand fir, subalpine fir, or western redcedar. The modeling for future trends in fisher habitat was conducted using assumptions of a warmer-drier climate condition representing anticipated future climates. Since the common set of desired conditions are targeting vegetation conditions representative of the warmer drier range of NRV and using the warmer-drier climate assumptions in the model, the expected outcome would naturally be a lower amount of fisher habitat overall. Keep this in mind when interpreting the results below.

The predicted outcome of the alternatives on denning habitat is shown in Figure 67. The amount of fisher denning habitat based on the model query is currently estimated at 985,110 acres and is predicted to decline due to a combination of natural and human-caused disturbance. Since all the alternatives were subject to the same natural disturbance regimes and had the same desired conditions, the predicted outcome of denning habitat for the alternatives all had a similar downward trend after 50 years. Although the desired conditions were the same, differences in treatment rates lead to notable differences in the outcome of fisher habitat changes among alternatives. Alternatives with a faster pace of achieving desired conditions had more decline than those with slower rates. The differences in alternatives differed by about 127,173 acres (between 803,200 in Alternative Z to 676,027 in Alternative X). All alternatives except Alternative X remain above the NRV low which is estimated at 680,522, while Alternative X declines below that level slightly. The Preferred Alternative is predicted to experience about a 30 percent decrease down to 686,983, which is near the lower NRV range (See Figure 67 below).

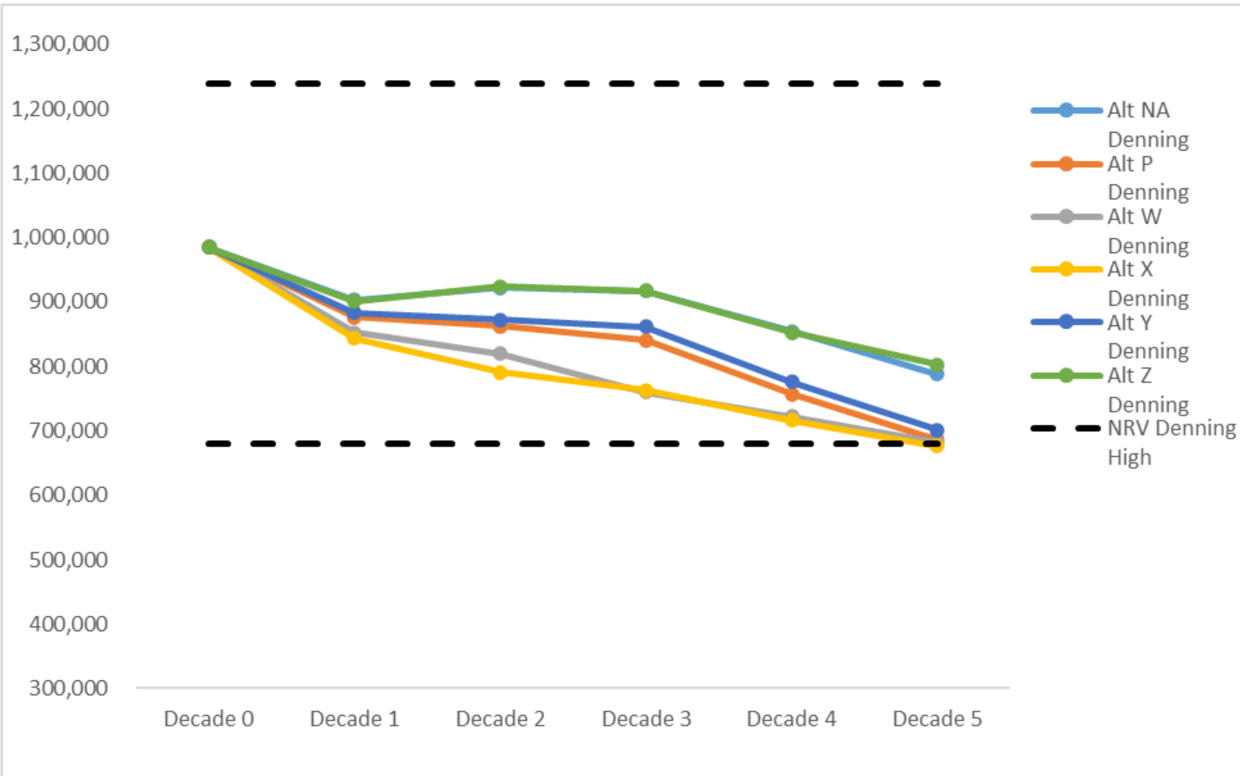


Figure 67. Trend of fish denning habitat by alternative and decadal time step as estimated through the SIMPPLLE and PRISM models for the fisher denning query. The black dashed lines represent the upper and lower Natural Range of Variability ranges. The colored lines represent the differences in denning habitat for each alternative. The Preferred Alternative is shown in orange.

Similar to denning habitat, the amount of total fisher habitat (both denning and foraging) declines under all alternatives as shown in Figure 68. The amount of total fisher habitat is currently estimated at 1,649,930 acres according to the fisher query, and due to natural and anthropogenic sources of disturbance, is predicted to decline. Again, since all the alternatives were subject to the same natural disturbance regimes and had the same desired conditions, the predicted availability of fisher habitat after 50 years differed little among alternatives (between 1,235,586 and 1,336,605 acres), with the Preferred Alternative predicting a percent decline of 24.3 percent to 1,247,842 acres Figure 68). Although the desired conditions were the same, alternatives did differ in treatment rates, leading to notable differences in the relative rate of fisher habitat loss among alternatives (Figure 68). Like with denning habitat, alternatives that achieved the desired conditions faster (that is, higher treatment rate) resulted in progressively faster rates of habitat loss for total habitat. For example, for the most intensive alternative, Alternative X, modeled fisher habitat declines from 1,649,930 acres to 1,399,871 by the first decade, drops to 1,194,021 by Decade 3 before recovering to 1,312,094 acres by 50 years. In contrast, for Alternative Z, modeled fisher habitat declines from 1,658,721 acres to 1,336,605 acres but not until Decade 5. Despite difference among alternatives, the availability of fisher habitat is projected to remain within the natural range of variation (NRV) for all alternatives, although Alternatives W and X do temporarily fall outside of this range before recovering above the NRV low by the fifth decade (Figure 68).

The overarching trend of all alternatives in both denning and total fisher habitat is driven by three factors:

1. The model's climate conditions are assumed to operate under a warmer-drier climate which were conditions under which fisher habitat was at the lower end of NRV. SIMPPLLE generates natural disturbances like lightning ignitions and then the model's fire logic determines the rate of spread based on climate condition
2. The model is managing towards the desired conditions which are based on warmer-drier periods of the NRV range, conditions in which fisher habitat was at the lower end of NRV. PRISM prescribes a treatment schedule and types of treatments to meet desired condition, such as forest composition and size classes.
3. Today's current conditions are ripe for disturbance according to the model assumptions. For instance, a dry climate might stress mature trees of a certain species and make them susceptible to insect infestation in the model assumptions. Another example, the fire spread logic in the model environment is influenced by the time since the last disturbance, and the probability of spread is increased under warm dry conditions. Each start is given the opportunity to grow. The size the fire grows to is dependent on the surrounding vegetation, as well as the historic probability that it will end with a weather event, or, if simulating fire suppression, whether or not there are enough resources to put the fire out. The type of fire that spreads (lethal, semi-lethal, or non-lethal) is dependent on the vegetation conditions of the site, including past disturbance or treatment, the climate assumption for the timestep, its elevational position relative to the burning fire (uphill, downhill, etc.), and whether it is downwind or not. The speed at which a fire grows in a certain direction is dependent on the slope of the landscape and the wind speed and direction. Again, the fire process will stop according to the probability of a weather-ending event, successful fire suppression, or perhaps running up against a natural barrier, such as the treeline or a lake. SIMPPLLE will then determine the effect of the fire by considering whether there are trees present capable of reseeding or resprouting the site (in the case of a lethal fire), whether the stand's fuel conditions have been reduced (for semi- or non-lethal fires), and whether there has been a change in size or species on the site.

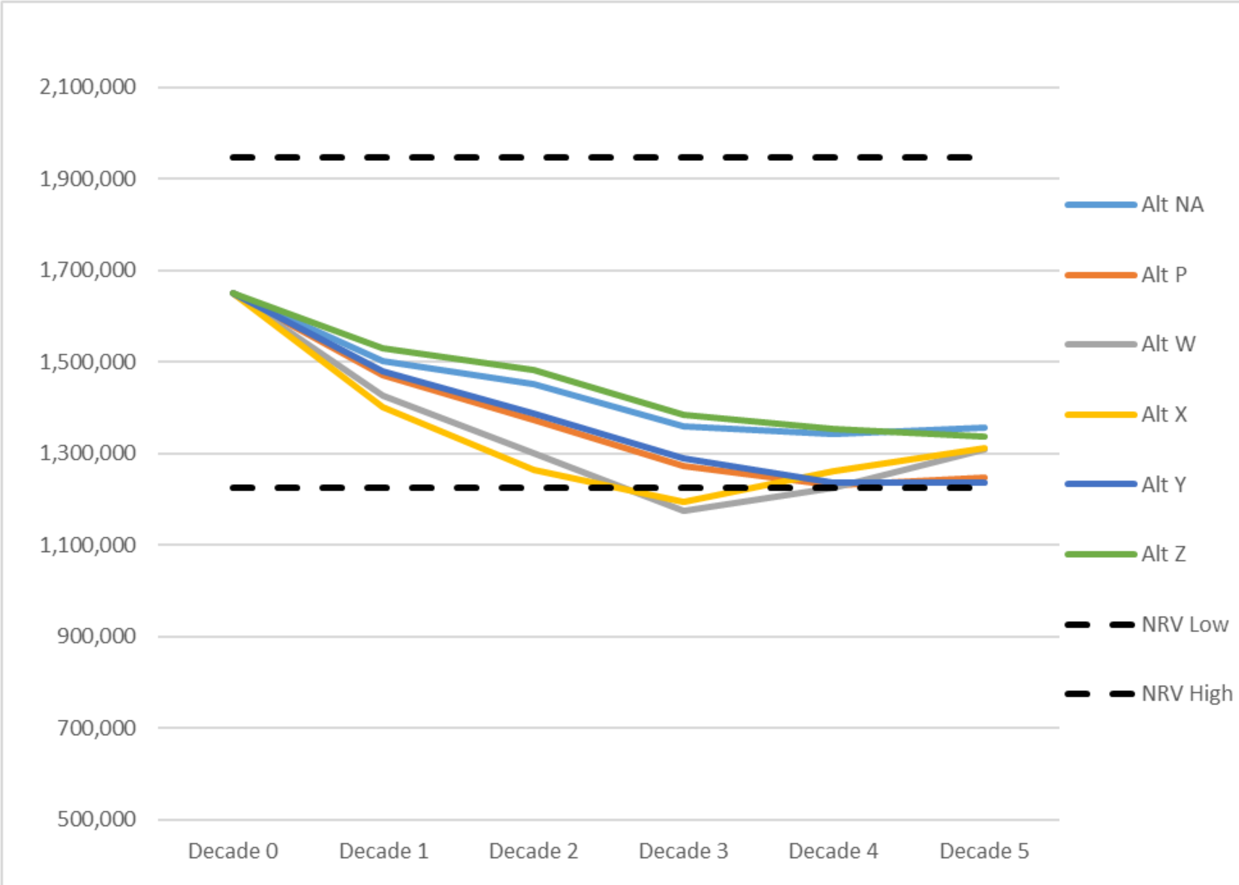


Figure 68. The projected amounts of fisher total habitat (foraging plus denning) by alternative and decadal time step as estimated through the SIMPPLLE and PRISM models. The black dashed lines represent the upper 95 percent and lower 5 percent Natural Range of Variability ranges. The colored lines represent the differences for each alternative. The Preferred Alternative is shown in orange.

Y-axis units in decades. X-axis units in acres. NRV=Natural range of variation.
Data from simulated PRISM and SIMPPLLE model. The colored lines represent alternatives. The black dotted line shows the natural range of variation (high and low range).

The amount of habitat decline within the three management areas is shown in Table 193, while the trend in fisher habitat within the three broad management areas is shown in Table 194. While decline happens in all management areas, the decrease within Management Area 1 and 2 is relatively consistent among alternatives. In contrast, the variability in the reduction in fisher habitat after 50 years between the alternatives is greatest within Management Area 3. Thus, the differences in outcome between the alternatives are mostly manifested in differences in habitat change within Management Area 3. This is largely because of constraints in the model imposed by land management direction found in the plan or regulations such as wilderness managment, limitations on timber harvest in Idaho Roadless Rule Areas, and constraints within lynx habitat imposed by the Northern Rockies Lynx Direction as examples. The model constrains timber harvest in these areas and uses natural disturbances there. In addition, it tends to direct harvest treatments to Management Area 3 to trend forest vegetation towards the desired vegetation conditions.

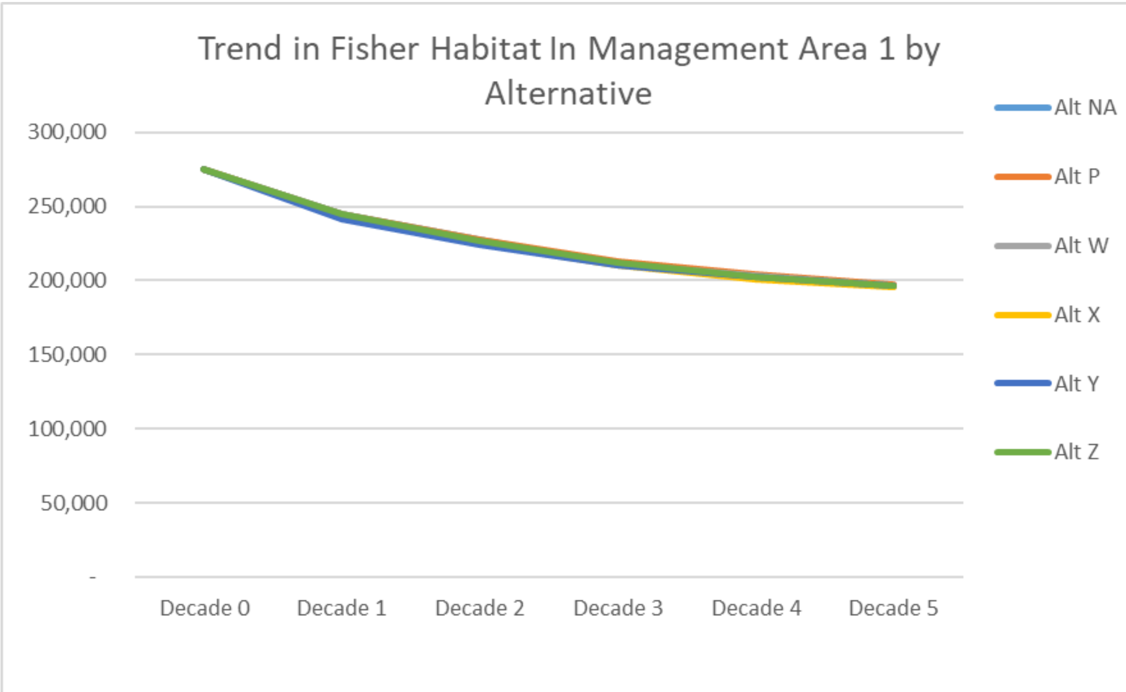


Figure 69. The trend in fisher habitat within Management Area 1 by alternative over the 5-decade time steps projected in the model

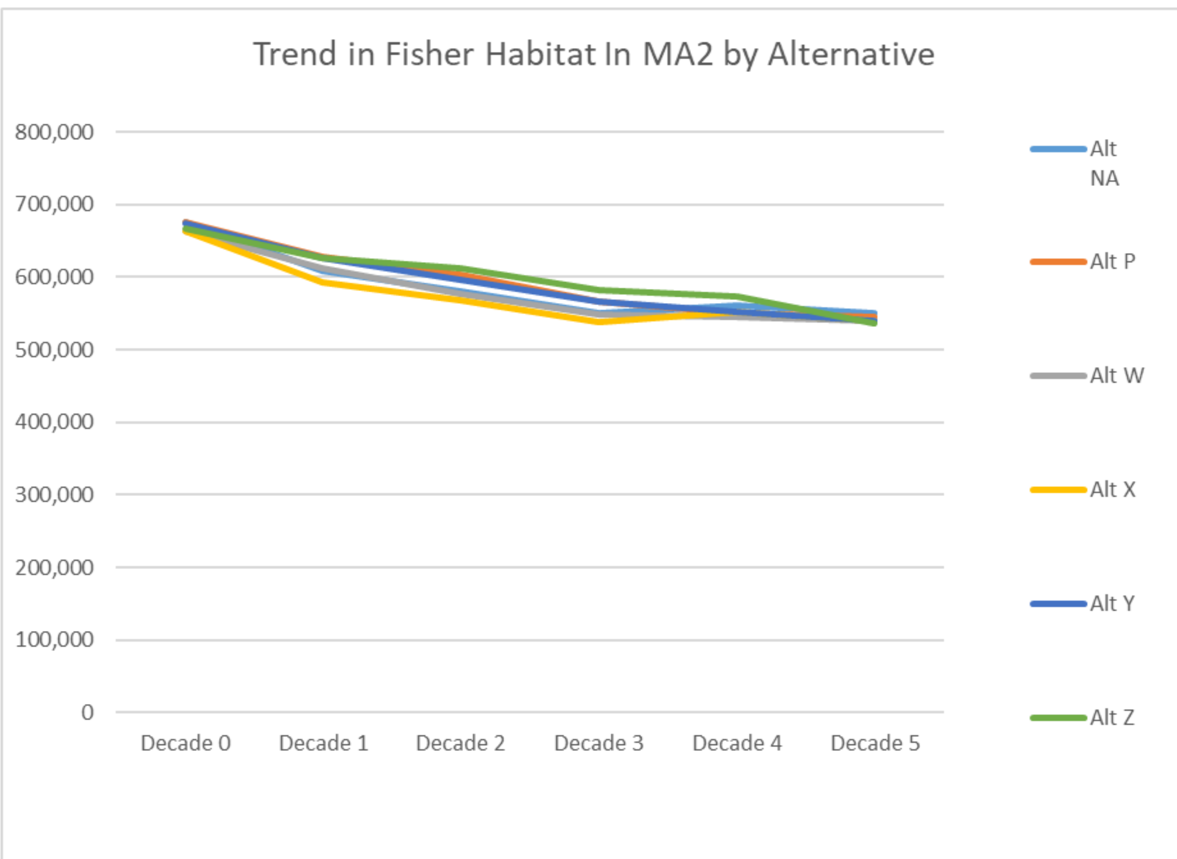


Figure 70. The trend in fisher habitat within Management Area 2 by alternative within the 50-year time horizon projected by the SIMPPLLE Model

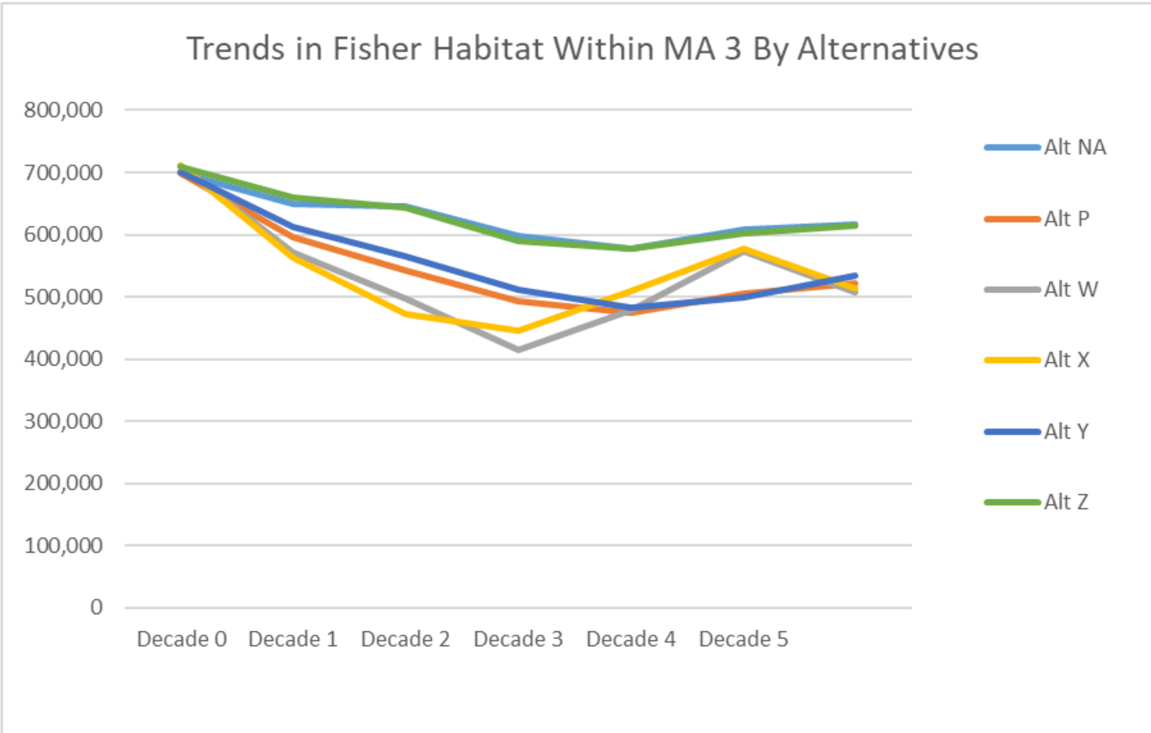


Figure 71. The trend in fisher habitat within Management Area 3 by Alternative as projected in the 50-year time horizon in the SIMPPLLE model

Table 193. Change in acres and percent decline in fisher habitat after 50 years, by management area and alternative

Management Area	Alternative	Change in Acres in total Acres in Decade 5	Percent Decrease
Management Area 3	No Action Alternative	121,873	17
Management Area 3	Alternative W	232,972	33
Management Area 3	Alternative X	203,500	29
Management Area 3	Alternative Y	218,658	31
Management Area 3	Alternative Z	131,155	19
Management Area 3	Preferred Alternative	224,235	32
Management Area 2	No Action Alternative	115,134	17
Management Area 2	Alternative W	119,107	18
Management Area 2	Alternative X	110,816	17
Management Area 2	Alternative Y	122,922	18
Management Area 2	Alternative Z	93,423	14
Management Area 2	Preferred Alternative	125,806	19
Management Area 1	No Action Alternative	71,812	26
Management Area 1	Alternative W	71,788	26
Management Area 1	Alternative X	73,894	27
Management Area 1	Alternative Y	72,623	26

Management Area	Alternative	Change in Acres in total Acres in Decade 5	Percent Decrease
Management Area 1	Alternative Z	72,545	26
Management Area 1	Preferred Alternative	70,690	26

The amounts of different types of total disturbance projected in the model under the Preferred Alternative across the 50-year time horizon broken out by management area is shown in Table 194 below. The average annual amount of disturbance as a percent of the total forest area is about 1.58 percent annually, which is a relatively modest amount. The amount of total disturbance acres is at the high end of the desired disturbance amounts for all alternatives except the No Action Alternative and overall is within the amount of disturbance needed on average per year to keep the Nez Perce-Clearwater within the average fire return interval according to the distribution of fire regime groups on the national forest (see Fire Management section of the Final Environmental Impact Statement). At 62,419 average annual acres, the amount is on the high end of the range identified in the alternatives which were between 53,000 and 64,500 and respresents a worst case scenario within that range. Table 194 shows the amount of timber harvest and total fire forestwide, and as a percentage of Management Area 3 under the Preferred Alternative. These are the disturbances that influence the trends in total fisher habitat. Note that timber harvest is concentrated within Management Area 3, and that timber harvest makes up a substantiative portion of the disturbance in that management area. Forestwide, the amount of fisher habitat disturbed by timber harvest is approximately 33 percent over the 50-year time horizon of the plan forestwide. Timber harvest is concentrated in Management Area 3 which supports a substantiative amount of fisher habitat forestwide. Timber harvest is projected to be the dominant disturbance regime in Management Area 3 making up approximately 49 percent of the disturbance in that management area. Timber harvest will be a minimal part of Management Area 2 and non-existent in Management Area 1.

Forestwide, fire is expected to make up 63 percent of all disturbance forestwide and is expected to disturb an amount of approximately 50 percent of the total forest area. Note, however, that some fire is expected to reburn the same area within the time horizon of the model. Fire is expected to operate in Management Area 3 at lower levels than at the forestwide amount and makes up approximately approximately 38 percent of the total disturbance in Management Area 3, which is expected to disturb approximately 39 percent of Management Area 3. Note again that fires are likley overlap timber harvests during the 50-year period so the disturbance is not always additive.

The amount of timber harvest projected by the model in the first decade is modest, representing only approximately 12 percent of the total disturbance or about 89,039 acres total in the first decade. The amount represents about 8,904 acres annually forestwide, an average annual amount of timber harvest sustained in the 1960s to the 1990s that sustained fisher habitat Figure 64 and Figure 65. As a percentage of the total area of the national forest, this amount of harvest represents approximately 2.26 percent of the total forest area per decade and less than 1 percent as an annual average.

Table 195 shows the proportional distribution of disturbance by management area under the Preferred Alternative, and the proportion of the total area of the national forest made-up of each management area. This table suggests that Management Area 3 receives a greater proportion of the total disturbance compared to the other management areas.

Table 194. The acres of disturbance types broken out by management area (MA) and forestwide total over the 50-year time horizon under the Preferred Alternative

Type of Disturbance	MA 3	MA 2	MA 1	Total Forestwide Disturbance by Type	Annual Average Acres per year (Total Forestwide Disturbance by Type ÷ 50 years)	Average annual acres of disturbance as a percent of the total area of the national forest (3,939,056 acres)
Disease	128,677	141,732	36,421	306,830	6,137	0.16%
Insects	33,454	75,279	73,929	182,662	3,653	0.09%
Intermediate Treatments	207,767	0	0	207,767	4,155	0.11%
Light Severity Fire	110,713	105,486	113,879	330,078	6,602	0.17%
Mixed Severity Fire	189,713	249,647	298,784	738,144	14,763	0.37%
Stand Replacing Fire	134,616	262,140	260,062	656,818	13,136	0.33%
Prescribed Fire	47,777	202,399	0	250,176	5,004	0.13%
Regeneration Harvest	420,448	28,039	0	448,487	8,969	0.23%
Total	1,273,165	1,064,722	783,075	3,120,962	62,419	1.58%

Table 195. The acres in each management area, the total disturbance projected by the SIMPPLLE model in each management area, the proportion of the national forest made up of each management area, and proportion of the total disturbance occurring in each management area under the Preferred Alternative according to the model. Note that disturbances often overlap in space through time so the overall footprint of the disturbance will be smaller than the total acres.

Management Area	Area	The Management Area's proportion of the total plan area	Total Acres of Disturbance	Total Disturbance in Each Management Area as a percent total disturbance	Total Disturbance as a Percent of Area
Management Area 1	1,231,638	31.3%	783,075	25%	64%
Management Area 2	1,467,078	37.2%	1,064,722	34%	73%
Management Area 3	1,240,340	31.5%	1,273,165	41%	103%
Total	3,939,056	100%	3,120,962	79%	79%

Table 196. The amounts of timber harvest and fire forestwide and within Management Area 3 over the 50-year time horizon projected by SIMPPLLE model

Disturbance event	Acres or percent
Total Timber harvest (Intermediate plus regeneration harvest)	656,254
Timber Harvest as a Percent of Total Disturbance over 50 Years	21.03%
Timber Harvest as a Percent of Total Plan Area over 50 Years	16.66%
Total Timber Harvest in MA3 (Acres of Intermediate + Regeneration)	628,215
Total Timber Harvest as a percent of disturbance in MA3	49.34%

Disturbance event	Acres or percent
Total Harvest as a Percentage of Area in MA3	50.65%
Total Timber Harvest as a percent of Total Forestwide Fisher Habitat (1,994,238 acres)[1] over 50 years	32.91%
Timber harvest in MA3 as a percent of fisher habitat in MA3 (917,737 acres)[2]	68.45%
Total Fire (Light Severity +Mixed Severity+Stand Replacing Fire+Prescribed Fire)	1,975,216
Total Fire as a Percent of total Disturbance Forestwide	63.29%
Total Fire as a Percent of Total Forest Area (3,939,056 acres)	50.14%
Total Fire within Management Area 3 (Light Severity +Mixed Severity+Stand Replacing Fire+Prescribed Fire)[3]	482,819
Fire as a percent of total disturbance within Management Area 3	37.92%
Fire in Management Area 3 as a total percent of the Management Area 3 (1,240,340 acres)	38.93%

1. Note that not all timber harvest at the Forestwide scale will be in fisher habitat.
2. Note that most but not all timber harvest in Management Area 3 will be in fisher habitat.
3. Fire is expected to burn some areas treated for timber harvest and re-burn some areas more than once.

Several studies have described the conditions under which fishers have persisted on lands managed for timber production including on industrial timber lands (Sauder and Rachlow 2014, Sauder and Rachlow 2015, Niblett 2017, Mathews 2013, Green et al 2022, Higley and Mathews 2009, USFWS 2017). Many of these studies described the past management for the study area, some of which had undergone relatively intensive management on industrial timber lands. The descriptions of the management in these areas are inadequately described to comprehensively compare to the combined disturbance and regrowth being evaluated for the plan and alternatives because they do not report the amounts of natural disturbances, timber harvest, and tree regrowth combined. However, many of these studies emphasize the retention of legacy features like live trees, snags, and downed wood as conservation measures (Mathews 2013, Green 2022, USFWS 2017).

Green et al. 2022 reintroduced and studied fishers to evaluate whether fishers can persist in lands managed for timber production. Green (2022) described the treatment history their landscape as follows:

"By 1902, about 31% of the forested area in and around Stirling had been logged commercially using selective-logging practices that extracted approximately 50% of the available timber. Between 1903 and 1992, logging on Stirling continued using selective-logging practices by Diamond Match Company. Selective logging during this period left approximately 20% canopy closure in logged areas of Stirling. Sierra Pacific Industries acquired Stirling in 1992 and began logging using even-age management in 1999. Sierra Pacific Industries logged approximately 600 ha (1483 acres) annually using even-aged management during the study period. Logging units were <8 ha in size and included retention of wildlife trees, snags, legacy trees, mast-producing hardwoods, and large downed wood. Units also included at least 2% of the original stand as retention islands. These retention standards were applied to all logging units in Stirling during the study period as per a 2008 Candidate Conservation Agreement with Assurances for fisher on Stirling between Sierra Pacific Industries and the U.S. Fish and Wildlife Service. In 2008, a majority of Stirling (59%) was in a small-tree or moderately-dense-forest condition. The remainder of Stirling was in an early-seral condition (6%) or older age classes (35%)."

Green et al. (2022)reported population growth and fisher densities comparable to other fisher populations. The amount of treatment in their study area was more intensive than proposed on the Nez Perce-

Clearwater with higher amounts of small trees and less older age classes than the plan's desired vegetation condition. Green et al. (2022) emphasized the importance of biological legacies in their management as an important factor for fishers.

Higley and Mathews (2009) and Mathews (2013) documented fisher denning within the 89,400-acre Hoopa Valley Indian Reservation where timber is actively managed. They captured 179 individual fishers from 2004 to 2011 for their study. They described the management of the reservation's timber resources as follows (with units converted from hectares to acres):

Past and current timber harvests created a mix of mature old growth and early seral forests. Prior to 1990, clear-cuts averaged 30–49 acres, although cuts up to 682 acres occurred. From 1960 to 1980, 30% of Hoopa was harvested, averaging over 1236 acres cut/year across multiple clear-cuts averaging 46 acres. Between 1994 and 2010, under the direction of the Hoopa Tribe's Forest Management Plan, tribal forest managers harvested 23,196 m3 (9.83 million board feet) annually on approximately 371 acres, precommercially thinned approximately 408 acres, early-released 247–432 acres, and burned for cultural resource management 15–99 acres. Harvest was implemented using regeneration methods with green tree (12 trees/ha 50 cm diameter at breast height) and snag (all that do not pose a safety hazard) retention in small, 24.7 acre stands. A minor amount of commercial thinning and single-tree and group selection was also employed.

Between 1994 and 2010, the amount of disturbance described above would be between 2,082 and 2,613 acres annually representing between approximately 2.3 and 2.9 percent per year and a total disturbance of between 37.2 to 46.7 percent of the reservation in 16 years. Fishers there are apparently recovering as Mathews (2013) reported catching 179 fishers from 2004 to 2007 and documented good reproduction but expressed concerns over recruitment and dispersal. Mathews (2013) reported a prior apparent 73 percent fisher population decline in Hoopa between 1998 and 2005, citing clear cut logging on Hoopa and on adjacent lands prior to 1990, which left no biological legacies. The amounts of treatment on Hoopa Valley are more than the total annual disturbance proposed in the plan at a forestwide scale (1.58 percent annually) and less than the amount within Management Area 3.

Zeilinski (2013) studied fisher tolerance to the rate and variety of managed forests. They documented that fishers consistently occupy, at the highest rate of use, places where an average of 2.6 percent of the area has been disturbed per year. The disturbance in these areas was described as restorative, which they identified as mostly thinning or intermediate treatments. They reported a rate of an average of 47.1 acres of disturbance per year per square mile. At those rates, fisher habitat at a forestwide level could sustain 129,933 acres per year in fisher habitat at a forestwide level or 59,796 acres in Management Area 3 if the treatments were mostly restorative and still maintain high rates of fisher use. They also describe fisher habitat use at medium use levels as having undergone 93.4 acres per year per square mile which were also identified as restorative treatments. This would equal approximately 291,034 acres of fisher habitat disturbed annually within the total fisher habitat of the Nez Perce-Clearwater if the disturbance was restorative. They reported low levels of fisher use when 121.8 acres of treatment per year per square mile of mostly extractive timber harvest activities had occurred, which would represent 379,529 acres of mostly extractive treatments annually, an amount far higher than the Nez Perce-Clearwater's proposed 53,000 to 64,500 acres average annual disturbance.

Sweitzer (2016) studied fisher habitat occupancy and persistence rates in response to restorative fuels treatments and wildfire. Sweitzer (2016) described their study area as undergoing 2.4 percent of the study area disturbed per year with restorative fuels reductions, which were defined as thinning, masticating, and up to 3.5 percent total disturbance annually with fires and prescribed fires included. Sweitzer (2016) documented fisher use was at higher levels in areas where annual disturbance rates from restorative fuels treatments were 2.6 percent per year but documented, a decline of 24 percent when disturbance rates were 3.2 percent annually. These numbers were comparable to those reported by Zeilinski (2013). These amounts are fewer than both the annual rate of treatment within Management Area 3 which is projected to be around 1 percent annually and the forestwide amount of disturbance which is around 1.58 percent annually. It should be noted that the scale at which percent disturbance was measured was within 1 square kilometer cells rather than at larger landscapes as measured by our model.

The indication is that the model's decline towards natural range of variation lows is consistent with fisher persistence, and that the amount of total disturbance proposed in the Preferred Alternative is less than has been documented to sustain fisher use in other areas of the fisher's range. It is important to note however, that the disturbance occurring at higher annual percents described in those landscapes represented restorative fuels reductions such as thinnings, or understory reductions rather than clear cut timber harvest proposed in this plan. It is also important to note that in these the landscapes managed for timber production, had a commitment to retaining legacy features to allow habitat use of younger aged forest stands. The Nez Perce-Clearwater National Forest has plan components to leave such features as part of their desired conditions and guidelines.

Fisher Home Range Habitat Suitability

With forest wildlife, the area of habitat available to a species is a subset of the habitat within the envelope of biophysical conditions that could potentially provide habitat. Forest conditions change through time as disturbance occurs and forests regrow as a natural part of system dynamics. At any given time, some proportion of forest habitats are in a state that does not provide for a given species as a result of forest condition. For example, if the species relies on mature forests, early seres would not provide potential habitat for the species until forests regrow. Changes in forest conditions over long periods of time result in variation in the amount of total available habitat for a species and define the natural range of variation in forest conditions. The fisher total habitat suitability model presented above is an example of the total habitat available to fishers.

Most wildlife habitat selection studies examine the characteristics of used or selected habitat compared to the total available habitats across the area of comparison, such as a home range or characteristics within a home range. Selected habitats are identified as those that have proportionally more use compared to total available habitats because of habitat characteristics or condition. The condition of forested habitats can determine the selection of habitats by a species. The fisher home range habitat suitability query identifies the amount of selected or preferred habitat out of the total available through time based on a set of criteria thought or assumed to be representative of selected habitats in contrast to total habitat. Naturally, selected habitats are a subset of total available habitat. Figure 72 shows the relationship between the total amount of fisher habitat and the amount of habitat out of the total that has the spatial characteristics of selected fisher home ranges for the natural range of variability. Habitat with characteristics of selected home ranges is estimated for both for the natural range of variation and for the future habitat simulations, so the results are comparable to each other.

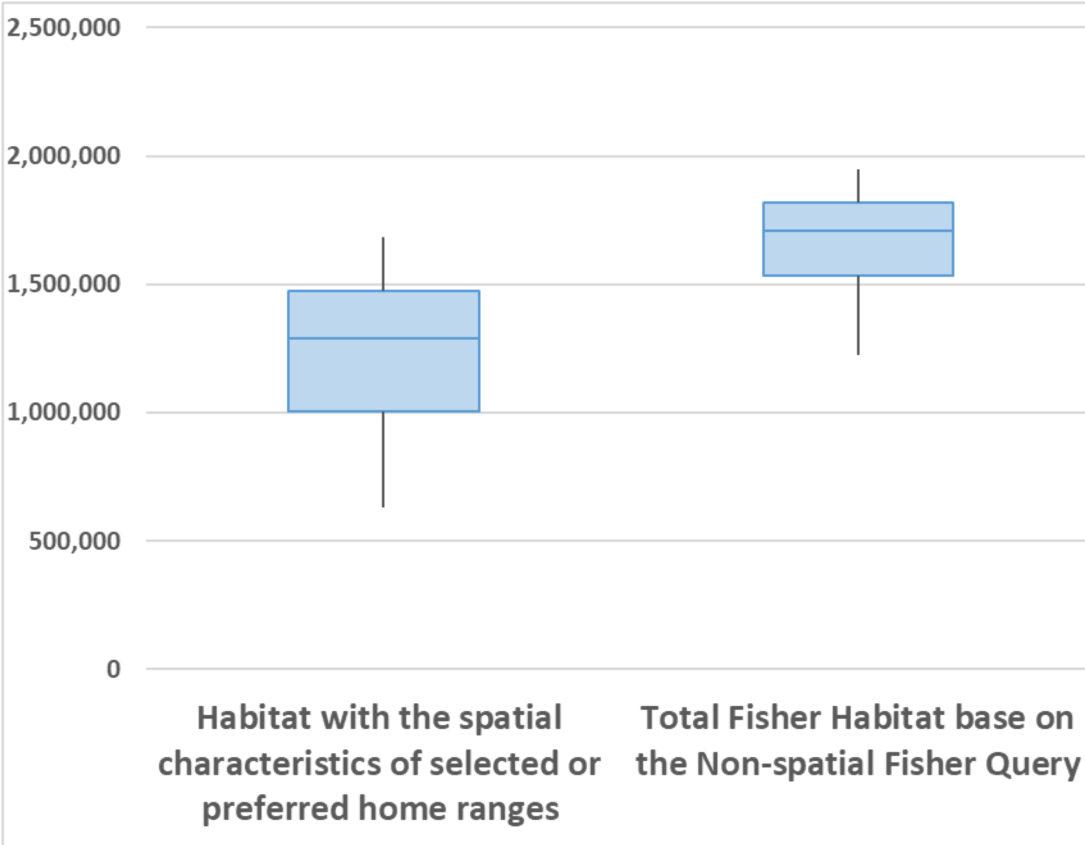


Figure 72. A comparison of the box plots of the natural range of variation of total fisher habitat compared to habitat with the spatial characteristics of preferred fisher home ranges. The box plot on the left represents the natural range of variation for habitats that have the spatial characteristics of preferred home ranges, while the box plot on the right represents the natural range of variation for total fisher habitat based on fisher habitat query. The line in the middle represents the median amount of fisher habitat across all time steps. The boxes show the 25th and 75th quartile and the whiskers show the full natural range of variation. Note that the lower whiskers on the box plot are longer than the ones on the upper whiskers, and that the median line is closer towards the top of the boxes, indicating a slightly skewed distribution towards the higher end of NRV. This suggests that fisher habitat was at higher end of NRV more often than it was towards the lower end. The skewed distribution is an artifact of the behavior of the trend lines during NRV runs. The periods when climate conditions trended fisher habitat rapidly towards the lower end of NRV, while fisher habitat trended upwards over longer periods of time in the model environment.

Under the natural range of variation (NRV) within the model, habitat with the spatial characteristics of selected home ranges fluctuated from between a low of about 631,124 acres and a high of about 1,683,374 acres with a difference of about 462,750 acres between the NRV high and low. The average through time was about 1,229,249 acres. This compares to the amount of total habitat without the spatial criteria under the natural range of variation (NRV) of 1,224,385 at the low end and 1,947,284 acres at the high end, with difference of 722,899 and an average of about 1,658,721 across all time steps. Note that the amount of habitat that has the spatial characteristics of preferred home ranges is always less than the total amount of fisher habitat and that selected habitats are a subset of total available habitat.

One important source of departure from the NRV is the landscape pattern disturbance. During NRV runs, the spatial distribution of fisher habitat was dynamic over time in the model, shifting around the landscape through time in response to large scale disturbance and regrowth. At any given point in time, there was a portion of the total amount of fisher habitat that was in a state that would have low probability of fisher use. The pattern of disturbance suggested that large areas of fisher habitat were impacted by fire leaving other large areas with low amounts of open habitats. The dynamic nature of fisher habitat with its patchy distribution at the landscape scale explains how the NRV for the amount of disturbance in warm moist and cool moist broad potential vegetation types (PVTs) can be higher overall than those tolerated by fisher at the home range scale. To illustrate, the NRV for the percent of the landscape in the warm moist broad PVT in the grass-forb-shrub seral stage is between 2 and 17 percent, a total higher than the 5.3 percent open habitat fishers reportedly prefer for home ranges Sauder and Rachlow (2014). While disturbances occur at these higher percents at the landscape scale, they occurred mostly in large patches resulting from wildfire disturbances and so are not evenly distributed across the landscape. To put it another way, fires burned off large blocks of habitat, while in other areas, fisher habitat had low amounts of open habitat. In contrast, forest management has resulted in small, scattered treatments, 40 acres or smaller, evenly distributed across the landscape and often at lower amounts overall than within the NRV. While timber harvest treatments mostly occur in forests of larger size classes, wildfire can burn forests of all ages. This facet of fisher habitat underscores the importance of understanding the patch dynamics and application of the proper distribution and amount habitats in these conditions at the landscape scale.

The difference between preferred habitat and total habitat is not even across the NRV indicating that, as the habitat trends down towards the low end of the natural range of variation, it becomes more fragmented, resulting in a proportionally lower amount of preferred habitat. In other words, as a greater amount of the total habitat is disturbed, it becomes proportionally more fragmented such that preferred fisher habitat becomes proportionally less available. Figure 73 presents the difference between total fisher habitat and preferred fisher habitat under the NRV. Note that the space between the blue line (NRV of total habitat) and orange line (NRV of fisher habitat with the spatial characteristics of preferred home ranges) increases as they get closer to the NRV low (Figure 73). It basically means that fisher habitat is naturally more fragmented when at the NRV low. These are the expected natural or endemic amounts of fragmentation during NRV runs that existed under natural disturbance. These may be compared as a reference of the relative amounts of fragmentation compared the alternative outcomes.

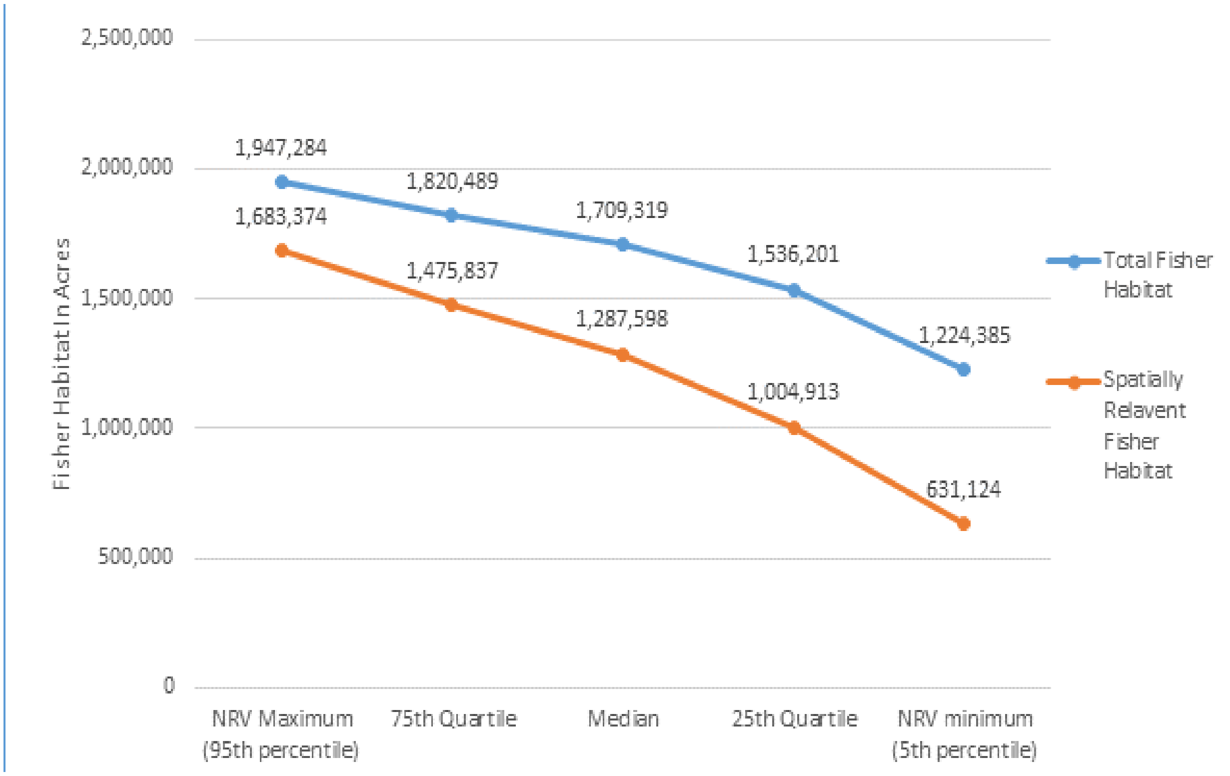


Figure 73. Differences in fisher habitat between the habitat availability model and the spatially explicit moving windows analysis across the Natural Range of Variability. In addition to an absolute difference in acres of predicted fisher habitat, the models also predict more fragmented habitat at the NRV low. Note that the space between the blue line (habitat availability model) and the orange line (moving windows analysis) increase when total habitat is at the NRV low compared to when total fisher habitat is at the NRV high.

A comparison of the trends of the spatial fisher habitat model under the alternatives is presented in Figure 74. When comparing model outcomes, there are differences. Both models estimate the same acres of mature, mesic forests and the same acres of open or sparse vegetation because both models rely on the SIMPPLEE model queries. The difference between models in what is available versus what is suitable fisher habitat reflects how the available mature, mesic forest is arranged on the landscape. By setting spatial thresholds for preferred forest conditions within the landscape, the analysis explores questions of connectivity (area of mature, mesic forest) and fragmentation (area of open or sparse vegetation) for a specified probability of fisher occupancy threshold of 0.4. The difference between the two models, thus, represents the modeled effects of connectivity and fragmentation on the suitability of fisher habitat to support a home range.

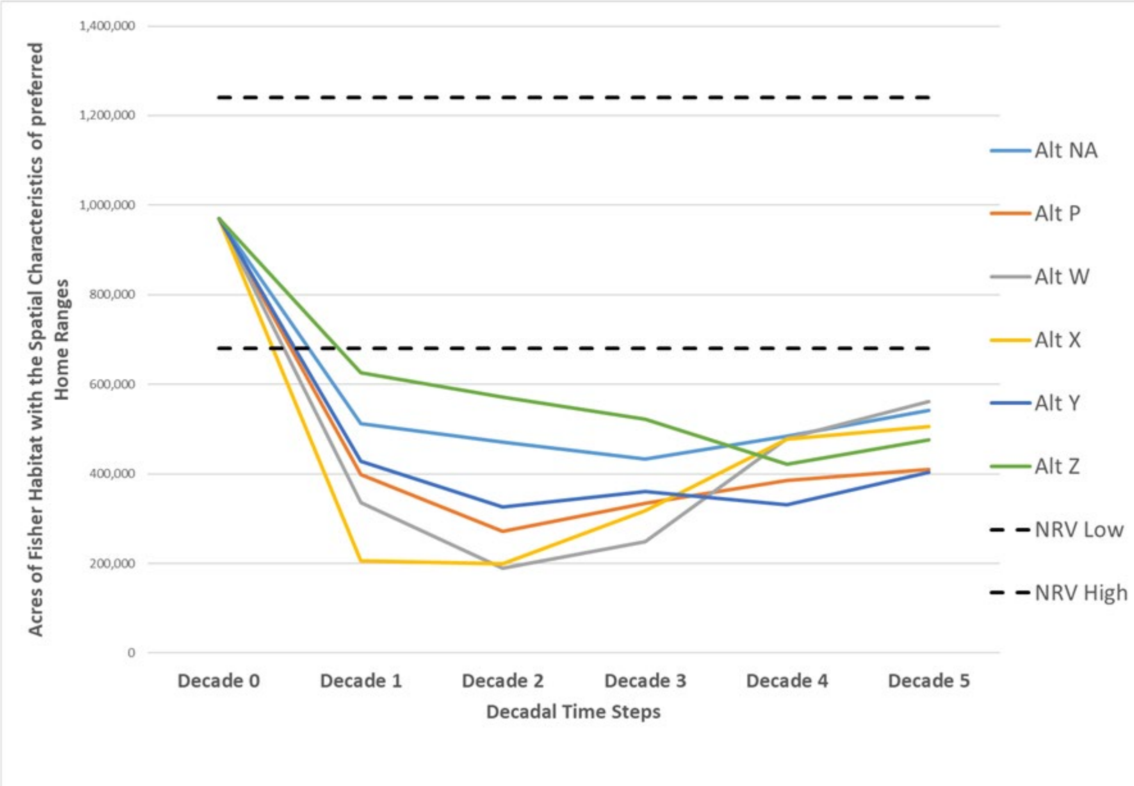


Figure 74. Predicted trend in the amount of fisher habitat in acres that have the spatial characteristics of female home ranges at a specified probability of occupancy of 0.4 by decade and alternative. Time steps represent decades, data was generated from a query of in SIMPPLLE and PRISM outputs that represent fisher habitat and an algorithm that identifies areas with greater than or equal to 55.8 percent mature and less than or equal to 10 percent open. For the query mature is defined as trees 10" D.B.H. or greater, while open is defined as all non-forested habitats, and forested habitats in grass, shrub, and seedling stage or 0-4.9" sapling size.

Like the total fisher habitat availability model, the Fisher Home Range Habitat Suitability model estimated the current acreage of fisher habitat that is suitable to support home range to be well within the natural range of variation (NRV) at about 970,265 acres (Figure 74). Again, since all the alternatives were subject to the same natural disturbance regimes and had the same desired conditions, the predicted acres of habitat suitable to support a fisher home range differed little among alternatives (Figure 74), although the difference were greater than those for total fisher habitat availability (Figure 68). Like the previous model, the rate of change depended largely on the rate of treatment, with the most intensive vegetation management alternatives resulting in a faster rate of change (Figure 74). Applying the spatial criteria via a moving window analysis to future predictions of fisher habitat suggests an increase in fragmentation in fisher habitat through time. The percent decline in spatially relevant fisher habitat is presented in Table 197. The decline in habitat through fragmentation occurs within all alternatives.

Model results of the spatial query are primarily a reflection of the landscape pattern of disturbance and resulting landscape pattern of fisher habitat in the modeling environment. So as modeled, the resulting landscape from natural disturbance like wildfire, and insects and disease, differs from the landscape pattern that result from the combination of natural disturbances, and vegetation treatments like timber and fuels treatments. The outcome in the SIMPPLLE model was the result of how SIMPPLLE and PRISM prioritized the distribution, size, and priority of disturbances through time. The pattern of landscape disturbance modeled in SIMPPLLE and PRISM do not necessarily replicate the spatial pattern of the proximity index used by Sauder and Rachlow (2015) which showed that fishers selected landscapes that had large patches of mature forest that were arranged in complex, highly connected patterns.

Table 197. The percent decline of habitat with the spatial characteristics of preferred home ranges at the end of 50 years

Alternative	Percent Decline
No Action Alternative	44%
Alternative W	42%
Alternative X	48%
Alternative Y	58%
Alternative Z	51%
Preferred Alternative	58%

Also like the fisher total habitat availability model, some alternatives decline faster but then recover some before the 5th decade, which is observed in Alternative W and Alternative X, reflecting a faster recovery back into fisher habitat compared to other alternatives. The time horizon projected in the model is too short to understand the longer-term trends. Under the Preferred Alternative, the availability of fisher habitat that is suitable to support a home range drops by nearly 66 percent after the second decade to about 385,339 acres before rebounding and ultimately resulting in a nearly 58 percent decline, to roughly 410,126 acres, by the end of the fifth decade. None of the alternatives, however, fall outside of the natural range of variation for total acres of open or sparse vegetation (Figure 75) a reasonable proxy for total disturbance.

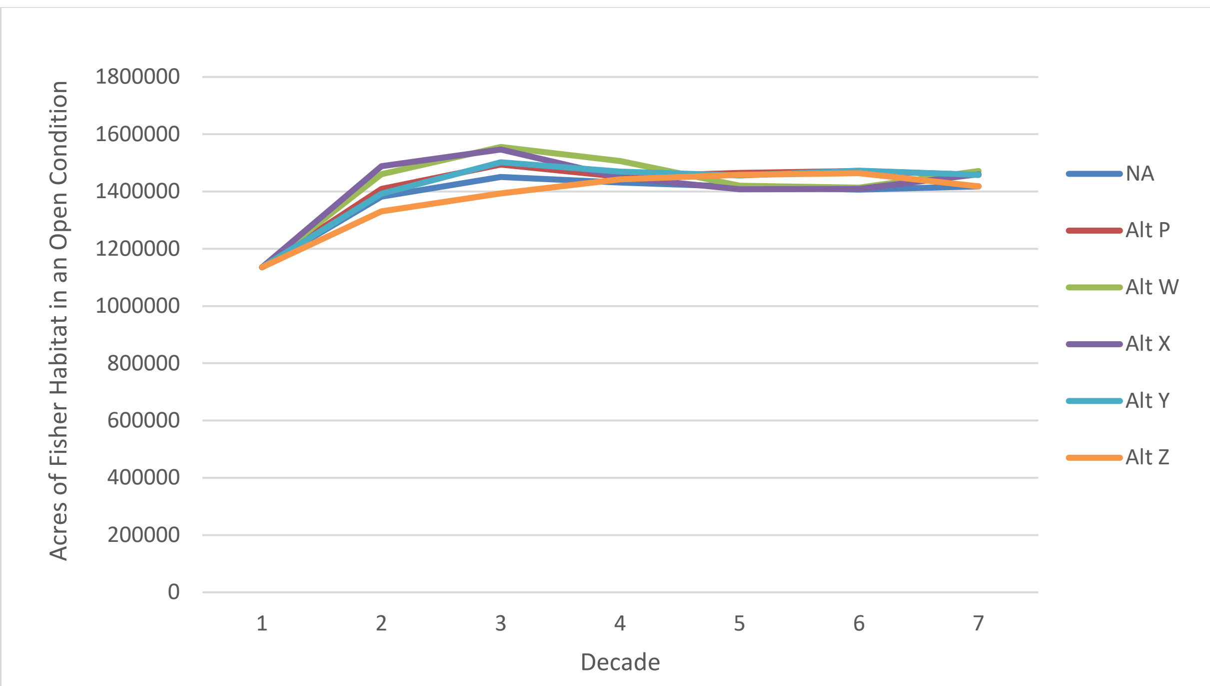


Figure 75. Predicted trend in open condition within fisher habitat by alternative

It is not the total acres of disturbance that primarily differentiates the effects documented by the moving windows analysis, but rather the size and distribution of individual disturbance events. Historical sources of disturbance largely resulted in large, concentrated areas of open or sparse vegetation; however, management actions are smaller and often more dispersed across the landscape. The outcome is that although all the alternatives fell within the natural range of variation for total acres disturbance, the patch size and distribution did not. Ultimately, this departure from historic landscape patterns is the primary driver of the decline in habitat suitable to support a fisher home range.

Like the fisher total habitat model, the variation between the alternatives was mostly manifested within Management Area 3, whereas the trend within Management Areas 1 and 2 remain relatively consistent among alternatives (Figure 76, Figure 77, and Figure 78).

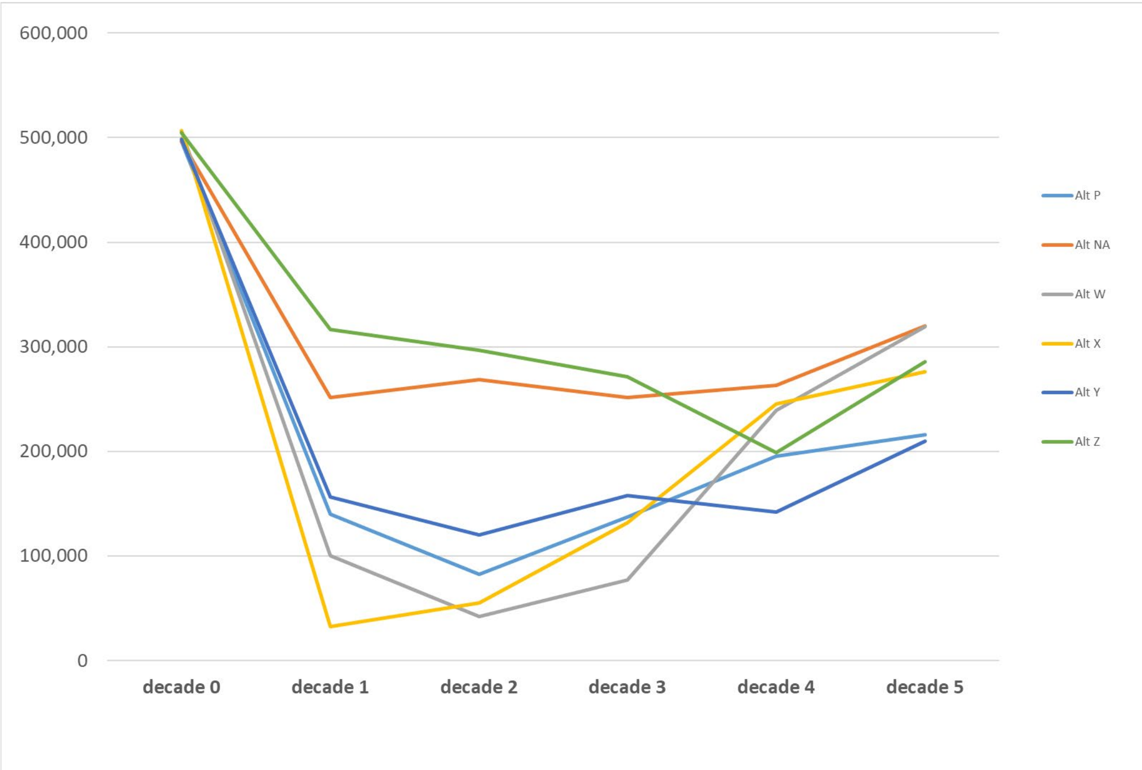


Figure 76. The trends of fisher habitat with the spatial characteristics of preferred female home ranges by alternative within Management Area 3

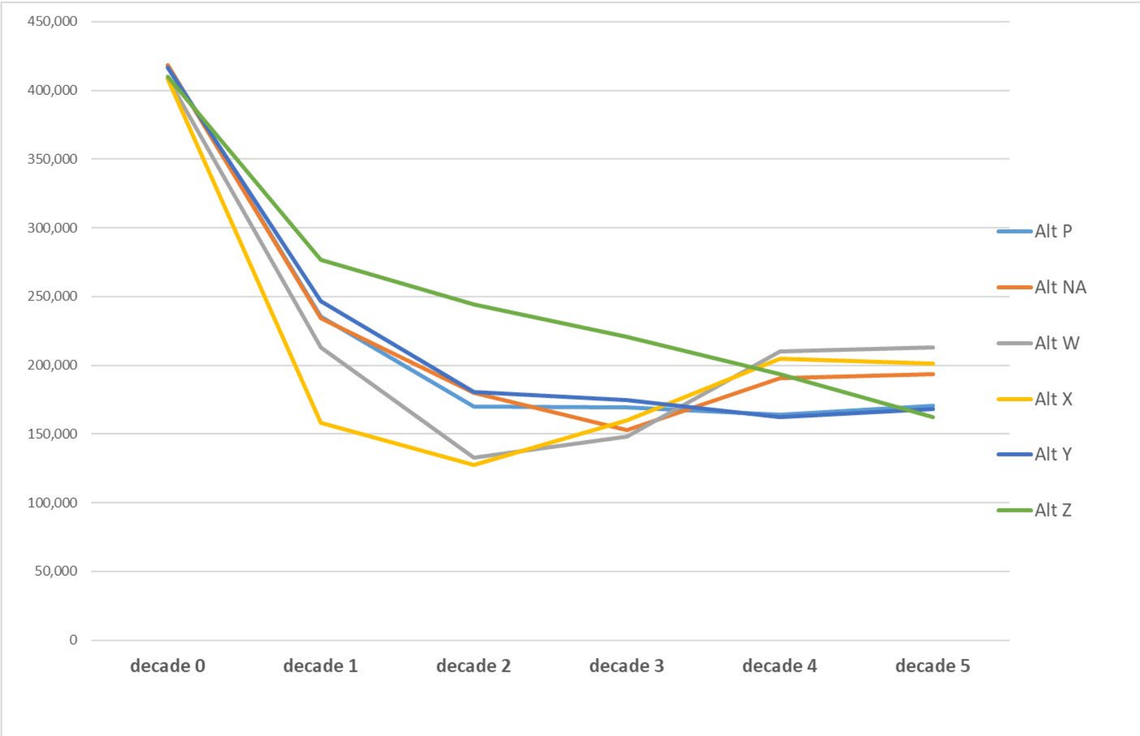


Figure 77. The trends of fisher habitat with the spatial characteristics of preferred female home ranges by alternative within Management Area 2

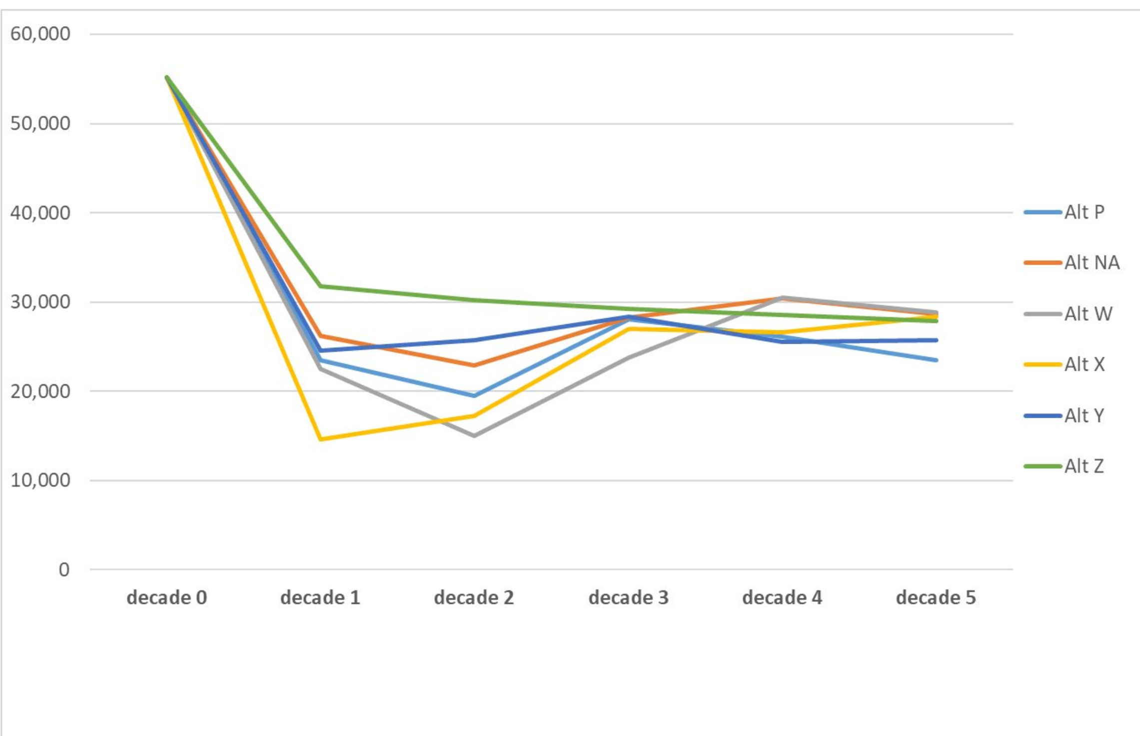


Figure 78. The trends of fisher habitat with the spatial characteristics of preferred female home ranges by alternative within Management Area 1

Model Discussion

One thing to note is that in all alternatives, the moving windows analysis results in the greatest rate of change in habitat within the first decade (Table 198). Further examination of the proposed treatment schedule in the model revealed that total disturbance of fires, prescribed fire, timber harvest, and insects and disease exceeded the plan's annual disturbance acres of Disturbance/Restoration annually to be within natural range of variation in the first decade by modest amount but not thereafter. For example, the plan proposes between 53,000 and 64,500 acres of total disturbance annually to meet desired conditions. Within the first decade in the model, the amount of total disturbance averages 76,917 acres annually. The amounts of disturbance in the first decade in the model are about 12,417 acres annually. The amount of disturbance in the model averages 65,291 acres annually over the 50-year period, which is on the high end of the proposed range of desired disturbance amounts in the plan. The model results represent a worst-case scenario under the Preferred Alternative. Examination of the types and amounts of disturbance indicate that approximately 423,463 acres of disturbance or 55 percent of total disturbance is wildfire of some type, with 20 percent stand replacing fire, 23 percent mixed severity fire, and 12 percent light severity fire. Including prescribed fire, the disturbance from fire in the first decade makes up the majority of total disturbance (63 percent). Another factor might be that the model could have identified non-habitat when the spatial criteria could not be met within the moving window when it ran up against the boundary edge of the modeled landscape.

Table 198. The types and acres of disturbance types in the first decade under the Preferred Alternative

Disturbance Type	Acres of Disturbance in Decade 1 -Preferred Alternative	Percent of the Total for Each Disturbance Type	Percent of the Total Forest Area (3,939,056 acres)
Disease	14,598	2%	0.37%
Insects	48,522	6%	1.23%
Intermediate	27,562	4%	0.70%
Planting	97,115	13%	2.47%
Prescribed Fire	68,618	9%	1.74%
Regeneration Treatment	89,039	12%	2.26%
LIGHT-SEVERITY-FIRE	90,574	12%	2.30%
MIXED-SEVERITY-FIRE	179,015	23%	4.54%
STAND-REPLACING-FIRE	153,874	20%	3.91%
Total Disturbance	768,917	100%	19.52%

The model projects additional disturbance because existing vegetation conditions on the ground today are conditions that are prone to increased amounts of natural disturbance like wildfire, insects, and disease according to the model assumptions. Additionally, the model is using assumptions of a warmer-drier climate which tends to produce more disturbance in the model. These factors combined suggest that forest conditions in fisher habitat today are prone to disturbances like wildfire.

While the effects of fire on fisher habitat have not been studied within the Northern Rockies, some recent studies have been published on the effects of fire on the Sierra Nevada population of fishers that could be useful in the interpretation of the effects of fire disturbance in the model (Hansen 2015, Swietzer 2016, Lewis 2016, Blohmdahl 2019, Thompson 2019, Thompson 2021). The general consensus and key findings from these studies are that while fishers appear to avoid high severity fire, fishers have been documented to use and persist in burned areas including managed burns especially if the fires were low and mixed severity burns. Fisher use of postfire landscapes may center on low severity or unburned islands (fire refugia or fire skips) (Hansen 2015, Thompson 2019, Blohmdahl 2019, Thompson 2021). Second, while fisher population might decline after fire, they were found to persist albeit at lower numbers (Thompson 2021). Third, areas that burned at low or moderate severity fire had forest structural characteristics predictive of den presence within burned areas and the presence of den structures are not necessarily dependent on time since fire (Swietzer 2016, Blohmdahl 2019). Sweitzer (2016) found fishers using previously burned areas, including areas that had been subjected to managed burns. Within fire perimeters, the distribution of burn severity is heterogeneous. Fire mosaics consist of myriad burn severities, including areas that experienced little or no burning. A critical outcome of this heterogeneity is the formation of fire refugia—unburned or lightly burned areas in the burned matrix that are functionally unaltered by fire (Blohmdahl 2019). Areas predictive of denning habitat can occur even in areas burned with high severity fire especially if they contained some large-diameter trees capable of surviving higher severity fire (Blohmdahl 2019). As fire refugia or fire skips age, they often contain remnant old-growth patches, an abundance of residual large woody structures, and legacy old-growth trees that survived the fire and contribute to fisher denning habitat (Lewis 2016, Jones 1991, Jones and Garton 1994). Fisher studies from the Northern Rockies (Jones 1991, Jones and Garton 1994) documented fisher use of areas previously burned by wildfires that retained scattered large trees and structures important for denning, security, or thermoregulation. A landscape mosaic created and supported by a mixed-severity fire regime could provide a diversity of habitat and prey while protecting against large habitat losses associated with large or uncharacteristically severe disturbances. Efforts to promote a sustainable low- to mixed-severity fire regime that creates habitat heterogeneity and forest resiliency can support fisher conservation (Thompson 2021).

Prescribed fire makes up approximately 9 percent of total disturbance or about 68,618 acres per decade or an average of about 6,862 acres per year. This amount of treatment makes up about 1.7 percent per decade and less than 1 percent annually forestwide. Prescribed fires are typically conducted under conditions that result in light or moderate severity burns.

The fire outcomes in the model do not fully incorporate the highly complex and variable nature of fire, especially within the fire regime groups that burn with mixed severity fire, which make up most of the fisher's habitat envelope. It only partially accounts for mixed-severity fire. The disturbance algorithm calculates changes to stand density and canopy cover by dominance type as a function of disturbance severity. If a pixel burned with mixed severity, then the stand density is reduced by 50 to 75 percent depending on dominance type and associated species. For example, if a stand was 50 percent grand fir and 50 percent western larch, then all grand fir is removed, the stand converts to a western larch dominant stand at lower density. In reality there is high variability in mixed burn severity, and lots of residual legacy features that research above suggests allows continued fisher use after burning. Furthermore, the model operates with a minimum pixel size of 5 acres which is not fine enough resolution to capture the variability of mixed severity fire that occurs at fine scales. Small fires (under 5 acres) are the dominant disturbance scale in terms of number of fires.

The spatial algorithm to identify habitat with the spatial characteristics of fisher home ranges possibly treated many burned pixels as non-fisher habitat if the canopy cover thresholds if the model classified them as below query thresholds. In reality, research suggests that at least some of these burned areas will likely maintain habitat use (Hansen 2015, Swietzer 2016, Lewis 2016, Blohmdahl 2019, Thompson 2019, Thompson 2021). Model outcomes should be viewed with caution because it might inappropriately overestimate the impacts to fisher habitat from natural disturbance.

Several studies have evaluated the tradeoffs of maintaining fisher habitat while using fuels treatments designed to reduce the threats of high severity fire. Fuel reduction efforts can reduce wildfire intensity, limit extent, and protect critical structures used by fishers for resting and reproduction; however, at the same time, these activities come with short-term reductions in habitat quality (Thompson 2011, Scheller et al. 2011, Truex and Zielinski 2013, Zielinski et al 2013, Hanson 2015, Sweitzer et al. 2016, Thompson 2019). The overarching findings are that while fuel treatments can reduce probability of occupancy or habitat use short term over smaller scales, fuels treatments can reduce the loss of fisher habitat to large scale high severity fires long term. Furthermore, these studies suggest that patterns of occupancy indicated that fishers remained in the vicinity of fuel reduction projects as long as they were able to move around fuels treatments and thinned areas. Furthermore, fisher occupancy or habitat use recovers from fuels or restorative treatments within a shorter period of time, whereas recovery from high severity fire takes longer and represents larger losses of habitat. Finally, even though restorative fuel reduction reduced occupancy, fishers would continue to maintain occupancy and persistence rates at lower levels (Thompson 2011, Thompson 2019, Thompson 2021, Sweitzer 2016, Hanson 2015). Model results should be interpreted as potentially lowering probability of occupancy rather than complete loss of fisher habitat use and loss of persistence.

SIMPPLLE model testing suggested that active management, including forestry treatments and prescribed fire, do decrease the risk of fisher habitat loss to wildfire. To test this, we ran the model without forestry and prescribed fire treatments and compared the amount of fisher habitat that would have burned without treatments to the amount that would burn in the presence of forestry and prescribed fire treatments under the Preferred Alternative. The results indicate that forestry and prescribed fire treatments reduced the projected amount of fisher habitat burned by wildfire by approximately 33 percent overall (Figure 79).

Our results for fire are similar to those found by Thompson et al. (2011) who used landscape trajectory analysis to evaluate the long-term outcome of fisher habitat when considering different management options in Sierran fisher habitats. They simulated the effects of both no action and forest thinning, with and without an unplanned fire, on vegetation characteristics over a 45-year period. Under the no action scenario, landscapes remained similar to the reference conditions for approximately 30 years until forest succession resulted in a loss of landscape heterogeneity. Comparatively, fuel treatment resulted in the reduction of certain forest elements below those found in female fisher home ranges, yet little overall change in habitat suitability. Adding a wildfire to both scenarios resulted in divergence from the reference conditions, though in the no action scenario the divergence was four times greater, and the landscape did not recover within the 45-year timeframe. Therefore, a schedule of treatments like those in the Preferred Alternative may represent a tradeoff of timber harvest effects in exchange for preventing greater wildfire losses of fisher habitat.

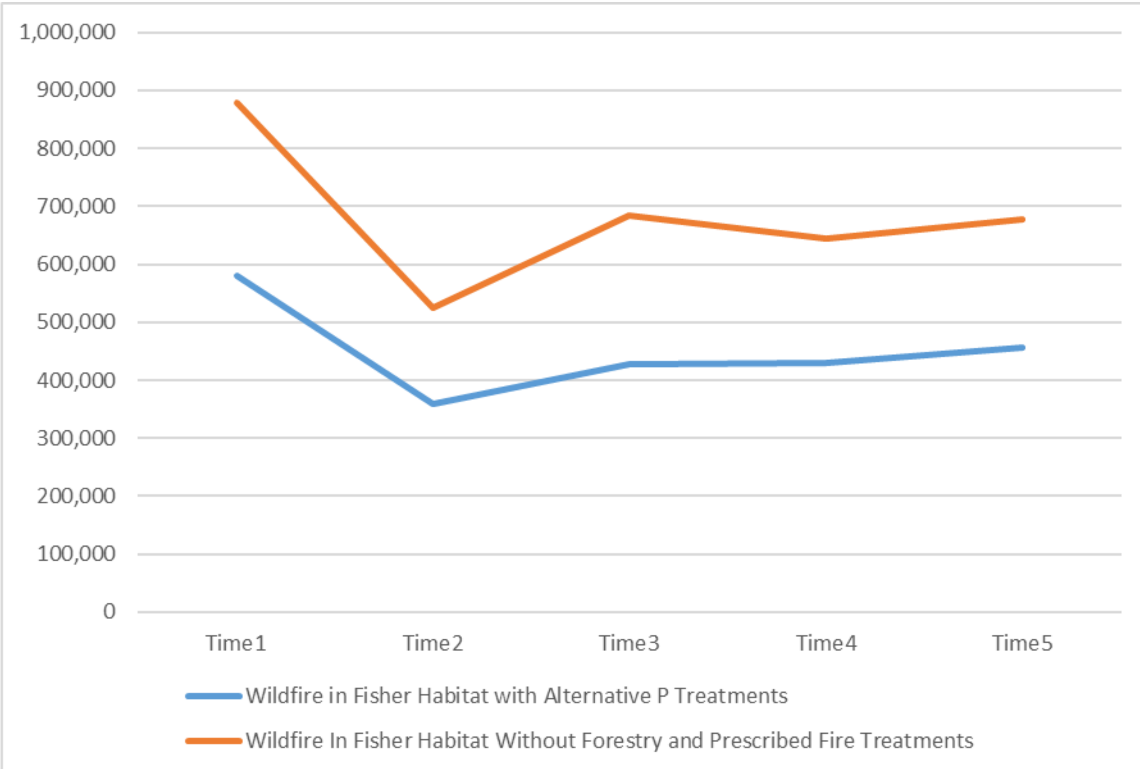


Figure 79. A comparison of the amount of fisher habitat burned by wildfire without prescribed fire nor forestry treatments compared to the amount of fisher habitat burned by wildlife with prescribed fire and forestry treatments of the Preferred Alternative by decade. The orange line represents acres burned in wildfire without forestry and prescribed fire treatments while the blue line indicates the amount of fisher habitat burned by wildfire when forestry and prescribed fire treatments are implemented according to the Preferred Alternative.

Olson (2014) modeled the response of fisher habitat to climate change in the Northern Rockies. Climate change modeling predicted an increase in fisher habitats under two scenarios but also found that fisher habitat would become more fragmented as well. Olson (2014) found a large contrast in the results when minimum patch size and species dispersal capabilities were considered. Their distribution model with full dispersal and no limits on patch size predicted a 24.5 percent increase in fisher habitat by 2090, whereas a dispersal limit of 1 kilometer through non-habitat, such as agricultural fields and urban zones, and a minimum patch size yielded a loss of 25.8 percent of fisher habitat under this same scenario. Varying dispersal appears to limit habitat availability more than minimum patch size under most scenarios. Fisher habitat was associated with mesic forest and the model found no support for fisher selection for dry forests. The Olson (2014) model suggested that locations within the study area in the Rocky Mountains with the greatest fisher abundance is the Clearwater River subbasin in Idaho. Climate change modeling by Olson (2014) also predicted that the contiguous habitat in the Clearwater Mountains in Idaho become less suitable and more fragmented, resulting in a large loss of contiguous habitat as climate changes. The fragmentation and decline of fisher habitat under the warmer-drier climate conditions in our model within the clearwater basin was consistent with findings by Olson (2014).

Not much information is available in the scientific literature to inform on how much open areas female fishers can tolerate. Additionally, different researchers define open habitats differently and do not report home range composition nor its effects on probability of use though some studies are useful. The following paragraph examines scientific literature that might inform the resilience of fishers to landscape disturbance and for context in interpreting model results.

Core areas of females and males on the Olympic Peninsula comprised about 12 percent and 26 percent natural forest openings, respectively (Lewis 2016), which were considerably higher than 5–10 percent reported for females and males in northwestern California (Zielinski et al., 2004), and higher than open habitats in female home ranges of 5.3 percent reported by Sauder and Rachlow (2014). The 12 percent amount in female home ranges on the Olympic Peninsula is slightly higher than the threshold we used in the fisher spatial query for female home ranges in our model. Lewis (2016) defined natural open habitats as low amounts of open-canopied habitat, and the metric evaluated was percent of pixels that are classified as natural open area. Lewis (2016) also suggested the probability of use of an acre for a female fisher core area diminished as the amount of open habitat increased. Nonetheless, their findings support the broad consensus that female fishers generally avoid non-forested cover types and noted that the bulk of the mid-seral forest used by females occurred in areas protected from logging (Lewis 2016). Nibblett (2017) studied fishers on industrial timber grounds in Northern California and described the area as having 24 percent open habitats defined open habitat as canopy closure 25 to 39 percent, which is how Zelinski (2004) defined open. Weir and Corbold (year) defined open as water or logged areas and stated that at a home range with 25 percent open would equate to zero probability of occupancy. Kordosky (2020) defined open as low canopy cover less than 40 percent found that female home ranges averaged 8.4 percent plus or minus 7.36 open in their core use areas and 13.8 percent plus or minus 9.42 in their home range. Green (2022) studied fishers on industrial timber lands in Northern California and described early seral conditions as trees less than 5.9 inches and open as canopy cover less than 40 percent, which they reported early seral as making up 6 percent of the forest and open as making up 12 percent which would equate to a total of 18 percent open according to our query criteria. Green (2022) however, did not report the composition of female home ranges or distinguish between used and unused areas. Higley and Mathews (2009) studied fishers on the Hoopa Valley Indian Reservation managed for timber production, and identified seedling, non-forest, and sapling as occurring at 3.8 percent, 2.6 percent, and 10.2 percent respectively. Combined, these amounts would represent approximately 16.6 percent open according to our query criteria. Higley and Mathews (2009) found that home ranges generally included less non-forested or open seedling stand types, and these types were approximately 10 percent or less within female home ranges. They recommended management avoid 20- to 40-acre clearcuts because such landscapes do not mimic any natural disturbance and would ensure that huge areas are unsuitable for fishers because of predators Higley and Mathers (2009). Higley and Mathews (2009) recommended managing for larger openings up to 1,235 acres that better mimic natural disturbances and reduce fragmentation. Sauder and Rachlow (2014) provides the best information for our area and suggests that fisher probability of occupancy declines as the amount of open increases, where at 15 percent open the probability of occupancy would be a little more than 0.2 while at 20 percent open the probability of occupancy near 0.1. Sauder and Rachlow (2014) did capture some fishers on industrial timber lands where open habitats averaged 17 percent and ranged between 10.3 and 25.5 percent.

The moving windows analysis relies on specific thresholds in vegetation composition to categorize a location as fisher habitat. The choice of a high proportion of mature, mesic forest and a low proportion of open or sparse vegetation is intuitive; however even small changes in a threshold can significantly alter the magnitude of the effects in the moving windows analysis. The process of creating a threshold takes a continuous probability (that is, 0 to 1) and recategorizes that probability as habitat or not (that is, 0 or 1), yet fisher may still use areas categorized as non-habitat. For example, although the moving windows analysis categorizes an area that includes 15 percent open or sparse vegetation as non-habitat, there is still a 20 percent chance that the area would be occupied (based on Figure 2 on Page 80 of (Sauder and Rachlow 2014). As the proportion of open or sparse vegetation considered in the moving windows analysis was in many cases only slightly over the 10 percent threshold, the magnitude of the fragmentation effects may be considerably less if those small differences do not lead to the precipitous drop in the probability of use required by creating a categorical threshold. Moreover, the models did not classify dry forest, such as lodgepole pine and Ponderosa pine, as suitable fisher habitat. Although, fisher tend to avoid dry forests, fisher have been documented using them (Krohner 2020) suggesting that dry forests may contribute to landscape connectivity and help mitigate the effects of fragmentation. The spatial fisher query in our model represents the amount of habitat with the spatial characteristics preferred by fisher home ranges at specified probability of occupancy of approximately 0.4 based roughly on Sauder and Rachlow (2014) but does not indicate absolute loss of habitat. Fishers continue to use areas that exceed the 10 percent open thresholds we used in our query at lower probability of occupancy. The spatial query outcomes should be interpreted as only a reduction in probability of occupancy, but not as a complete loss of habitat use or occupancy.

The spatial query for fisher home ranges is based on two criteria that must both be met. The amount of mature forest required at least 55.8 percent, and the amount of open was required to have 10 percent or less open. We conducted model testing to determine which factor was more influential. Testing revealed that the criteria for open habitat was responsible for a greater proportion of habitat being identified as non-preferred fisher habitat. In contrast, the amount of mature forest above 55 percent was present across much of the national forest in most time steps in 50-year projections. In some area the amount of mature dropped down to between 40 and 55 percent, which are amounts of that are known to support fisher home ranges or where landscape composition on industrial timber lands contains low amounts of older age classes (Green 2022, Nibblett 2017, Mathews 2013, Kordosky 2020, Sauder and Rachlow 2014). For example, Sauder and Rachlow (2014) identified a range of mature forest between 39.5 percent and 64.8 percent in occupied fisher home ranges. An example of a future decadal projection map generated in SIMPPLLE is shown in Figure 80. It shows that most of the landscape remains above at least 40 percent mature, and substantial percentages remain above the 55 percent threshold over much of the landscape area. The amount of area with high canopy cover is widely identified as preferred fisher habitat in many studies (Jones and Garton 1994, Powell and Zeilinski 2004, Raley 2012). The evaluation of the model suggested that the amount of open habitat, in many cases, was only slightly over the 10 percent threshold. Model testing at different thresholds for percent open revealed how sensitive the model is to the threshold used for identifying fisher habitat. The 10 percent threshold used is higher than that identified by Sauder and Rachlow (2014) at less than 5.3 percent in the best fisher habitats. It should be noted, however, that the two criteria often interacted with each other to increase the amount the model identified as non-preferred habitat, perhaps excessively.

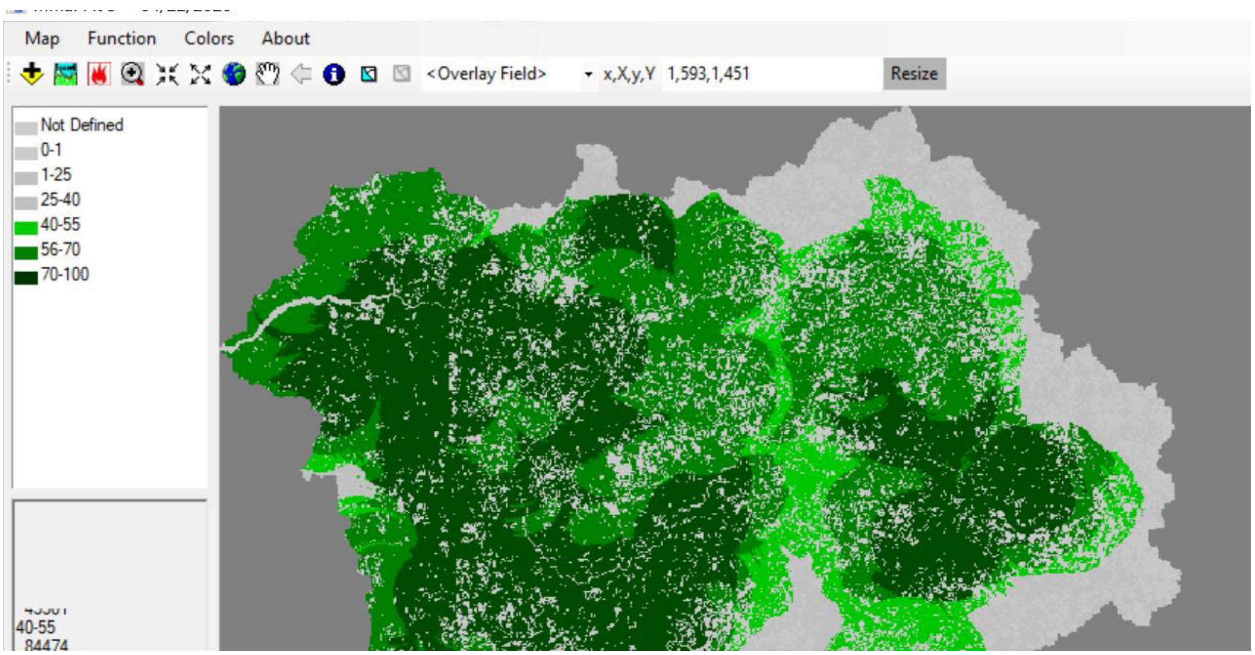


Figure 80. A map generated from a decadal timestep for a future model outcome for the North Fork landscape showing pixels where the moving window indicated the outcome for the mature forest criteria in the spatial query. Areas colored gray have less than 40 percent mature, areas colored light green indicate lands with between 40 to 55 percent mature, darker green indicates mature forest cover between 56 to 70 percent, and the darkest green color indicates pixels with between 70 to 100 percent canopy cover.

One of the most important contributions made by Sauder and Rachlow (2014) was that the proximity index of mature forest was more indicative of fisher habitat than the amount of area with high canopy cover. The proximity index of mature forest is an indicator of the size of and distance among all patches of a habitat type within a landscape to distinguish between landscapes with sparse distributions of small habitat patches and landscapes comprised of complex clusters of larger patches indicative of mature forest arranged in complex, highly connected patterns (Sauder and Rachlow 2014). Thus, the proximity index applied to fisher habitat is an index of the connectivity of fisher habitats. The proximity index was 40 times more plausible than the amount of open area at best explaining landscape level selection by fishers (Sauder and Rachlow 2014). We did not use the proximity index in our model (as recommended by Joel Sauder) because the interpretation of the results are less intuitive and we wanted decision makers, practitioners, and the public to be able to understand and implement the plan in a way that continues to support fisher habitat. Therefore, we use the percent of mature forest in conjunction with the amount of open habitat because it is likely correlated to the proximity index of mature forest and was the third most supported model in Sauder and Rachlow (2014). It may be possible to manage the landscape distribution of patches to maintain the connectivity of mature forest while simultaneously managing the system for timber production, even when the landscape distribution of such management is different than the landscape pattern under natural disturbance. The plan has several plan components that will contribute to the connectivity of mature forests including those for riparian protections which are abundant and well distributed, those that address landscape pattern within the Forestlands section, the maximum patch size limit of 207 acres, and the species-specific desired condition for fisher habitat as examples. It is well established that fisher have large home ranges that are predominantly composed of mature, mesic forests with few areas of open or sparse vegetation, but it is the specifics of these relationships that ultimately drive the model outcomes. For example, the moving windows analysis assumes an average home range of 49.3 square kilometers as an analysis window. Fisher home ranges in the Northern Rockies are among the largest known across their distribution, but even in the Northern Rockies there is considerable variation in home range size both among individuals and locations (Sauder and Rachlow 2014, Sauder 2014, Jones 1991b, Schwartz et al. 2013). While we used the average size, approximately half the home ranges were larger and half were smaller. Also, our home ranges were perfect circles rather than variable in shape like true home ranges. Species-habitat relationships are very sensitive to the spatial scale at which they are considered (Stuber and Fontaine 2017, Mirochnitchenko et al. 2021), thus changing the size of the window in a moving windows analysis can lead to significant changes in predicted relationships. A smaller window might have been appropriate if we had used the smaller, core use areas, which is an area of concentrated fisher use within home ranges, and if so, the size of the moving window would have been smaller. Because there is a high degree of variation in fisher home range size, there is subsequently greater uncertainty in the model outcomes associated with the choice of a single 49.3 square kilometers as an analysis window. For example, the use of a smaller analysis window may reduce the magnitude of the fragmentation effects if the disturbances are separated enough to allow individual windows to fall between disturbance locations. Alternatively, because the thresholds are based on a proportion, using a smaller window may increase the magnitude of the fragmentation effects because a smaller area of disturbance will be more likely to exceed the proportional threshold. Similarly, the analysis also assumes that the average size of a fisher home range constrains the acreage of disturbance that is acceptable for occupancy, but home range size reflects the availability and distribution of resources. As such, when mature, mesic forest is abundant and openings few, home ranges are more like to be small, but when mature forest is rare and openings more abundant, home range size is likely to increase. Across such a range of variation in home range size, the relative proportion of each vegetation community may be similar (for example, 10 percent open), but the absolute acres of each vegetation community may be quite different. While we tested different aspects of the model, our timeframes and budgetary constraints did not allow testing of the outcomes of different window sizes and science is lacking the information to better inform the best scale and method at which to evaluate fisher habitat distribution at the home range scale. The point is that this is a source of uncertainty in the model.

The model's selection of treatments is driven by the desired condition ranges for dominance types (Figure 81) and size classes. The desired conditions ranges were based on the dry end of natural range of variation (NRV) runs with a few exceptions shown in Table 199 where the desired conditions differ substantially from the dry NRV range. The plan does this for a few reasons including to promote more resilient forest conditions by converting dominance types to tree species more resilient to insects, disease, or resistant to fire. A second reason is to restore species like western white pine to its former dominance type. A third reason is because the climate is expected to be warmer and drier, and some species are more resilient to warmer-drier conditions.

In order to simulate the desired outcome, the PRISM model selects a treatment schedule and type of treatment to achieve the desired condition ranges. The selected treatments are based on actions that would need to achieve the conversion of dominance types in reality. For example, a clear cut with replanting would be required to convert grand fir to a different dominance type like western white pine or Ponderosa pine. The outcome in the model is a shift towards the dominance types specified in the desired conditions. A substantial portion of fisher habitat is made up of the dominance types shown in Table 199. Fishers are not tied to a particular dominance type as demonstrated by many scientific publications showing broad variety in tree types used (Raley 2012), so changing tree types is not necessarily problematic. However, a substantial proportion of fisher habitat is composed of grand fir and a small portion is composed of subalpine fir and spruce mix, and these dominance types are prioritized for treatment to convert dominance types to meet desired condition ranges. Furthermore, a disproportionate amount of the plan area is composed of these two dominance types. Therefore, the PRISM model prioritizes a schedule of treatments appropriate to achieve conversion, which are mostly clear cuts. The result is that a disproportionate amount of treatments prescribed in the PRISM model is scheduled within fisher habitat, which rapidly reduces grand fir in model outcomes as demonstrated in Figure 81. Figure 81 shows that grand fir dominance types declines by nearly 400,000 acres by decade 5, an amount commensurate with the loss of total fisher habitat Figure 68) and denning habitat (Figure 67). Grand fir dominance is projected to decline by 40 to 50 percent for the same 50-year comparative period. Grand fir composition is reduced to a greater extent in the warm dry than in the warm moist broad potential vegetation type (PVT) groups across all alternatives. The amount of Ponderosa pine, western white pine, and other dominance types concurrently increase in the model outcomes and are counted as young regenerating forests after treatment. In the case of white pine and western larch, the change is moving from one dominance type assumed to be preferred by fisher to another dominance type that is preferred by fisher. However, the time it takes to regrow into a mature habitat used by fishers and longer to develop the decadent characteristics used as denning habitat, large diameter dead or live trees with hollow trunks, downed wood, and cavities. Fisher habitat, and especially denning habitat, takes a long time to grow back, approximately 30 to 40 years, to reach the young forest size class of 8.5 to13.5 inches identified by Jones and Garton (1994) used by fishers in winter, and substantially longer than the time required to provide decadent and decay that provide denning habitat. Fisher habitat begins to recover towards the end of the 50-year time horizon in the model, which is why the alternatives with faster rate of disturbance recovers some by the 50-year mark (Figure 68 and Figure 74). Because the conversion requires regeneration harvest to achieve dominance type conversion, the treatment schedule and constraints on opening size, PRISM creates many small openings across the landscape that contribute to the trends seen in the spatial query of preferred fisher home ranges. As such it is not surprising that all the alternatives result in grand fir dominance being projected to decline by 40 to 50 percent over the 50-year timeline.

Even changes from grand fir to other dominance types that are representative of fisher habitat, such as western white pine or western larch, may have immediate negative effects if the habitat conditions indicative of mature, mesic forests are lost at a pace faster than they are replaced (Schwartz et al. 2013). For example, the desired condition for western white pine dominance is 25 to 40 percent in Management Area 3 but currently is less than 2 percent (see Forestlands section). Restoration of western white pine, which may often require regeneration harvest (FW-GDL-TBR-02, FW-STD-TBR-08), may result in reduced fisher habitat, because despite plan direction to ensure restocking happens rapidly (FW-STD-TBR-03), young white pine stands may not have the necessary structural diversity (Schwartz et al. 2013). Threats to western white pine restoration from blister rust may further delay the development of mature forests, because no cultivars are completely resistant to blister rust. Ultimately, all the alternatives explored would result in a reduction in fisher habitat availability at least in the short-term; however, in the long-term, conditions may improve due to increased heterogeneity and diversity in the landscape. Indeed, the increase in the availability of fisher habitat toward the end of the 50-year timeframe may suggest such an outcome and is a result of regrowth of the treatments in the first decade.

Schwartz et al. (2013) studied fisher in in the Clearwater River sub-basin and eastern slope of the Bitterroot-Selway ecosystem in Idaho and Montana. This included fisher captured and studied along the Lochsa River over Lolo Pass. Schwartz et al. (2013) used radio-telemetry locations from collared fisher to document fisher habitat use. Fisher disproportionately used both stand sites and regional landscapes characterized by large diameter trees and avoided areas with Ponderosa and lodgepole pine. Selection for large diameter trees in the Rocky Mountains occurs at multiple scales. These results highlight the importance of mature or late-successional forests and the importance of both stand- and landscape-level factors when directing forest management of fisher habitat in the U.S. Rocky Mountains. Fisher selected sites with larger diameter trees in landscapes with large trees, while avoiding stands of primarily xeric species composition. Specifically, this study revealed selection for large maximum tree diameter at breast height, a higher proportion of large trees at the landscape scale, and avoidance of stands with Ponderosa and lodgepole pine. Among tree species, the most preferred species was grand fir, as well as stand complexity characteristics of large logs and the presence of tree cavities. Schwartz (2013) noted that the abundance of western redcedar and grand fir may be higher now than in historical times when western white pine dominated moist, mid-elevation forests. Schwartz (2013) noted that current management to restore western white pine ecosystems may have significant ramifications for fisher given their findings, as young white pine stands may not have the structural diversity in the understory and be too open at maturity. Schwartz (2013) recommended that silvicultural treatments of stands not only consider the retention of large trees but also consider the larger landscape when managing for fisher and recommended retention of large decadent trees and snags within areas with a higher proportion of large trees to provide denning habitat for female fisher.

Western white pine conversion has a lower probability of success because even resistant strains are still susceptible to loss from blister rust. The susceptibility of western white pine to loss can reduce success rates in reestablishing white pine and provides justification for attempting to plant white pine at rates higher than the natural range of variation to compensate. Therefore, there is risk that western white pine restoration would not take hold to provide for future fisher habitat. These stands would take decades to begin to be used by fisher and would take longer to provide for fisher denning habitat with the abundant large snags, hollow trees, and downed wood that fisher prefer.

Jones and Garton (1994) provided an estimate of the timeline for habitat recovery following regeneration harvest. They suggested that fisher would avoid regeneration harvest for at least 50 years, use them occasionally for another 60 to 100 years, and likely not preferentially select them until trees were 120 to 160 years in mixed conifer forest (Jones and Garton 1994). Fisher may not find hollow trees in these stands for denning until trees reach an age where they are infected by heart rot and hollow out, a process that can take a very long time. The change away from grand fir would potentially change the abundance of trees with cavities large enough for fisher denning. This is because old, large grand fir, along with western redcedar, provide the hollow tree structure required by fisher for denning. Denning trees might be the most important factor for fisher habitat use and reproductive success. The change in the number and extent of hollow trees for denning would be extensive and would potentially take centuries to recover. While regeneration harvest generally follows a natural recovery pattern, the pace at which forests are converted must carefully be considered. Objectives vary by alternative, but all of them occur at a pace that would sharply reduce fisher habitat.

Reproductive females require tree cavities in large-diameter live trees and snags for birthing and rearing kits until weaning. Tree cavities are critical components of fisher habitat that provide protection from predators and cold. In most cases, the cavities used as dens for reproduction are created by heartwood decay caused by heart-rot fungi (Aubry and Raley 2006, Raley et al. 2012, Weir and Corbould 2008). Den trees used for reproduction are typically among the largest trees available and are 1.7 to 2.8 times larger in diameter than other trees in the vicinity of the den. Den trees also tend to be old. Estimated average age of den trees in British Columbia averaged 372 years for Douglas-fir, 177 years for lodgepole pine, and 96 years for trembling aspen (Davis 2009). Older, larger trees tend to have more heartwood decay than younger trees. Available evidence indicates that the incidence of heartwood decay and cavity development is more important to fisher for denning than is the tree species (Raley et al. 2012) (Raley et al. 2012). However, there is differential susceptibility to heart rot among the trees that occur within the Nez Perce-Clearwater. Trees that readily form heart rot that progresses into hollow trees in the Interior Columbia Basin include grand fir, western redcedar, western larch, black cottonwood, quaking aspen, and paper birch (Davis 2009) (Bull et al. 1997). Internal decay in grand fir, subalpine fir, and mountain hemlock often is indicated by conks of the Indian paint fungus, which decay can involve the entire tree trunk (Bull et al. 1997). A hollow tree is created when heart rot fungi invade the heartwood of a living tree and decay progresses to the point that the cylinder of decayed heartwood eventually detaches from the sapwood and slumps downward, leaving a hollow chamber. This process begins only in a living tree and can take many decades to produce a chamber large enough for wildlife to use. Although lodgepole pine, Douglas-fir, subalpine fir, Engelmann spruce, and western white pine are subject to heart rot, they seldom form a hollow chamber. In northeastern Oregon, grand fir and western larch make up most of the hollow trees used by wildlife (Bull et al. 1997). Hollow chambers may be common in old western redcedar in the Interior Columbia River Basin because hollows caused by heart rot in old western redcedar trees are used by pileated woodpeckers for roosting in western Washington. Conversion of grand fir to other types may result in less future hollow trees, both from the standpoint of the importance of grand fir's susceptibility to becoming hollow compared to other tree species but also from the standpoint that it would take a long time to develop the hollow tree characteristics required by fisher after treatment. While the conversion of grand fir stand types will not eliminate all trees with cavities, it might reduce the availability of fisher denning structures across broad areas as treatments convert grand fir dominance types to other dominance types.

Table 199. A comparison of natural range of variation (NRV) range, the desired conditions, and current conditions within dominance type where the desired conditions differ substantially from the NRV ranges

Broad Potential Vegetation Type	Dominance Type	Full NRV Range Percents	Dry NRV Range Percent	Desired Condition Range Management Area 3 Percent	Current Condition Percent
Warm Dry	Ponderosa pine mix	39–44	39–44	50–60	17
Warm Dry	Grand fir	19–28	19–27	2–10	33
Warm Dry	Western larch	0–0	0–0	1–2	2
Warm Moist	Ponderosa pine mix	0–1	0–1	10–20	2
Warm Moist	White pine	14–22	13–22	25–40	3
Warm Moist	Grand fir	29–38	27–36	5–15	46
Cool Moist	White pine	0–0	0–0	5–15	0
Cool Moist	Subalpine fir and spruce mix	39–63	32–56	25–35	60
Cool Moist	Douglas-fir and western larch	0–0	0–0	5–10	1

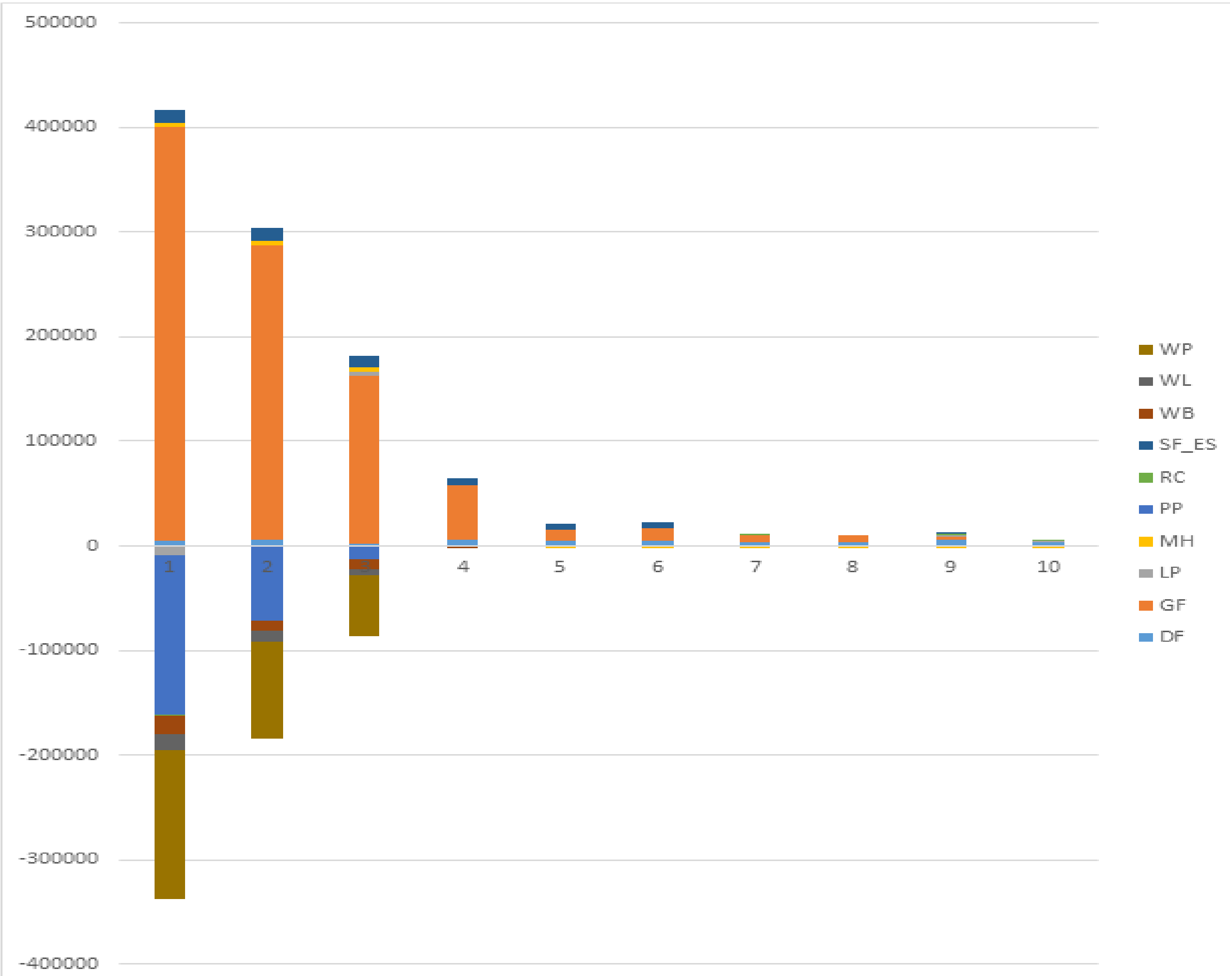


Figure 81. Trend toward desired condition by decade and dominance type

WP = Western White Pine. WL = Western Larch. WB = White Bark Pine. SF = Subalpine fir. ES = Engelmann Spruce. RC = Western Red Cedar. PP = Ponderosa pine. MH = Mountain Hemlock. LP = Lodgepole pine. GF = Grand fir. DF = Douglas-fir.

While the spatial model of fisher habitat is a useful tool for comparing alternatives, the pattern of fisher habitat at the landscape scale alone does not address the complexity of small-scale patterns discussed widely in fisher publications across their range. Fine scale habitat selection includes the presence of snags, coarse woody debris, and hollow trees. The Forest Inventory and Analysis data is a better tool to assess these habitat characteristics. Mature forest, snags, and downed wood were analyzed in the forested habitats section above. The modeling suggests that both snags and the large and very large size class increase under all the alternatives.

All alternatives in addition to the Preferred Alternative were designed from the beginning with workload, capacity, and budget constraints in mind. The analysis assumes that the objectives, timber outputs, natural disturbances, and desired conditions are achievable and will be the expected outcome of the plan. However, there is uncertainty in the amount of disturbance that will occur from year to year and from decade to decade. Furthermore, budget and capacity availability can change to either facilitate or constrain progress towards achievement. Other sources of uncertainty include wildfire occurrence can fluctuate at multiple scales and is stochastic in nature. While the model assumptions take into account suppression, actual patterns of firefighting efforts are made on a case-by-case basis, based on specific circumstances of each fire event. Litigation can delay or prevent implementation of projects and will likely be a source of variability in implementation rates. In conclusion, the treatment schedule modeled in SIMPPLLE is proposed and intended but actual implementation might differ substantially and should be esteemed as an estimate of the amount of disturbance, but the outcome might be different because of the uncertainties describe here.

Modeling Conclusions

The SIMPPLEE model found that all the alternatives will decrease the available total fisher habitat by roughly the same degree. This is not surprising because all the alternatives share a common set of desired conditions for future forest dominance types and plan direction (FW-STD-TBR-04) assures treatments are designed to achieve desired conditions. Grand fir, for example, is an important dominance type for fisher (Schwartz et al. 2013) that currently represents nearly half of the warm moist potential vegetation type (PVT). Current conditions for grand fir are outside of the natural range of variation (NRV), and well above the desired conditions represented by the alternatives. Much of the change in grand fir dominance is expected to occur within the warm dry PVT group but also within the warm moist, as grand fir is replaced by Ponderosa pine (see Forestlands section), a change that results in the loss of fisher habitat (Schwartz et al. 2013).

Although the loss of mature, mesic forest will affect fisher habitat availability, the SIMPPLEE model predicted that total fisher habitat in all the alternatives would fall within the NRV, including the Preferred Alternative. While the pace of restoration in the alternatives indicated an increasing gradient of impacts to fisher habitat, the pace under all alternatives is within the disturbance amounts similar to or less intensive than amounts of disturbance in Washington, Oregon, or California, that supports fishers on other lands managed for multiple uses or even industrial timber lands as noted above. The treatment schedule, as indicated by model testing, might represent a tradeoff of habitat alteration under the controlled conditions of forestry treatments rather than through large scale a loss by uncharacteristic wildfire resulting from the interaction of fuels build up and climate change, two of the key threats identified for fisher habitat by the threats assessment (See threats assessment in Appendix C).

In contrast, the outputs from the moving windows analysis found that the availability of suitable habitat to support a fisher home range would fall precipitously, and ultimately fall outside the NRV for all alternatives. The findings from the moving windows analysis highlight the importance of understanding how the spatial dynamics of the landscape, independent of habitat availability alone, affect fisher habitat suitability. The total acreage of open or sparse vegetation fell well within the NRV, but the patch size and distribution did not. Restricted by plan direction (for example, FW-STD-TBR-05), the restoration treatments common to all the alternatives generally created a greater number of small patches of open or sparse vegetation as compared to the large fires that represent the historic source of disturbance. Within the moving windows analysis the juxtaposition of an opening next to a stand of mature forest has a substantial effect on the suitability of the stand as fisher habitat. By creating more openings in the landscape relative to the NRV, the treatments in effect reduce the suitability of more acres of mature forest than would a large fire of equal acreage. Figure 82 and Figure 83 provide a visual representation of the importance to fisher of the spatial arrangement of disturbance. In both hypothetical examples, the same landscape is subjected to the same amount of disturbance, but different patterns in the distribution of disturbance regimes. In the first example (Figure 82), disturbance is concentrated in large blocks representative of the arrangement typical of historic fires. The disturbance regime results in a few large openings with total percent similar to desired condition ranges, but also leaving large stands of mature forest clustered together with few openings (Figure 82). In the second example (Figure 83), disturbance is dispersed into small blocks as is more typical of silvicultural practices. The disturbance regime results in stands of mature forest that are more fragmented with many small openings (Figure 83). Although each example is based on approximately the same acreage of available mature forest and the same acreage of open habitat, the change in the distribution of disturbance has substantial consequences for modeled fisher habitat suitability (Figure 82 and Figure 83). The findings from the moving windows analysis suggest that restoration efforts may have potential deleterious effects for fisher due to increased habitat fragmentation if not carefully considered within the context of the surrounding landscape. Landscape pattern treatments that allow for larger openings would allow treatments to replicate the larger size of disturbances that occurred under natural disturbance.

It should be noted that PRISM does not consider factors that influence the feasibility of timber harvest when choosing spatial locations for harvest. Because additional factors like the proximity to roads, slope, or other factors often influence the choice of harvest locations, it is likely that future timber harvests will be more clustered than the model predicts. As a result, the model may be overestimating the decline in spatially constrained habitat.

The overall theme of the plan components, including within Management Area 3, is to manage the landscape pattern in a way that reflects natural disturbance regimes, maintain live tree retention, and reduce the chances for high severity fire. Examples of plan components that suggest this management are found in all the vegetation broad potential vegetation types and in all management areas. Examples include MA3-DC-FOR-01, MA1 and MA2-DC-FOR-06, MA3-DC-FOR-02, FW-DC-FOR-07, MA1-DC-FOR-02, MA3-DC-FOR-03, FW-DC-FOR-08, MA1 and MA2-DC-FOR-07, MA3-DC-FOR-04, FW-DC-FOR-10, MA3-DC-FOR-05, FW-DC-FOR-11, MA1 and MA2-DC-FOR-08, MA3-DC-FOR-06. The model did not incorporate the direction in plan that speaks to the landscape pattern and distribution of disturbance. Instead, it prioritized treatments and disturbances to meet the plan's desired dominance types and size class distribution and only incorporated a 40-acre constraint on forestry treatments without adjacency constraints. The 40-acre constraint on timber treatments forced the model into a landscape pattern that differs substantially from the disturbance patterns under natural disturbance. The plan's 207-acre maximum regeneration treatment size (before regional forester's approval is required) would trend patch sizes and distributions towards a landscape pattern more like those developed under natural disturbance. While informative about how landscape scale disturbance patterns might affect the probability of fisher occupancy, the model outcomes should be interpreted with caution because they represent conditions that differ from real management in the future under the plan, which would follow the guidance in these plan components for landscape distribution.

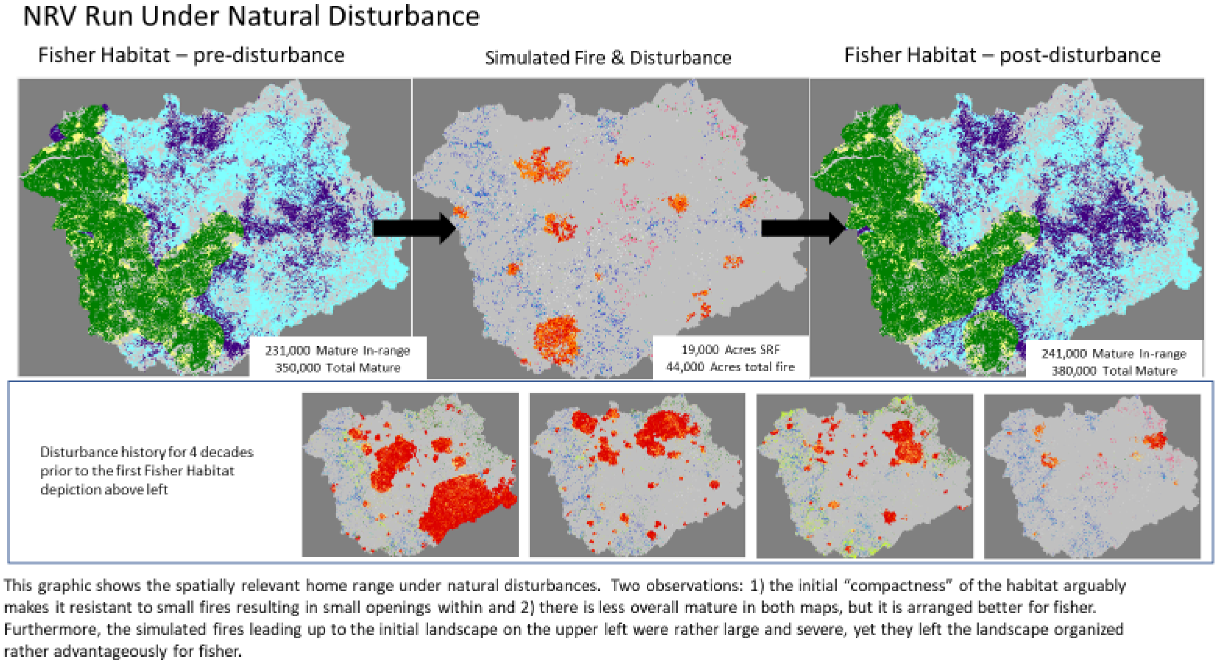


Figure 82. Model simulations in SIMPPLLE under natural disturbance parameters

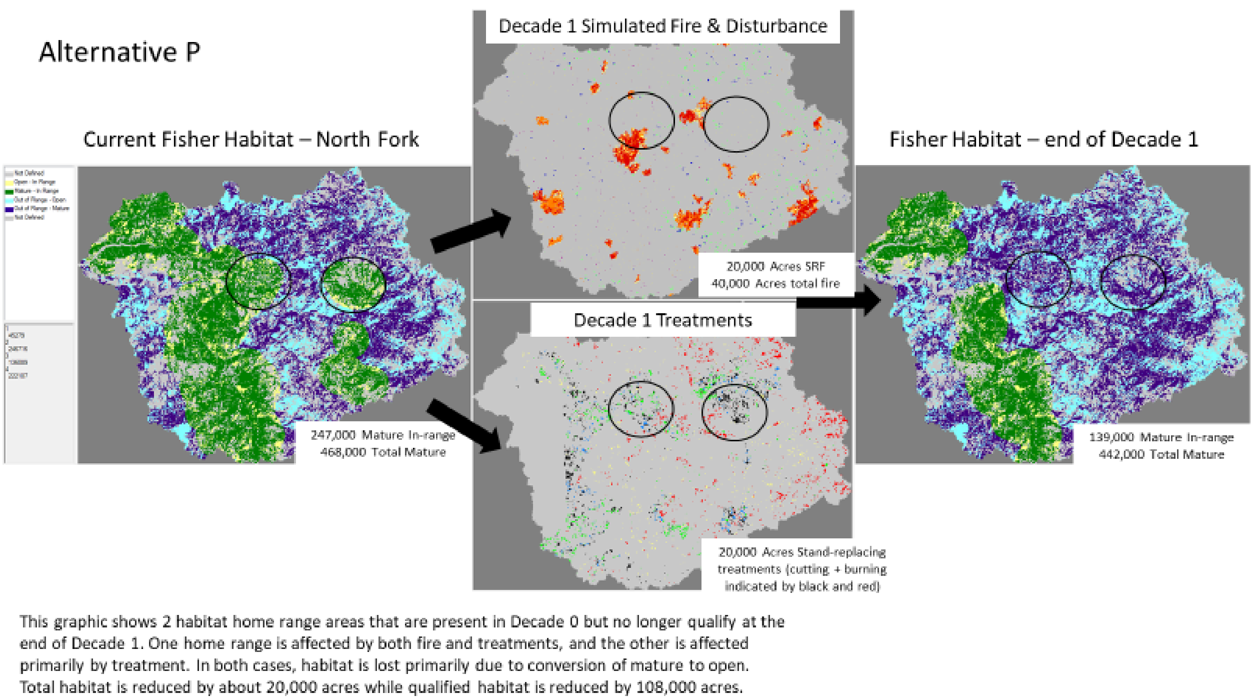


Figure 83. Example of one decadal time step simulating future conditions under the Preferred Alternative

Relatedly, while prescribed fire would more closely reflect natural disturbance, it is not possible to replicate the pattern of natural disturbance with forestry treatments because of operational, logistical, and social constraints. The limits of forestry equipment, like slope limitations, limit where forestry treatments are feasible. Forestry practices struggle to replicate the fine scale variability produced by fires, and regeneration harvests on the scale of tens to hundreds of thousands of acres would not be socially acceptable. Also, fires burn forests without regard for size distribution, whereas forestry treatments must typically be economically feasible and therefore disproportionately treat larger size classes for lumber value. Forestry treatments designed to produce timber leave less residual biological legacies compared to natural disturbance. Furthermore, constraints in the Land Management Plan impose restrictions on achieving a natural pattern of disturbance. For example, fires and tree diseases know no boundaries, but land allocations constrain the location, types, and purposes of forestry treatments. Similarly, fires often burn across riparian areas whereas plan components like FW-STD-RMZ-01 constrain mechanical treatments within riparian zones which will act as a natural constraint on the size of treatments. Additionally, the constraints in the alteration of lynx habitat imposed by the Northern Rockies Lynx Direction constrain treatments in lynx habitat. Finally, while the plan's constraint on patch size found in FW-STD-TBR-06 which imposes a 40-acre limit with exceptions that allow treatment up to 207 acres without regional forester approval, limit the capacity to treat landscapes consistent with the size and distributional pattern of natural disturbance. However, the larger patch size exception will allow a trend towards a distributional pattern more representative of natural disturbances. An alternate strategy that can still maintain fisher habitat is to ensure that forestry treatments are sized, shaped, and distributed such that they main connectivity and complexity of mature forest, while being mindful of the distribution of open habitats, and employing a firm commitment to leaving biological legacies especially live trees, so that as regenerating forests regrow, they contain features useful for fisher resting and denning. This would be a strategy consistent with the direction in the plan.

The estimates of current fisher habitat availability derived from the both the SIMPPLLE model query and the more nuanced moving windows analysis are similar to habitat-use and occupancy studies of fisher in the Northern Rockies (Krohner 2020, Sauder 2014, Sauder and Rachlow 2014, Olson et al. 2014). The moving windows analysis estimated that approximately 59 percent of the mature, mesic forest within the plan area is likely providing suitable habitat for fisher (that is, greater than 40 percent chance of occupancy). Congruence with the baseline conditions found in other studies not only further supports the importance of the plan area as one of two core fisher habitat areas in the Northern Rockies but gives credence to the other model outputs. Still, it is important to put the findings from the models in context. Out of necessity, the models simplify very complex and dynamic relationships. Though the best available scientific information was used to build the models, there remains a high degree of variability and an element of uncertainty.

The models also did not distinguish between sources of disturbance. Although fisher are generally sensitive to forest openings, the structure inherent to an opening ultimately determines whether fisher will use or avoid an opening. Silvicultural practices that reduce forest density and structural complexity can reduce habitat suitability (Powell and Zielinski 1994, Olson et al. 2014, Schwartz et al. 2013); however, in some cases the effects may be short-term and unlikely to lower occupancy or persistence (Sweitzer et al. 2016) if treatments maintain the large trees and local habitat features preferred by fisher (Zhao et al. 2012, Niblett et al. 2017, Jones and Garton 1994). Plan direction (for example, FW-DC-TBR-01) identifies timber harvest methods and how vegetation treatments are achieved, with some components (for example, MA3-GDL-FOR-06, MA2 and MA3-GDL-FOR-05, MA3-DC-FOR-04, MA2 and MA3-GDL-FOR-01, and FW-DC-TBR-03) ensuring that the microhabitat elements fisher rely upon remain available (see Forestlands section). Similarly, fisher will use areas affected by wildfires (Hanson 2015), but high-intensity fires are more likely to reduce the availability of local habitat features (for example, large down wood, large snags) preferred by fisher (Sweitzer et al. 2016, Blomdahl et al. 2019). Plan direction (for example, FW-DC-FIRE-01, FW-DC-FIRE-02, MA1 and MA2-DC-FOR-07, MA3-DC-FOR-04, FW-DC-WL-04 and FW-DC-TBR-06) creates a landscape that is more resilient to fire, and thus less likely to result in a large, high intensity fire that may lead to largescale losses of fisher habitat; however, the plan also directs post-fire treatment (for example, FW-STD-TBR-07) that may have negative effects on the availability and distribution of the local habitat features fisher prefer (see Fire Management and Timber sections). As the models did not encapsulate the variation inherent to various types of disturbance, there is additional uncertainty for how disturbance may ultimately shape fisher habitat suitability.

During timber harvest, Jones and Garton (1994) suggested that fisher habitat management may require a landscape-based approach to maintain the integrity of ecological systems. Applying such an approach would require land managers to adopt long-term, large-scale plans that would mimic natural landscape patterns and processes. Such an approach would keep a certain proportion of forests in various successional stages, together with a specific frequency distribution of various patch size and linkage areas across the landscape. Such an approach would help ensure the viability of fisher populations within a managed landscape (Jones and Garton 1994). This type of approach is what the Land Management Plan employs.

All alternatives were designed to provide ecosystem integrity by providing a common set of desired conditions that mostly represent the natural range of variability with some exceptions of some dominance types designed to increase resiliency under warmer-drier future climates and restore more prominent amounts of tree species more shade intolerant species that are resilient to fire. The decline is the natural consequence of managing towards desired vegetation conditions representative of warmer-drier periods of the natural range of variation (NRV), conditions under which fisher habitat was at its NRV low. Naturally, fisher habitat under that management regime would trend towards its NRV low. It is also the consequence of departing from the NRV in dominance types at least over intermediate time scales while the conversion takes place. As that is the common set of desired conditions, all alternatives trend towards the lower end of NRV and the outcomes are similar across all alternatives. The primary difference is the pace at which that change occurs, which varies by alternative. Alternatives with a higher pace present some risk to impacting fisher habitat abruptly enough that it can lower probabilities of occupancy which ultimately could force fishers to live in suboptimal habitat or result in actual population declines. The higher pace combined with the shift in dominance types prominent in fisher habitat, could interact to result in a landscape that is less ideal from a fisher's perspective. From a fisher conservation standpoint, alternatives with a slower pace towards desired conditions represent a more conservative approach to shifting tree dominance types within the appropriate timeframe to conserve fisher populations. However, such an approach might also leave fisher habitat more prone to losses from natural disturbances like uncharacteristic wildfire. Concern about the pace of the trends is moderated by the fact that the total disturbance amounts of 53,000 to 64,500 acres of desired total disturbance, which also encompasses timber disturbance, is within the estimated range of total disturbance under the NRV and is the same across all alternatives. These are amounts, from a disturbance per year standpoint, at which fisher populations habitats have been sustained in other parts of its range. Furthermore, the plan's guidance to retain legacy structures forestwide will help ameliorate the effects of regeneration harvest as has been demonstrated even on lands managed for timber production.

Although the exact magnitude of the effects associated with the reduction of mature, mesic forest and the increase in fragmentation may be uncertain, there is reasonable certainty that at the landscape scale, the overall suitability of fisher habitat within the plan area will be reduced. However, it is important to realize that the models suggest a decline in fisher habitat suitability, not extirpation. Even given the caveats of the moving windows analysis, the analysis supports the notion that the plan area will continue to provide suitable habitat for fisher to persist on the Nez Perce-Clearwater because the plan provides a framework for managing the landscape within the amounts of disturbance typical of the natural range of variation (NRV), includes direction to manage forestlands landscape patterns consistent with natural disturbance, within limits that have sustained fisher populations in other areas, and within amounts that the national forest has already sustained in past decades of extractive uses that created conditions today that support fisher populations. The plan's species-specific desired condition for fisher FW-DC-WL-04 will help manage towards conditions that will support fisher habitat. Management under the Revised Forest Plan will differ from the natural landscape pattern of disturbance, but plan direction supports a strategic approach to how disturbance is distributed on the landscape that can help to ameliorate such effects. The Revised Forest Plan contains plan direction in the Forestlands section to address the landscape distribution of disturbances. The desired conditions for fisher found in the Wildlife section of the Revised Forest Plan describe habitat use of fisher at various scales to inform habitat management.

The key points from the modeling exercise:

- The availability of the mature, mesic forest types that fisher prefer is expected to decline under all alternatives but remain within the natural range of variation.
- The availability of mature, mesic forest in the next 10 to 40 years is sensitive to the pace of restoration, showing a faster rate of decline under alternatives with faster rates of attainment, though the availability of mature, mesic forest is similar across all alternatives by the fifth decade.
- Restoration efforts that lead to disturbance patterns that depart from the natural range of variation in size and distribution may reduce the availability of habitat that is suitable to support a fisher home range.

The availability of habitat that is suitable to support a fisher home range in the next 10 to 20 years is sensitive to the pace of restoration, showing a faster rate of decline under alternatives with faster rates of attainment; however, the availability of habitat that is suitable to support a fisher home range is similar across all alternatives by the fifth decade, although the variation is greater than the variation in the availability of mature, mesic forest.

Plan Direction that Contributes to Fisher Habitat

Most of the plan direction that contributes to fisher habitat includes ecosystem plan components found in the Forestlands section of the Land Management Plan. Also contributing to fisher habitat are plan components within the Aquatic Ecosystems and Fisheries section, especially those that address riparian habitats. Desired conditions for size class distribution within the warm dry, warm moist, and cool moist broad potential vegetation types (PVTs), especially for those 10 inches diameter at breast height (DBH) or taller, would help provide a range of mature forested habitats similar in percent to those described by Sauder and Rachlow (2014) that provide for fisher habitat. For example, depending upon the management area, the amount of mature forest 10 inches and greater within the warm moist broad PVT ranges between about 40 percent on the low end to 83 percent on the high end. If the Nez Perce-Clearwater manages towards the middle of this range, then the amount of fisher habitat in the mature condition would support fisher with nearly 55 percent in a mature condition. Similarly, within the warm dry size class distribution, these size classes range from between 42 to 83 percent; management towards roughly the middle of this range would promote size classes the provide mature forest for fisher, and the same pattern holds within the cool moist, where adequate amounts of mature forest would be present under the desired conditions. It is also a broad PVT that does not provide much fisher habitat though it might become more used by fishers as climates warm.

Within the smaller size classes, the percent of habitat below the 4.9-inch size class were evaluated. These include the grass and forb and shrub stage and the 0- to 4.9-inch size class. The desired range for these size classes is between 6 and 30 percent combined within Management Area 3 in the warm moist broad PVT. The ranges within the Land Management Plan are consistent with the natural range of variation (NRV). However, the distribution of these open habitats matters for fisher. Under natural disturbances, there were broad areas burned in fires that had a much higher amount of this age class locally. At the landscape scale, they were clustered where fires burned. There were also areas locally that had less than 5 percent in these size classes that served as fisher habitat. The appropriate landscape pattern is critical to understanding and appropriately managing fisher habitat. If management within these ranges is applied across the landscape evenly, as they did in the model, then they would not replicate the pattern of disturbance that fisher evolved with. This type of management would render forested habitats less suitable to fisher because of fragmentation and would result in a lower probability of occupancy within fisher habitat.

The Land Management Plan does include desired conditions that address landscape pattern in each broad potential vegetation group section within the Forestlands section. Examples include plan components MA1 and MA2-DC-FOR-07 and MA3-DC-FOR-04. They provide direction for the landscape pattern to be arranged in vegetation patches consistent with typical fire histories. These desired conditions also contain language to retain live retention trees in early seral age classes. These measures would help provide for fisher, if followed.

Other plan direction that would help fisher includes the following:

- FW-DC-FOR-07 and 08, MA2 and MA3-GDL-FOR-01, MA2 and MA3-GDL-FOR-03-05, and FW-DC-WL-04 will retain snags and downed wood that are important to fisher.
- A trend towards historic conditions and the desired conditions for vegetation (FW-DC-FOR-01, FW-DC-FOR-03-09, FW-DC-FOR-11, and FW-DC-FIRE-03) will change the distribution and amount of fisher habitat nearer to what would have been present under natural disturbance processes.

Geographic area direction that improves or maintains connectivity includes GA-DC-GH-01 and GA-DC-SR-03. Additionally, FW-DC-WL-01-05 maintains connectivity.

Ecosystem Plan Components

Plan components which contribute to the ecological condition for fisher are summarized in Table 200. These plan components help provide the structure, function, composition, and connectivity to provide for fisher habitat.

Table 200. Summary of plan direction, components, and effects which contribute to the ecological condition for fisher

Plan Direction	Plan components	Effects
Desired conditions	FW-DC-TE-01 FW-DC-TE-05 FW-DC-TE-06 FW-DC-FOR-05 MA1 and MA2-DC-FOR-06 MA3-DC-FOR-02 FW-DC-FOR-06 FW-DC-FOR-07 FW-DC-FOR-08 MA1 and MA2-DC-FOR-07 FW-DC-FOR-09 FW-DC-FOR-10 FW-DC-FOR-11 MA1-DC-FOR-02 MA1-DC-FOR-03 MA1-DC-FOR-07 MA1-DC-FOR-08 MA2-DC-FOR-02 MA2-DC-FOR-03 MA2-DC-FOR-07	Plan components will contribute to mature, closed canopy habitat important to for fisher. Plan components call for retaining dead, dying, and live legacy trees, which are more likely to contain heart rot and provide appropriate denning sites. These components provide for size class distribution that matches the natural range of variability. Older age classes provide for the structure components needed by fisher. Plan direction in some components address landscape pattern of disturbances. Aquatic plan components provide for connectivity and habitat used by fisher. Specifically, riparian habitat desired conditions and guidelines will provide connectivity. The plan contains a species-specific desired condition for fisher which describes the ecological conditions that sustain fishers. Some plan direction for dominance types would cause a decrease in preferred fisher habitat. This includes FW-DC-FOR-03, FW-DC-FOR-06, and FW-DC-FOR-09 for dominance types in the warm dry, warm moist, and cool moist broad potential vegetation types. Specifically, the change from grand fir or spruce-subalpine

Plan Direction	Plan components	Effects
	MA2-DC-FOR-08 MA2-DC-FOR-10 MA3-DC-FOR-03 MA3-DC-FOR-04 MA3-DC-FOR-05 MA3-DC-FOR-06 MA3-DC-FOR-10 MA3-DC-FOR-11 FW-DC-RMZ-01 FW-DC-WL-02 FW-DC-WL-04MA1 and MA2-DC-FOR-08 MA3-DC-FOR-06 FW-DC-FIRE-01 FW-DC-FIRE-02 FW-GDL-FIRE-01 Plan components for riparian protection FW-DC-WTR-02	fir into other dominance types would alter preferred fisher habitat. The effect would be indirect via a decrease in habitat. Plan direction for the desired amounts of size classes, dominance types, within stand characteristics, and density will provide the ecological conditions to provide ecosystem integrity to contribute to the long-term persistence of fisher. These plan components do not include protections for grand fir, Douglas-fir, or Engelmann spruce–grand fir old growth, which are dominance types used by fishers. The Plan does include protections for redcedar old growth, which are important for fisher. However, grand fir old growth would contribute to fisher habitat. The lack of protection for some old growth types might result in the decline of these old growth types and potentially impact fisher denning habitat.
Guidelines	MA2-GDL-FOR-02 MA2-GDL-FOR-03 MA3-GDL-FOR-07 MA3-GDL-FOR-06—varies by alternative with Alternative Z providing better than Alternatives W, X, and Y MA2 and MA3-GDL-FOR-01 MA2 and MA3-GDL-FOR-02 MA2 and MA3-GDL-FOR-03 MA2 and MA3-GDL-FOR-04 MA2 and MA3-GDL-FOR-05—varies by alternative with Alternative Z providing better than the Preferred Alternative and Alternatives W, X, and Y	Guidelines restrict management to activities designed to increase resiliency of the stand, which may contribute to long-term fisher habitat stability. Plan components provide structural components important to fisher, such as snags, large live trees, and downed coarse woody debris, especially during management.
Standards	FW-STD-RMZ-01 FW-STD-RMZ-04 FW-STD-RMZ-05 FW-STD-RMZ-06 FW-GDL-WL-01	Standards reduce thinning in riparian management zones, which provide habitat and connectivity for fisher. These standards provide for downed wood and denning structures within these areas.

Effects to Fisher Habitat from Other Resources

The effects from other resources to fisher are summarized in Table 201. The table below identifies plan direction that would have consequences to fisher. In most cases, the effects are described briefly, but some effects required further explanation in the table below.

Table 201. Effects to fisher habitat from other resources

Resource Area	Environmental Consequences	Explanation
Terrestrial Ecosystems across the landscape	Yes	Desired conditions support diverse habitat conditions that may be beneficial to fisher. Specifically, FW-DC-TE-01, FW-DC-TE-05, and FW-DC-TE-06 would support fisher habitat.
Biophysical Features	No	No consequences
Forestlands	Yes	See the Effects from Forestlands section below for adverse effects. See the Ecosystem Plan Components table above for beneficial effects.

Resource Area	Environmental Consequences	Explanation
Carbon Storage and Sequestration	No	No consequences, may have beneficial consequences to fisher.
Meadow, Grassland, and Shrubland	No	No consequences, may have beneficial consequences to fisher because healthy meadows, grasslands, and shrublands could provide for fisher prey.
Fire Management	Yes	See the Fire Management section below for plan direction pertaining to fire.
Invasive Species	No	These plan components promote native vegetation that would contribute to fisher habitat.
Soil Resources	No	No consequences to fishers. Soil plan direction would guide management towards healthy soils, that provide the basis for healthy vegetation that supports many wildlife species including fishers.
Aquatic Ecosystems	Yes	Plan components contribute to habitat and connectivity for fisher.
Water and Aquatic Resources	No	No consequences, may have beneficial consequences to fisher because healthy aquatic resources could benefit fisher habitat and prey.
Conservation Watershed Network	No	No consequences, may have beneficial consequences to fisher. These plan components identify watersheds that are prioritized for restoration which over the long term, will improve fisher habitat.
Riparian Management Zones	Yes	Riparian habitats contribute to fisher habitat and connectivity. The plan components would contribute to fisher habitat by ensuring connectivity even when timber harvest occurs within fisher habitat.
Infrastructure (Aquatic and Riparian)	Yes	Plan components move or locate roads into upland habitats used by fisher. The consequences should be minor.
Energy and Minerals (Aquatics and Riparian)	No	No consequences, may be beneficial to fisher habitat.
Livestock Grazing (Aquatics and Riparian)	No	No consequences. Grazing does not generally occur within fisher habitat to a great extent because the types of habitats that fisher use are typically not grazed by livestock due to lack of forage.
Lands and Special Uses (Aquatics and Riparian)	No	No consequences, but may be beneficial to fisher habitat.
Recreation (Aquatics and Riparian)	No	No consequences, may have beneficial effects on fisher habitat.
Wildlife	Yes	Wildlife plan components should contribute to conserve fisher habitat. Specifically, FW-DC-WL-03, FW-DC-WL-04, and FW-GDL-WL-01 should contribute to fisher habitat conservation and connectivity.
Multiple Use Wildlife	Yes	Habitat for big game is often in early seral or non-forested conditions. Management to provide these features may require treatment of fisher habitat. Habitat for elk often includes early seral conditions to provide high quality nutrition. Some of the areas where elk would receive high quality nutrition would include habitat that fisher use, such as those in the warm moist and warm dry broad potential vegetation type. Providing high quality nutrition to elk would require treatment of the habitat areas that could impact or fragment fisher habitat.
Air Quality	No	No consequences, may have beneficial consequences.

Resource Area	Environmental Consequences	Explanation
Tribal Trust	Yes	FW-OBJ-TT-01 may alter some fisher habitat to produce huckleberry. Huckleberry plants prefer unshaded or partially shaded areas and grow within grand fir and spruce-fir habitat types. The pace of this treatment should be compatible with fisher habitat.
Cultural Resources Tribal Trust	No	No consequences
Municipal Watersheds	No	No consequences
Sustainable Recreation	Yes	Sustainable recreation plan components would influence development and human use of the Nez Perce-Clearwater. Suitability of uses identify where some activities could occur under the Land Management Plan. In some cases, fisher habitat may be impacted by recreation developments and human disturbance. Developments would represent permanent loss of fisher habitat, however, would be limited in scale and impact to fisher.
Scenery	No	No consequences. Some management of scenery may be beneficial to fisher.
Public Information, Interpretation, and Education	No	No or minimal consequences
Infrastructure	Yes	Maintenance and objectives for road rerouting in the Land Management Plan could impact fisher habitat in some cases. The footprint of these activities would reduce fisher habitat. The scale and intensity to habitat would only have minor consequences for fisher.
Land Ownership and Land Uses	Yes	Beneficial effects. FW-DC-LND-01 states that land ownership supports habitat for species of conservation concern, including fisher. FW-GDL-LND-02 is designed to conserve resources through land ownership.
Ecosystem Services	No	Generally compatible with fisher conservation but some activities identified in desired conditions could reduce or destroy fisher habitat. In most cases, these activities would occur over a scale and intensity that would essentially have only a minor impact on fisher habitat.
Suitability	yes	Nearly all suitable uses could impact fisher habitat. Suitability for timber harvest, timber production, road construction, temp roads, prescribed fire, and minerals could result in habitat impacts. Other suitable uses could result in disturbance but not likely changes to ecological conditions for fisher.
Timber	Yes	See the Timber section below.
Energy and Minerals	Yes	Plan direction makes forestlands available for these activities in the future. These activities could result in loss of fisher habitat. In most cases, these activities would occur over a scale and intensity that would essentially have only a minor impact on fisher habitat. However, some projects could be large and impactful. The effects of individual projects would
Livestock Grazing	Yes	Livestock grazing plan direction would serve to direct management of livestock grazing to conserve fisher habitat. FW-GDL-GRZ-03 limits grazing to 35 to 55 percent utilization, which is considered moderate grazing intensity and would serve to maintain healthy rangelands. These would help reduce the impact to fisher from livestock grazing.

Resource Area	Environmental Consequences	Explanation
Special Forest and Botanical Products	Yes	These plan components contain direction for providing firewood. Firewood harvest can reduce snags and downed logs. These features are important to fisher habitat. Firewood harvest is typically limited to areas near roadways. Areas away from roads would continue to have snags and downed wood to provide for fisher habitat. Firewood harvest should only have limited impact to fisher habitat.
Designated Wilderness	Yes	Natural processes contribute to the mosaic of forest conditions that are beneficial to fisher. They are managed with natural ecological processes, which are more random and variable. Designated wilderness areas prohibit many activities that reduce fisher habitat through suitability. Wildfire management in wilderness areas may reduce fisher habitat in some cases. Wilderness areas have limited amounts of fisher habitat.
Designated Wild and Scenic Rivers	Yes	Management direction in wild and scenic river corridors would benefit fisher habitat. While all designated rivers provide some benefit, wild rivers are more protective than recreational rivers. While timber harvest is suitable, timber production is limited. Any treatment in fisher habitat would need to comply with wild and scenic river plans and maintain the free-flowing qualities and outstandingly remarkable values.
Recommended Wilderness plan components and direction	Yes	Recommended wilderness management would have similar effects as designated wilderness, with some exceptions. They would be managed to preserve wilderness character. Natural processes would be the primary agents of ecological change. MA2-DC-RWILD-04 identifies these areas as connectivity areas for wildlife. While timber harvest is suitable in these areas, timber production is prohibited. Suitability varies by alternative for a variety of non-conforming uses. These alternatives are analyzed above. Recommended wilderness management would be protective of fisher habitat because many activities are unsuitable within recommended wilderness.
Eligible and Suitable Wild and Scenic Rivers	Yes	Management would be similar to designated wild and scenic rivers. Rivers and their corridors would be managed to protect their outstandingly remarkable values and free flowing conditions. Timber production would not be allowed, but timber harvest would be allowed. Management would generally be protective.
Lolo Trail National Historic Landmark	Yes	The Lolo Trail National Historic Landmark would be managed to maintain the integrity of the landmark. Natural processes are the primary agents of change, though prescribed fire is suitable. Some management seeks to maintain the viewshed of the landmark, which may impact some fisher habitat. Scenic integrity guidelines in the Land Management Plan would contribute to fisher habitat. The Landmark would not allow firewood cutting, which would provide for habitat features like snags and downed wood. Neither timber harvest nor production are suitable uses.

Resource Area	Environmental Consequences	Explanation
Idaho Roadless Rule Areas	Yes	Plan components contribute to the connectivity of fisher habitat. MA2-DC-IRA-02 directs that composition, structure, and pattern of vegetation reflect natural disturbances. This should help conserve fisher habitat in these areas. These areas provide for the connectivity of wildlife habitat. Some habitat may be impacted by new motorized trails. These would be minor impacts to fisher and limited to the footprint of the trails. The Idaho Roadless Rule governs many of the activities that would occur. These would contribute to conservation of fisher habitat. Timber harvest could affect some fisher habitat. Fisher habitat is projected to decline in Idaho Roadless Rule areas in the SIMPPLLE model under all alternatives as a result of timber harvest to meet desired vegetation conditions and climate change.
Research Natural Areas	Yes	Plan direction would contribute to the conservation of fisher habitat. These areas are managed to emphasize natural processes as a baseline for research. However, prescribed fire is a suitable use and may affect some fisher habitat. These areas are limited in scope.
Lower Salmon River Geographic Area	Yes	Plan direction in the Lower Salmon Geographic Area emphasizes Ponderosa pine restoration, including for species limited to this area of the Nez Perce-Clearwater. In some cases, management here would treat fisher habitat to restore or increase Ponderosa pine.
Gospel-Hump Geographic Area	Yes	The Gospel-Hump Geographic Area emphasizes management for multiple uses. There is a substantial amount of fisher habitat within this geographic area. It emphasizes wildlife habitat, fisheries, motorized and non-motorized recreation, timber, and research. Part of this area includes an emphasis on timber production and could result in effects to fisher habitat.
Pilot Knob Geographic Area	No	No consequences, may have beneficial consequences for fishers.
Special Areas	Yes	Some special areas are old growth cedar groves that provide denning habitat for fisher. The plan components seek to increase public awareness and visitation to these areas, which could increase disturbance for fisher. Fisher are not reported to be sensitive to human disturbances, but this may not have been studied. While use could change or increase in these areas, the disturbance likely would not be in wintertime when fisher are denning.

Fire Management

Fire management was designed to achieve desired vegetation conditions. While fire is a natural process, it interacts with vegetation treatments to impact fisher habitat. The effects of wildfires, prescribed fires, and vegetation treatments can result in reduction of fisher habitat. The changes in the amount of fisher habitat within Management Area 2 are mostly driven in the SIMPPLLE and PRISM models by wildfire and prescribed fires. These trends do not vary much by alternative in Management Area 2. Fuels management projects would contribute to the decline of fisher habitat within Management Area 3 and may be used in places that are not suitable for harvest or are too steep for harvest. Regeneration harvests followed by prescribed fire would kill live leave trees and potentially burn retained snags. Plan direction encourages the use of wildfire and prescribed fire to meet other resource objectives. This has potential to impact fisher habitat.

Timber

These plan components are designed to direct the manner in which timber production and harvest are conducted. Timber plan direction would directly impact fisher habitat and result in both short-term and long-term consequences for fisher. Timber production alters fisher habitat for long periods of time because it removes trees, changes seral stage, and alters density or composition of habitat. Different treatments have different effects. Even-aged harvest strategies remove most of the living trees, resulting in the loss of fisher habitat used for foraging by up to 40 years, and removes denning habitat structures much longer for time periods of time potentially for more than 100 years. Intermediate treatments or thinning reduces stand complexity, though these types of treatments can increase the rate at which trees obtain larger size classes. Roughly 40 percent of fisher habitat occurs in Management Area 3 and, according to the Sauder model, the majority of the high-quality habitat mostly resides in Management Area 3 where timber harvest would mostly occur. Salvage operations for snags can impact fisher habitat negatively by removing trees and snags that would provide for fisher habitat as forests regenerate.

Plan direction in the Timber section prescribes the situations in which different types of treatments are required as standards. FW-DC-TBR-01 is designed to contribute to a sustainable flow of saw timber and non-saw timber through vegetation treatments intended to restore resilient ecosystem structure and function. It encourages this use where identified as suitable. FW-DC-TBR-03 directs that dead and dying trees in excess of those required for minimum snag retention are available for harvest. This direction would allow removal of dead and dying trees important to fisher denning habitat but would also require retention of those needed to meet guidelines in the forestlands section of the plan. FW-DC-TBR-06 would decrease the loss of fisher habitat to wildfire and would be beneficial for fisher.

FW-STD-TBR-01 and FW-STD-TBR-02 would constrain timber activities only to lands suitable for timber harvest. FW-STD-TBR-04 would ensure restocking happens to speed the recovery of fisher habitat after harvest. FW-STD-TBR-05 assures treatments are designed to achieve desired vegetation conditions. As noted in many cases, it would require even aged management, such as replanting clear-cuts with desired tree species. It has exceptions for when treatments could differ. FW-STD-TBR-05 constrains treatments to ensure their ability to meet desired conditions and not based solely on economics or unit output of timber. FW-STD-TBR-06 restricts openings to 40 acres and does not require consideration of adjacent recent treatments when conducting timber production on Nez Perce-Clearwater lands nor those of other ownerships. This is the case when harvesting at only the 40-acre sized treatments. The standard allows larger openings up to 207 acres before regional forester approval is required and could be used when determined necessary to help achieve desired ecological conditions for the plan areas. The larger opening size would allow treatments to replicate the larger size of disturbances that occurred under natural disturbance and trend the Nez Perce-Clearwater towards a more natural distribution of patch sizes found under the natural range of variation.

FW-STD-TBR-08 specifies that the restrictions on sizes of treatments would not apply in response to a loss from stand replacing natural disturbances. This would allow practices like salvage logging to occur in fisher habitat impacted by these events. The removal of remnant trees and hollow snags would reduce the value of the habitat for fisher and slow the amount of time it would take for these habitats to recover. FW-STD-TBR-09 would ensure clearcutting would be required when dominance types exceed desired conditions and when managing in situations when working with an undesirable dominance type. This would require clearcutting in many situations when working in fisher habitat and would cause the loss of fisher habitat over long periods of time. It would ensure that cutting of diseased trees or trees with mistletoe would require clearcut harvesting. These are features important to fisher habitat and would be lost during treatments, potentially resulting in a century or more to become fisher habitat again.

Other standards and guidelines are similar in restricting treatments to certain types during some situations, such as seed tree harvest and shelterwood harvest. The circumstances where these types of harvests would be used would be restricted, facilitating other types of treatments that may be harmful to fisher habitat. FW-STD-TBR-12 would limit harvest to the sustained yield limit but provides broad exceptions that could facilitate additional impacts to fisher habitat. FW-GDL-TBR-02 would ensure that treatments within grand fir habitats would regenerate after treatment to the desired species. FW-GDL-TBR-04 requires regeneration treatments to have reached at least a certain age before treatment. These ages are generally less than that needed to provide hollow trees, though they would meet mature forest criteria. Timber management direction of the plan provides a basis for methods to manage forestlands to achieve desired conditions, which has the potential to reduce the amount of habitats suitable for home ranges while increasing resilience over longer time frames.

Climate Change

Climate change may alter the distribution of wildlife species directly through changes in suitable climatic conditions as well as indirectly through changes in vegetation. For example, reductions in snowfall accumulation associated with climate change (Klos et al. 2015) are likely to directly affect the distribution of fisher within the state and the plan area. The accumulation of snow is presumed to limit the distribution of fishers (Raine 1983, Krohn et al. 1995, Krohn et al. 1997), therefore as snowpack declines, fisher distribution is expected to increase as more suitable habitat is accessible (Suffice et al. 2017)(Zielinski et al. 2017).

Although the most apparent effect of climate change on fisher is likely changing snow conditions, the effect of climate change on fisher habitat are more nuanced. Climate change alters the availability and distribution of wildlife habitat directly, through altered vegetation growth, mortality, and regeneration, as well as indirectly through changes in disturbance regimes and other ecosystem processes (Keane et al. 2018).

Within the Northern Rockies the forest types that typify fisher habitat have generally lower vulnerability to climate change (Hansen and Phillips 2015) except, where due to fire suppression, they have expanded into drier sites (Keane et al. 2018). Indeed, climate change is generally expected to increase the availability of fisher habitat on the landscape (Olson et al. 2014) due to increased productivity in more mesic locations (Keane et al. 2018). Importantly, however, the distribution of suitable fisher habitat is expected to shift to higher elevations and further to the north and west, with consequences for the availability and connectivity of suitable habitat within the plan area (Olson et al. 2014). In general, fisher habitat within the plan area is expected to contract to higher elevation, leading to overall greater fragmentation (Olson et al. 2014). The findings from the literature are in congruence with the outputs from the SIMPPLLE model (see Timberland section), which suggests that conditions within the plan area will represent the dry and warm end of the natural range of variation, favoring forest communities tolerant of such dry conditions.

Although climate induced changes in the distribution of conditions capable of supporting the vegetation indicative of fisher habitat will ultimately affect the distribution of fisher, changes in disturbance regimes will likely have more profound and immediate effects (Keane et al. 2018). In the short term, fire frequency and the proportion of forest burned annually are likely to increase (Rocca et al. 2014, Westerling et al. 2011), increasing the risk to the mature, mesic forests (Lesmeister et al. 2019) that fisher prefer (Powell and Zielinski 1994, Olson et al. 2014, Schwartz et al. 2013). As outlined in the analysis of fisher habitat (see below), wildfire, particularly high-intensity fires (Sweitzer et al. 2016, Blomdahl et al. 2019), can reduce the value of forest as fisher habitat. Moreover, wildfire can fragment existing habitat, further exacerbating the direct effects of habitat loss (Sauder and Rachlow 2014). The findings from the literature concerning how climate change may affect fisher habitat (for example, Olson et al. 2014) are in congruence with the outputs of the moving window analysis (see below), which suggests that disturbance would result in a lower abundance of fisher habitat and increased fragmentation. In the moving windows analysis, warmer drier conditions allowed for greater probabilities of fire spread, as well as increased mortality due to insect and disease outbreaks (see Fire Management section). Preliminary runs that considered a higher proportion of stand replacing fires versus mixed severity fire resulted in even less fisher habitat, suggesting the model is sensitive to the rate and intensity of wildfire. If fire patterns under future climates increase or change, especially if they change from mixed severity fire to more stand replacing fire, then the decline in fisher habitat may be more precipitous, However, the total amount of fisher habitat remained within the natural range of variability predicted by the model.

The additive effects of an increasingly fragmented distribution of climatic conditions capable of supporting fisher habitat (Olson et al. 2014) along with increased rates of disturbance (Rocca et al. 2014, Westerling et al. 2011), will lead to fisher habitat that is more disjunct. Fishers are capable of dispersing over large distances (Schwartz et al. 2013), but in a highly fragmented landscape individuals must increasingly use non-habitat patches that often fail to provide suitable resources resulting in a decrease in effective dispersal distances (Gilbert-Norton et al. 2010). As a result of such barriers, individual fisher may be incapable of moving between disjunct pieces of mature, mesic forest even if it exists on the landscape (Olson et al. 2014)(Tucker et al. 2017). The implications from our modeling exercise suggests the primary effect of fragmentation could be that it would reduce the number of home ranges available with habitat characteristics fishers prefer and increases the number of potential home ranges that have characteristics that are less optimal or perhaps not suitable depending upon their tolerance of such conditions.

Climate change has the potential to effectively reduce habitat availability and accessibility (Olson et al. 2014); however, efforts to restore ecological processes and increase dominance types that are more resilient to future climatic conditions and the disturbance regimes they foster, may help ameliorate some of these effects. Moreover, although climate change may increase fragmentation of habitat within the plan area, plan components that provide for protection of riparian areas may also provide important corridors that may offset the consequences habitat fragmentation (Gilbert-Norton et al. 2010).

Cumulative Effects

The cumulative effects area for fisher encompasses the Northern Rocky Mountain population of fisher in Idaho and western Montana. There are two core areas of fisher habitat in the Northern Rockies, the larger predominantly occurring within the Nez Perce-Clearwater National Forest, while a smaller core area occurs primarily within the Idaho Panhandle National Forest (Sauder 2014, Olson et al. 2014, Krohner 2020). Although the fisher range within the Northern Rockies encompasses a variety of landownership, the majority of suitable habitat occurs on public lands, as habitat suitability tends to be lower on industrial timberlands (Sauder and Rachlow 2014) even within landscapes that otherwise support fisher (Olson et al. 2014, Sauder 2014, Krohner 2020). As such, the key stressors and threats affecting the Northern Rockies fisher population outside of the Plan Area are themselves managed by the Forest Service. The Idaho Panhandle Final Environmental Impact Statement (pg. 325) concluded that implementation of the Idaho Panhandle National Forest Plan is not likely to result in the loss of viability for fisher populations on the Idaho Panhandle National Forest, in large part due to plan components that help to retain the ecological conditions (for example, snags, downed wood, connectivity) necessary to support the species. However, SIMPPLLE modeling conducted during revision of the Panhandle plan also showed a steep drop in fisher habitat dropping to the low end of natural range of variation (NRV) as well. Recent studies in that area suggest that the population is very low on in the Cabinet Mountains in Montana (Inmann and Coltrane

2022) and higher in that range in Idaho, with evidence of local extinction in the Selkirk and Purcell mountains and is not well connected genetically (Lucid 2019).

In addition to Forest Service management, the Idaho Statewide Wildlife Action Plan (2015) identifies fisher as a species of greatest conservation need. The Idaho Statewide Wildlife Action Plan recommends conserving any remaining old white pine, restoring white pine with disease resistant strains, addressing insects and disease, increasing stand diversity to withstand insect and disease, promoting responsible firewood harvest, protecting legacy trees, restoring long lived early seral trees, restocking after fire with white pine and western larch, restoring the natural fire interval, leaving fire killed trees, designing silvicultural prescriptions that promote historical forest conditions, trending age class and patch size towards the NRV assessing connectivity and gene flow between mountain ranges, and monitoring fisher. For low density carnivores, including fisher, the Statewide Wildlife Action Plan includes recommendations to manage habitat for connectivity, assess gene flow, analyze declines in fisher numbers, monitor climate, increase mature forest, promote timber practices that create small patch cuts interspersed with large connected uncut areas, and monitor the population and distribution trends. This direction complements plan components included in all alternatives explored here, as well as plan component within the Idaho Panhandle National Forest Plan, all of which are designed to provide sufficient fisher habitat by promoting forest condition that are resilient to disturbance and maintaining key habitat elements such as large trees and snags. The State of Idaho wrote a letter in response to findings in the process to determine if fishers warranted federal listing under the Endangered Species Act. The letter pointed to evidence of fisher data collected over the last 50 years by Idaho Department of Fish and Game indicating an upward trend in the species abundance and a low rate of incidental trapping while targeting other species (Idaho Office of Species Conservation, 2010). Trapping of fishers in Idaho is not currently allowed by state regulations. The Idaho Department of Fish and Game is also in the process of finalizing their Fisher, Wolverine and Lynx management plan that is due out in 2023.

Occupancy studies suggest that populations in Montana exist at low occupancy rates (Krohner 2020) with the best occupancy rates near the Idaho-Montana border. National Forests in Montana manage fishers as either sensitive species or species of conservation concern which helps ensure their long-term persistence.

Fisher populations extend south from the plan area into other portions of Idaho including the Payette National Forest, the Boise National Forest, and the Salmon-Chalis National Forest that exist at lower occupancy levels than in the plan area. These forests reside within the Intermountain Region of the Forest Service, and the Intermountain Region identifies the fisher as a Sensitive Species that manages such that the species will not lose viability or will persist long term.

The U.S. Fish and Wildlife Service (2017) determined in their species status assessment that fishers habitat availability in the Northern Rockies was high enough and connected enough to provide resiliency, redundancy and representation to sustain populations in the future. Their analysis considered a number of threats including fire, forestry, climate change, and more. Based on this information, the U. S. Fish and Wildlife Service determined that fishers are not warranted for listing.

Conclusion

The 2012 Planning Rule requires the responsible official to determine whether plan components provide the ecological conditions necessary to maintain a viable population of each species of conservation concern within the plan area (36 CFR 219.9(b)(1)). Key ecological conditions necessary to support a viable fisher population within the planning area include: 1) the availability of mature, mesic forests that includes the local features (for example, larger trees and snags, down woody debris) that fisher prefer, 2) habitat patch dynamics that can support fisher home ranges, and 3) connectivity among habitat patches.

Determination: Plan components provide the ecological conditions necessary to maintain a viable population of fisher within the plan area.

Justification:

1. Plan components shaping the desired future conditions for the planning area ensure that fisher habitat remains available for all alternatives considered. In a 50-year time horizon, the projected availability of the mature, mesic forests that fisher prefer ranges from 1,235,586 to 1,336,605 acres depending on the alternative, with the Preferred Alternative projected to include 1,247,842 acres. The U. S. Fish and Wildlife Service estimated that the Minimum Critical Area needed to support a population of fishers was 2,500 square kilometers which equals 617,763 acres and which is the area needed to support 50 breeding individuals needed to avoid inbreeding effects. Under all alternatives, the projected availability of total fisher habitat within the plan area after 50 years will be more than twice as much as the critical habitat threshold thought necessary to ensure population viability (U.S. Fish and Wildlife Service 2017). Furthermore, the pace of restoration is consistent with or below levels that have sustained fisher habitat here in the past, and elsewhere within the fisher's range even on industrial timber ground.
2. Plan components shaping the desired future conditions for the planning area ensure that the availability of habitat that is suitable to support a fisher home range remains high for all alternatives considered. In a 50-year time horizon, the projected availability of habitat suitable to support preferred female fisher home ranges varies between 407,511 to 562,754 acres depending on the alternative, with the Preferred Alternative projected to include 410,126 acres. Assuming female fishers require 49.3 square kilometers or 12,182 acres each, this amount would support 34 female home ranges with the spatial characteristics of preferred or high-quality female home ranges. An additional 837,716 acres would support fisher home ranges but at potentially lower occupancy levels. This does not include male fishers who show tolerance for a higher percent of open habitats within their home range (Lewis 2012). Under all alternatives, the projected availability of habitat that has the spatial characteristics of preferred female home ranges within the plan area is close to the critical habitat threshold (617,763 acres) thought necessary to ensure population viability (USFWS 2017).
3. Close to half of all fisher habitat occurs in either designated wilderness, recommended wilderness or Idaho Roadless Rule Areas that impose constraints on timber harvest activities which should help them be secured from fragmentation effects of timber production.
4. Plan components that direct landscape pattern of disturbances and the conservation of riparian habitats support habitat connectivity and provide for movement within the plan area as well as immigration and emigration beyond the plan area. These plan components could help land managers design treatments in a landscape pattern more representative of natural disturbance patterns and help ensure fisher habitats to remain connected. This will help mediate the effects of fragmentation of home ranges to support use.
5. Plan components that provide biological legacies to include live tree retention of larger trees, large diameter snags, and down woody debris ensure habitat has the necessary structural features at the stand level to support resting or denning and ensure that even regenerating successional stages provide these structures.

Harlequin Duck

Harlequin ducks are sea ducks that spend most of the year in near-shore sea environments but move inland to fast-moving streams to breed. The breeding season range for the Pacific population of harlequin ducks occurs across most of Alaska and British Columbia, as well as portions of the Yukon, Washington, Oregon, Idaho, Colorado, and Montana. Aquatic ecosystems, including fast-moving streams, provide key breeding habitat for harlequin ducks in Montana (Marks et al. 2016). Montana is at the eastern edge of the range of the Pacific population, which extends south to northwest Wyoming. They form lifelong pair bonds on the coastal wintering grounds and the pairs migrate to the stream where the female was born (Hansen 2014). During the breeding season, harlequin ducks use clear, low-gradient, fast-moving mountain streams with abundant aquatic insects. Females are known to lay eggs in a wide variety of microsites, including cliffs, under downed logs in burned areas, on instream logjams, or on streambanks with thick shrub or tree cover (Cassirer and Groves 1994). Key habitat characteristics include high water quality; a complex stream structure; aquatic prey; deep pools for escape; and rocks or large downed logs for loafing, as well as dense vegetative or log cover on the shoreline to reduce disturbance and protect birds from avian predators during incubation (Wiggins 2005). There appears to be a correlation between harlequin duck presence and mature or old growth stands and stands with unlogged buffers along streams (Cassirer and Groves 1994). Cover also provides stream shading that promotes cool water temperatures and associated higher oxygen levels important to the aquatic invertebrates that harlequins feed upon. On the west side of the Continental Divide, calm backwaters along rivers or beaver ponds may be important for brood rearing (Wiggins 2005, Kuchel 1977). Harlequin broods may move downstream from the fast-moving streams where they are born to larger streams and rivers as the summer season progresses (Cassirer and Groves 1994, Kuchel 1977), and they are often easier to observe at this time.

Like many other sea ducks, male harlequins depart the breeding grounds immediately after females begin incubation, so females do not frequently re-nest in the event of a nest failure. Relative to many other species of ducks, harlequins occur at very low population densities on their breeding grounds and exhibit high breeding site fidelity, low reproductive rates, and delayed reproduction (Wiggins 2005). Thus, they may be susceptible to local extirpations. Bond et al. (2009) estimated survival probability for 144 adult female harlequin ducks at four breeding areas in western North America. They found that survival was lowest during incubation, with the highest number of mortalities attributed to predation. Adult survival likely drives population dynamics. If a nesting pair is lost, the habitat may not be occupied by another pair in that or subsequent seasons. Because harlequins are on their nesting streams early in the season, nesting success may be affected by changes in waterflow. In Glacier National Park, breeding pairs inhabit Upper McDonald Creek from late April through mid-June and females with broods are on the creek during July, August, and early September. Late spring high waterflows in 2014 may have caused reduced detectability or failed reproduction on some streams where breeding had been observed in the past (Wiggins 2005). In Montana, nesting has not been monitored long enough or consistently enough to know whether climatic variation causes harlequins to move or causes nest failure, and, if so, how many years of nest failure they may be able to tolerate before a female will no longer return to a stream reach (Hansen 2014).

There are somewhat conflicting scientific findings regarding the effects of instream recreation and road related disturbance on harlequin ducks. Although harlequins are generally tolerant of people, they may be sensitive to types of disturbance at certain times of year. Hansen's analysis (Hansen 2014) in Glacier National Park indicated that harlequin ducks did not avoid high-quality habitats adjacent to roads and other sites with high recreational use. However, harlequin ducks have been observed avoiding boats, rafts, pack rafts, and kayaks in breeding stream reaches during incubation and the first four weeks after hatching (Kuchel 1977)(Clarkson 1992, Reichel and Genter 1996).

In all monitored watershed subbasins on the Nez Perce-Clearwater that have known harlequin duck nesting, the overall watershed condition is high, indicating that habitat diversity and quality for harlequin ducks on the Nez Perce-Clearwater is high at the watershed scale. According to PACFISH and INFISH Biological Opinion (PIBO) data monitoring, there is an improved trend in aquatic habitat metrics in reference and managed watersheds (U.S. Department of Agriculture 2019d). Habitat conditions, such as large wood, pool fines, percent pools, and residual pool depth have trended upwards since sampling began in 2001. Some stream reaches that appear to provide suitable stream characteristics and water quality are not known to be used by harlequin ducks, but only two breeding streams have been consistently surveyed and harlequin ducks can be very difficult to detect while on the nest.

Important harlequin duck habitat features include clear water and rocky substrates that support the benthic macro-invertebrates upon which the ducks feed. Harlequin duck habitat is particularly susceptible to forest management activities, water development projects, and human recreational use. Other habitats that have been identified as important to harlequin ducks include wide riparian vegetation zones, braided or multichannel streams with islands for nesting, rocky substrate, streams 10 meters or wider, mature or old growth vegetation overhead, and high-water quality (Wiggins 2005). Harlequin ducks are vulnerable to changes in these attributes.

Wiggins (2005) identified strategies that would help conserve harlequin duck habitat. The following is a list of actions proposed by Wiggins (2005):

- Introduce buffer zones along montane riparian habitats
- Avoid activities, such as clear-cut logging, that may alter the natural water flow regimes of montane streams or rivers
- Avoid building new roads near riparian areas and eliminate or stabilize obsolete logging roads
- Prevent livestock grazing along stream and riverbanks
- Manage water development proposals along breeding streams
- Require approved minerals management plans in watersheds that support harlequin ducks
- Discourage or prohibit recreational boating, trail and campground construction, and fishing activities from May to June on harlequin duck breeding streams
- Develop education materials, such as brochures, for the public

The intent of these actions includes protecting water quality, preserving the flow regime, minimizing disturbance, decreasing sedimentation, maintaining riparian vegetation, and reducing disturbance.

Existing Condition

Several river systems in the plan area contain harlequin duck observations. The most prominent is the Lochsa River and its tributaries, which have had multiple observations of breeding pairs over several years. Fish Creek and Colt Killed Creek both have several observations near the Lochsa River. The North Fork Clearwater River and Kelly Creek have also had several observations. The Selway River in the Selway-Bitterroot Wilderness area near the eastern border of the Nez Perce-Clearwater has had several observations, as well. Other observations are more sporadic and include the South Fork of the Clearwater, the Salmon River, Bear Creek, the lower Selway River, Weitas Creek, Orogrande Creek, Crooked River, Red River, Bargamin Creek, Brushy Fork Creek, and Tamarack Creek. Many of these observations were incidental, and these rivers have not been consistently surveyed. There are potentially more rivers within the Idaho Roadless Rule and wilderness areas that might have harlequin duck use but have not been surveyed or visited enough to have incidental observations.

Harlequin ducks are known to breed on the Lochsa River, the Selway River, and the Northfork Clearwater River and its tributaries. The Nez Perce-Clearwater provides habitat for regionally important populations of this species in Idaho. For example, per the Idaho Species Diversity Database in 2019, 38 percent of all harlequin duck observations in Idaho were recorded on the Nez Perce-Clearwater. This is possibly due to the highly accessible Lochsa corridor that may allow increased observations. The Northfork of the Clearwater has not been surveyed as intensively as the Lochsa and is not traveled by as many people.

The population trend on the Nez Perce-Clearwater is thought to be moving downward. Idaho Department of Fish and Game surveys suggest the population on the Lochsa River dropped from about 18 breeding pairs down to two over the past decade. The causes of the decline are not known but are concerning. Other rivers in the plan area have not been surveyed as intensively to determine trends.

Key Threats and Stressors

Threats were identified by Wiggins (2005) and included logging, mining, changes to water quality, sedimentation, hunting, recreational disturbance, livestock grazing, and pollution. They may also be vulnerable to changes in their ocean habitats from events like oil spills. Threats were evaluated in the plan area as described below.

Harlequin ducks are affected by threats that primarily impact their habitat. Thus, aquatic environmental threats are the preponderance of factors that threaten harlequin ducks. Of the threats identified in the Appendix C Wildlife Species and Habitat Summary, none are categorized as higher than “medium.” The threats were assessed for each at-risk species with a rule-based system for recognizing the magnitude of threats on the Nez Perce-Clearwater. The NatureServe methodology was used to evaluate the threats (Master et al. 2012). The administrative boundary of the Nez Perce-Clearwater comprised the scale of the evaluation. The NatureServe method uses a combination of scope and severity to assign a relative magnitude of threats. The scope represents the spatial overlap of the threat with the distribution of the species or its habitat in the plan area. The severity of the threat was determined by expert opinion and was assessed as the degree to which a given threat would either reduce populations or reduce the distribution of the species. Threats identified included permanent roads found on the transportation network; motorized trails; past timber management (pre-1980); fishing and harvesting aquatic resources; river rafting; fire suppression, including historical changes due to long-term suppression; uncharacteristic wildfire; direct and intentional channelization and bank alteration; rip rap and other streambank alteration; non-native invasive animal species; natural rarity; soil movement and deposition; avalanches and landslides; habitat shifting and alteration due to climate change; drought; temperature extremes; and storms and flooding.

Some of these threats have permanently altered harlequin duck habitat. For example, roads along the major rivers used by harlequin ducks have affected and permanently altered riparian habitat next to these rivers. Also rip rap and stream alterations implemented to prevent erosion and damage to roadways represent permanent alterations. While these are permanent alterations, it is not well understood how much these factors affect harlequin ducks. It should be noted that the NatureServe method takes a precautionary approach to unknown information. When the severity of a threat is unknown, the method identifies it as a medium threat if the scope is either pervasive or large. Nearly all of the threats identified using this method were the result of a lack of knowledge about the severity of these threats. Few publications address these factors in the published literature. Table 3 in Appendix C shows the threat category, the scope of the threat in the plan area, and the severity of the threat. Other threats were thought less impactful due to them not having a widespread scope or they are not occurring with enough intensity to cause population effects.

Ecosystem Plan Components

Plan components within the Land Management Plan include measures to enhance or restore stream habitat complexity and water quality. Aquatic desired conditions emphasize sustainable and diverse invertebrate and vertebrate aquatic species that are essential nutrition for harlequin ducks. Recreation desired conditions allow for nesting sites to remain undisturbed. Riparian management zone desired conditions will allow for adequate cover along stream banks and will provide overhead cover and shade to maintain the water temperature needed for invertebrate species, as well as protection from aerial predation. Table 202 identifies the plan components that are designed to provide ecological integrity of the aquatic and riparian zones and maintain or restore the ecological conditions needed to provide for a viable population of harlequin ducks that will persist long-term in the plan area. These plan components will direct management to provide for the harlequin duck through coarse filter habitat requirements.

Plan direction for the harlequin duck includes mostly coarse filter components found within the Aquatic Ecosystem section of the Land Management Plan; these components are strongly protective of aquatic habitats for federally listed fish. These restrictions in the plan on activities within aquatic and riparian habitats would provide well for harlequin ducks because they protect water quality and riparian habitats.

Table 202 provides a summary of plan direction, plan components, and effects to harlequin ducks.

Table 202. Plan direction, plan components, and effects to harlequin ducks

Plan Direction	Plan components	Effects
Desired conditions	FW-DC-WTR-01 FW-DC-WTR-02 FW-DC-WTR-03 FW-DC-WTR-04 FW-DC-WTR-05 FW-DC-WTR-06 FW-DC-WTR-07 FW-DC-WTR-09 FW-DC-WTR-10 FW-DC-WTR-11 FW-DC-RMZ-01 FW-DC-RMZ-02 FW-DC-ARREC-01 FW-DC-RMZ-01 FW-DC-CWN-01 FW-DC-CWN-03 FW-DC-ARINF-01 FW-STD-ARINF-02 FW- STD-ARINF-03 FW-STD-ARINF-05 FW-STD-ARGRZ-01 FW-STD-ARGRZ-02 FW-DC-ARREC-01	These plan components direct management to maintain or restore the integrity of aquatic ecosystems, including the structure, function, composition, and connectivity of the habitats that harlequin ducks use. The desired conditions provide many of the features used by harlequin ducks. The presence of beavers would benefit groundwater and aquatic habitat complexity. The desired conditions would direct management of many activities to reduce the effects.
Guidelines	FW-GDL-WTR-02 FW-GDL-WTR-05 FW-GDL-WTR-06 FW-GDL-WTR-07 FW-GDL-RMZ-09 FW-GDL-RMZ-01 FW-GDL-RMZ-02 FW-GDL-RMZ-03 FW-GDL-RMZ-04 FW-GDL-RMZ-05 FW-GDL-RMZ-06 FW-GDL-RMZ-07 FW-GDL-RMZ-08 FW-GDL-RMZ-09 FW-GDL-ARINF-01 FW-GDL-ARINF-02 FW-GDL-ARINF-03	These plan components reduce sediment and contaminants in aquatic habitats, which would help provide for harlequin duck habitat. Minimizing ground and vegetation disturbance in riparian areas would help conserve these areas, retaining processes for stream and bank complexity. These plan components prevent impacts to water quality and riparian habitats.

Plan Direction	Plan components	Effects
	FW-GDL-ARINF-04 FW-GDL-ARINF-06 FW-GDL-ARINF-07 FW-GDL-ARINF-09 FW-GDL-ARINF-10 FW-GDL-AREM-01 FW-GDL-AREM-02 FW-GDL-AREM-03 FW-GDL-AREM-04 FW-GDL-ARGRZ-01 FW-GDL-ARGRZ-02 FW-GDL-ARREC-01 FW-GDL-ARREC-02 FW-GDL-ARREC-03 FW-GDL-ARREC-04 FW-GDL-ARREC-05 FW-GDL-ARREC-06	
Standards	FW-STD-WTR-02 FW-STD-WTR-03 FW-STD-RMZ-01 FW-STD-RMZ-02 FW-STD-RMZ-04 FW-STD-RMZ-05 FW-STD-RMZ-07 FW-STD-ARGR-01 FW-STD-ARGR-03 FW-STD-CWN-01 FW-STD-CWN-02 FW-STD-CWN-03 FW-STD-AREM-01 FW-STD-AREM-02	Timber harvest standards would increase bank and stream complexity and provide for desired habitat conditions. Aquatic standards would help conserve aquatic habitat and food resources for harlequin ducks. They would prevent sedimentation and pollution from entering waterways.

Effects to Harlequin Duck Habitat from Alternatives

Management Areas

Harlequin duck observations have been made in all management areas and tend to be associated with river characteristics rather than a clear association with land use. The most observations have been along the Lochsa River, probably a result of good habitat and high visibility along this river from the highway. Many of these observations were made within the designated wild and scenic river section but other observations occur upstream in what would be Management Area 3. The North Fork of the Clearwater has observations that fall both within and outside roadless rule areas and in portions of the river in Management Area 3. The Southfork of the Clearwater has fewer observations and most of those were within Management Area 3. A stretch along the Selway River in the Selway-Bitterroot Wilderness area shows several harlequin duck observations, which would be within Management Area 1. Several harlequin duck observations have been made on Crooked Fork, a tributary of the Lochsa River within Management Area 3. Several observations have been made along Kelly Creek that extends up into the Hoodoo Recommended Wilderness areas, which would be Management Area 2. Observations show no clear patterns in relation to management area or land use. Habitat within Management Area 1 is protected as outlined below in designated wild and scenic rivers. Management Area 2 would be relatively well protected. Activities within Management Area 3 may have greater impacts. Activities that cause sedimentation, water quality changes, pollution, alteration of river channels, and alteration of riparian habitats. These activities were identified above and assessed as threats. Essentially, these threats are addressed through plan component protections, but plan direction in these management areas can have a substantial influence on factors that affect aquatic and riparian habitats.

Designated Wilderness

Designated wilderness management would provide protection for harlequin ducks because management direction would prevent activities that alter harlequin duck habitat. The Plan's wilderness areas direction emphasizes natural processes, solitude, and the protection of wilderness character. Suitability within designated wilderness areas only allows grazing and prescribed fire. These activities would have only minor impacts on harlequin duck habitat, if any. Other uses are unsuitable in wilderness areas. Designated wilderness areas would protect rivers, such as the Selway River and Bear Creek that have known harlequin duck observations. There are perhaps other rivers that contribute to harlequin duck habitat within the designated wilderness areas that have not been surveyed. Rivers that might also have harlequin ducks include the Moose Creek and tributaries, Big Sand Creek, Colt Killed Creek, Storm Creek, and Big Flat Creek.

Recommended Wilderness

Recommended wilderness area direction is similar to direction for designated wilderness. Recommended wilderness direction would provide good water quality, clean water, natural flows, and proper functioning waterways because they would be protected from many forest activities that impact aquatic habitats. Recommended wilderness direction includes desired conditions, guidelines, standards, and suitability plan components to maintain wilderness character. Suitability plan components identify which activities are and are not suitable within recommended wilderness areas. Activities that have potential to impact harlequin duck habitat are unsuitable or are only conditionally suitable in recommended wilderness areas. Examples of activities constrained by suitability components include timber production, road construction, some mineral activities, construction of new buildings, and recreational motorized travel. Only a few harlequin duck observations were within recommended wilderness areas and occur in Kelly Creek. The alternatives within proposed areas that have observations of harlequin ducks include the Hoodoo and Meadow Creek-Upper North Fork areas. Other recommended wilderness areas border rivers that have observations of harlequin ducks. These include the North Lochsa slope, Moose Mountain, Bighorn Weitas, Northfork Spruce White Sand, Pot Mountain, and Mallard Larkin.

Management in recommended wilderness areas is similar in effect as in designated wilderness areas, with some exceptions. Timber harvest is permitted to the extent allowed under the Idaho Roadless Rule, and temporary and permanent road construction is suitable, as allowed by the Idaho Roadless Rule. Otherwise, these areas would provide relatively well for harlequin duck habitat. The extent of these activities in recommended wilderness would be relatively limited.

The Land Management Plan has alternatives for recommended wilderness areas that vary from none in Alternative X to many roadless rule areas considered in Alternative Z. Alternative W would add parts of Colt Killed Creek, all of Cayuse Creek, significant portions of the North Fork of the Clearwater including above the confluence with Kelly Creek, Kelly Creek, Bargamin Creek, and Weitas Creek. Of these, there have been observations on Colt Killed Creek, Kelly Creek, the North Fork of the Clearwater, and Weitas Creek. Upper Big Sand Creek and Bargamin Creek have potential habitat for harlequin ducks. Alternative Y would include Kelly Creek which has observations of harlequin duck but would include few other rivers with known harlequin duck observations. It would only include portions of Bargamin Creek as a river that may have potential to have harlequin ducks. In Alternative Z, rivers included in recommended wilderness with harlequin duck observations include the North Fork of the Clearwater above confluence of Kelly Creek, Kelly Creek, and parts of the North Fork Clearwater near Pot Mountain. This alternative also includes parts of Bargamin Creek and upper Meadow Creek which have potential harlequin duck habitat. Under the No Action Alternative, rivers with known observations of harlequin ducks include Kelly Creek and a small portion of Colt Killed Creek. Only Cayuse Creek has potential harlequin duck habitat, but this creek has not had survey efforts nor observations of harlequin ducks. The Preferred

Alternative includes Kelly Creek and portions of the North Fork Clearwater in the Mallard Larkins that have known harlequin duck observations. It also includes Cayuse Creek and parts of Meadow Creek that have potential habitat. The alternatives with more recommended wilderness areas would benefit harlequin duck habitat more than those with less. Still, management for recommended wilderness is only slightly more protective than Idaho Roadless Rule area management, and all alternatives would include some areas with harlequin duck habitat within recommended wilderness.

The plan varies activities allowed within recommended wilderness such as winter motorized, mechanized and motorized use for administrative purposes, aircraft landings, mechanized travel, or motorized tools. These activities would have no effect on harlequin duck habitat.

Designated Wild and Scenic Rivers

About 70 percent of the observations of harlequin ducks have been observed within designated wild and scenic rivers, most of which have been on the Lochsa River. As noted above, this is in part because of the accessibility of this river. The Selway River is likely under surveyed and would potentially have more observations if the river were more accessible. Currently, designated wild and scenic rivers capture a significant portion of habitat for harlequin ducks. Rivers that also have significant amounts of harlequin duck habitat outside of these designated areas include the upper Lochsa River, the North Fork Clearwater River, Kelly Creek, Crooked Fork, and Fish Creek. The primary management direction for designated wild and scenic rivers is to retain their free-flowing condition, water quality, and the outstandingly remarkable values for which the river was designated in compliance with the wild and suitable river plan as in desired condition FW-DC-DWSR-01.

Suitability of uses within designated wild and scenic rivers may influence the conditions for harlequin ducks. The activities for which suitability could influence harlequin duck habitat include timber harvest, permanent road construction within scenic rivers, livestock grazing, mineral activities, and mechanized use, such as mountain biking. Other suitability has little or no effect. Wild and Scenic Rivers are differentiated into classes of rivers which include wild, scenic, and recreational rivers. The plan differentiates suitability within the different classifications with management in the wild classification more restrictive than management in the scenic and recreational classifications. In the wild classification timber production, timber harvest, road construction, saleable, leasable, and locatable minerals, motorized travel, and mechanized travel are unsuitable activities. Construction of new buildings is conditionally suitable only if consistent with the river management plan or Forest Service Manual direction. Thus, harlequin duck habitat within wild rivers would be protected from these activities. Within scenic and recreational rivers, timber production is not suitable, but timber harvest, road construction, mineral activities, construction of new buildings, motorized travel and mechanized travel are conditionally suitable. The conditions under which these activities are suitable are subject to the river management plan, Forest Service Manual direction, enabling legislation, and the General Mining Act of 1872. Grazing and prescribed fire are suitable in all wild and scenic classifications. Suitability plan components only identify whether a use would be suitable within those lands or not but does not authorize such uses. Furthermore, if an activity is unsuitable within a land allocation, that use would not be allowed. Authorization of suitable activities would require a project level environmental analysis before authorization. Any activities authorized would be subject also to MA1-STD-DWSR-01 and MA1-STD-DWSR-02. These plan standards require any authorized activities within the river corridor to comply with their individual comprehensive river management plans and shall protect and enhance their free-flowing character, water quality, and outstandingly remarkable values for which the river was designated. The effect would be that any actions authorized would have to meet those standards which would ensure they are conducted in a manner consistent with the protection of the rivers and their corridors. While some of the suitable activities could influence habitat conditions and disturbance of harlequin ducks, plan components would also add protection to these areas and should support good habitat conditions. The majority of harlequin duck observations are within designated wild and scenic rivers, this type of management will serve to help reduce degradation of harlequin duck habitat. Plan direction within designated wild and scenic rivers would be in effect along the Lochsa River, Selway River, and Salmon River which would provide for harlequin duck habitat. The Selway and Salmon rivers have much of their length also managed as designated wilderness which would afford harlequin duck habitat additional protections.

Wild and scenic river management includes recreational opportunities. Recreation has been thought to be a disturbance factor for harlequin ducks that can affect space use through avoidance behavior and abandonment of nesting areas. Identifying a river as suitable for inclusion into the wild and scenic river system has the potential increase recreation activity to that river.

Eligible and Suitable Wild and Scenic Rivers

Harlequin duck populations were identified as outstandingly remarkable values for the alternatives for wild and scenic river eligibility. Harlequin ducks were identified because the rivers in the plan area contain regionally important populations of this species. Harlequin ducks are river dependent and have been identified as an at-risk species. Rivers that contained observations of harlequin ducks in the Idaho Species Diversity Database were identified as having outstandingly remarkable values because of the presence of this species. These rivers formed the eligible rivers to consider for suitability in the alternatives. The rivers that were identified because of harlequin duck observations, among other outstandingly remarkable values, include the following rivers: Fish Creek, Bear Creek, Crooked River, Weitas Creek, Crooked Fork, the South Fork of the Clearwater, the North Fork of the Clearwater River, Kelly Creek, Red River, Waw’aalamnime Creek, Imnamatnoon Creek, White Sand Creek (formerly Colt Killed Creek), Brushy Fork, segments of the upper Lochsa River, and Bargamin Creek. A variety or combination of different rivers were considered for wild and scenic suitability under the alternatives. The various alternatives are listed in Chapter 2. Table 203 shows the rivers identified as having harlequin ducks and which rivers were identified as suitable as wild and scenic rivers under the alternatives.

Table 203. Rivers with harlequin duck observations considered in the alternatives for wild and scenic river suitability

River Name	No Action-Eligible only	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Upper Lochsa River	No	No	No	No	Yes	No
Crooked Fork	No	No	No	No	Yes	No
Brushy Fork	Yes	No	No	No	Yes	No
Colt Killed Creek	Yes	No	No	No	Yes	Yes
Kelly Creek	Yes	Yes	Yes	Yes	Yes	Yes
N. Fork Clearwater	Yes	No	Yes	Yes	Yes	No
Weitas Creek	No	Yes	Yes	Yes	Yes	Yes
Little North Fork Clearwater River	Yes	Yes	Yes	Yes	Yes	Yes
Fish Creek	No	Yes	No	Yes	Yes	Yes
Waw'aalamnine Creek	No	No	No	No	No	No
South Fork Clearwater River	Yes	No	Yes	Yes	Yes	No

River Name	No Action-Eligible only	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Salmon River	Yes	Yes	No	Yes	Yes	Yes
Bargamin Creek	Yes	No	No	No	Yes	No
Red River	No	No	Yes	No	No	No
Bear Creek	Yes	No	No	No	Yes	No
Crooked River	No	No	Yes	No	No	No

Not all rivers are equal in their importance to harlequin ducks. An examination of the number of observations can provide a hint as to the importance of each river to harlequin ducks. Recall that we identified rivers with observations of harlequin ducks as eligible for inclusion in the wild and scenic river system. Some rivers have more observations than others. Table 204 shows the number of harlequin duck observations along each river. A note of caution is in order for the interpretation of this data. First, survey efforts have not been equal among the rivers. Rivers with good access, good views of the river, and more people have more observations than those that do not. For example, the Lochsa River has had more survey efforts, and more exposure to people being along Highway 12, compared to other rivers like the sections of the Selway River in the Selway Bitterroot Wilderness or Kelly Creek. Given the previous considerations, the more important rivers to harlequin ducks appear to be the Lochsa River within the designated Wild and Scenic River area, the Lochsa River above the designated wild and scenic river area, the Selway, Crooked Fork, the North Fork Clearwater River especially above the confluence with Kelly Creek, Kelly Creek, the Little North Fork Clearwater, and Fish Creek. Rivers that might also be important but that have lower observability include Brushy Fork, Colt Killed Creek, and Bear Creek. Rivers that have good accessibility, but fewer observations include Weitas Creek, South Fork of the Clearwater, Red River, Salmon River, and Crooked River. The South Fork of the Clearwater has a lot of access, good views of the river, and a larger number of people but has comparatively fewer harlequin duck observations and may not be as important to harlequin ducks.

Table 204 The number of harlequin duck observations from the Idaho Species Diversity Database (accessed January 2023) on rivers identified as wild and scenic eligible because of harlequin duck populations

River Name	Number of Observations (Idaho Species Diversity Database)
Lochsa River Within WSR system	277
Upper Lochsa River Outside of designated Wild and Scenic River	23
Selway River Within Wild and Scenic River System	14
Crooked Fork	16
Brushy Fork	3
Colt Killed Creek	3
Kelly Creek	5
North Fork Clearwater Above Confluence with Kelly Creek	10
North Fork Clearwater Below Confluence with Kelly Creek	5
Weitas Creek	1
Little North Fork Clearwater River	9
Fish Creek	26

River Name	Number of Observations (Idaho Species Diversity Database)
Waw'aalamnine Creek	1
South Fork Clearwater River	8
Salmon River	2
Bargamin Creek	1
Red River	3
Bear Creek	2
Crooked River	2

The plan's alternatives considered a number of rivers with harlequin duck observations as suitable for inclusion into the wild and scenic river system. Of those, the best alternative for harlequin ducks is Alternative Z, which is the river systems approach, and it includes the most rivers with harlequin duck observations (see Table 203). The alternative with the least rivers included is Alternative W which includes five rivers with harlequin duck observations. Other alternatives are intermediate to these two and include seven rivers each in Alternative X and Y. Alternative X is slightly better than Alternative Y because it includes Fish Creek that has a higher number of observations. The Preferred Alternatives includes five rivers with harlequin duck observations as suitable for inclusion into the wild and scenic river system which would provide additional management considerations for these rivers. Of these rivers, the Preferred Alternative identified Fish Creek, Weitas Creek, Kelly Creek, and Colt Killed Creek as suitable for wild and scenic river consideration and known for populations of harlequin ducks. Fish Creek, Kelly Creek, and Colt Killed Creek have comparatively more harlequin duck observations. Management of these rivers under the Preferred Alternative would include maintaining their free-flowing characteristics, water quality, and outstandingly remarkable values. This management would serve to preserve and enhance these rivers, which would benefit harlequin ducks. This alternative would provide additional protection for harlequin duck habitat. Other harlequin duck habitats are protected by the designated wild and scenic rivers along the Lochsa River and Selway River and by the Selway-Bitterroot Wilderness. It should be noted that plan components in the Aquatics Ecosystems section of the plan would provide for harlequin duck habitat even if the rivers were not selected as suitable for inclusion in the Wild and Scenic River system.

Idaho Roadless Rule Areas

Idaho Roadless Rule areas provide management that would generally maintain harlequin duck habitat. Rivers that contain harlequin ducks often form, or are near, the boundary of roadless rule areas. Roadless rule areas that border rivers with known harlequin duck use include the Lochsa Face, North Lochsa Slope, Rackliff-Gedney, Bighorn-Weitas, North Fork Spruce-White Sands, Moose Mountain, Mallard Larkin, Hoodoo, and Pot Mountain. Management in these and other Idaho Roadless Rule areas influence conditions of tributaries that may support harlequin duck nesting and the water quality of the larger rivers where they brood their young. Overarching management would vary depending upon roadless rule themes, with wildland recreation and primitive being more protective than backcountry restoration. The primary agent of change would be wildland fire, though timber harvest is also suitable within these areas.

Management emphasizes maintaining roadless character and is primarily accomplished consistent with Idaho Roadless Rule themes. They also provide recreational opportunities, such as motorized and non-motorized recreation, and wildlife habitat. Plan suitability that could affect harlequin duck habitat includes timber harvest; road construction, as allowed by the Idaho Roadless Rule; livestock grazing; mineral activities; motorized travel; and mechanized travel. These activities could contribute to sedimentation and the alteration of harlequin duck habitat. However, the Land Management Plan has plan components that would help protect these activities from impacting river and riparian habitats. All alternatives would provide for harlequin ducks. While these activities are suitable, they are less likely to occur than in Management Area 3.

Recreation Opportunity Spectrum

Summer recreation alternatives vary the amount of area suitable for a variety of recreational uses. The recreation opportunity spectrum (ROS) is the mechanism identifying where motorized uses are suitable or not among the alternatives. While the plan identifies where motorized uses are suitable, it does not authorize motorized uses. Instead, the plan provides the guidance under which new motorized uses would be authorized, after a site-specific environmental analysis and decision authorizing motorized uses. Motorized settings identify where motorized uses could potentially occur, but it would require a site-specific environmental analysis and decision to authorize motorized uses. Motorized uses are authorized through a travel plan decision, timber project or individual project authorizing new motorized roads or trails. While it is reasonable to assume that areas identified as suitable for motorized uses could experience new motorized roads or trails, where, when or the amount of new motorized uses is unknown. Not all areas identified as suitable for motorized uses would experience new motorized roads and trails.

The potential effects of motorized uses on harlequin duck habitat include impacts to aquatic resources from motorized routes, but the effects depend on where routes are located, and how they are constructed. Effects include sedimentation, alteration of waterways, and disturbance. Plan direction in the Aquatic Ecosystem section of the plan includes measures to minimize sediment and alteration of waterways and riparian areas, such that impacts from motorized route development and use would be minimized. Therefore, the impact of motorized suitability is largely neutralized.

The ROS also determines the level of development and expected user experience of recreation areas. Increasing development could draw more people to harlequin duck habitat, which could increase disturbance. Changes in summer motorized travel could increase the probability of sedimentation into waterways. Plan direction in the Aquatic Ecosystems and Fisheries section of the Land Management Plan would help prevent sedimentation to help conserve water quality and clarity for harlequin ducks. The alternatives that have more areas as motorized and that have higher levels of development under the summer ROS settings would have a higher probability of effects to harlequin ducks and their habitat. The effects from the winter ROS were not analyzed because harlequin ducks migrate during the winter so there are no effects to the species from winter motorized suitability. The discussion below includes a description of the changes and the relative consequences from the summer ROS settings across the alternatives. The summer recreation alternatives are defined by percentages of availability.

- No Action Alternative: In the No Action Alternative, the existing Forest Plan would remain as the guiding direction for the Nez Perce-Clearwater. Recreation opportunity spectrum settings were not used to determine motorized suitability. Instead, the 1987 plans had multiple management areas each with specific objectives for maintaining objectives for elk habitat effectiveness, which is influenced by motorized route density. Objectives specified areas maintain a minimum of 25 percent, 50 percent, 75 percent, or 100 percent elk habitat effectiveness. Motorized uses were not allowed within wilderness areas, and road construction was limited within Idaho Roadless Rule Areas. The Clearwater Travel Plan identified the suite of system routes, identified where motorized uses were authorized and changed most areas of the national forest into a closed unless designated open system. Because the Nez Perce National Forest has not undergone travel planning, forest lands are open unless designated closed. There was no mechanism to identify where motorized uses are suitable or not. Motorized routes could be developed so long as the Forest Plan's elk habitat objectives were met.

- Alternative W: The primitive setting will increase by 9 percent, from 21 to 30 percent; semi-primitive non-motorized opportunities will decrease by 10 percent, from 34 to 24 percent; semi-primitive motorized opportunities will increase by 1 percent, from 22 to 23 percent; roaded natural opportunities will decrease 3 percent, from 23 to 20 percent; and rural opportunities will increase 4 percent, from 0 to 4 percent.
- Alternative X: The primitive opportunities will increase by 9 percent, from 21 to 30 percent; semi-primitive non-motorized opportunities will decrease by 21 percent, from 34 to 13 percent; semi-primitive motorized opportunities will increase by 10 percent, from 22 to 32 percent; roaded natural opportunities will decrease 1 percent, from 23 to 22 percent; and rural opportunities will increase 4 percent, from 0 to 4 percent.
- Alternative Y: The primitive opportunities will increase by 9 percent, from 21 to 30 percent; semi-primitive non-motorized opportunities will decrease by 8 percent, from 34 to 26 percent; semi-primitive motorized opportunities will decrease by 3 percent, from 22 to 19 percent; roaded natural opportunities will decrease 2 percent, from 23 to 21 percent; and rural opportunities will increase 4 percent, from 0 to 4 percent.
- Alternative Z: The primitive opportunities will increase by 9 percent, from 21 to 30; semi-primitive non-motorized opportunities will decrease by 7 percent, from 34 to 27; semi-primitive motorized opportunities will decrease by 4 percent, from 22 to 18 percent; roaded natural opportunities will decrease 2 percent, from 23 to 21 percent; and rural opportunities will increase 4 percent, from 0 to 4 percent.

Preferred Alternative: Opportunities for motorized access increase in the Preferred Alternative, particularly in the summer. Area suitable for summer and motorized uses include 55 percent suitable for summer and 60 percent suitable for winter motorized travel. About 45 percent of the national forest would be unsuitable in summer while 40 percent would be unsuitable in winter. The number of rivers with harlequin duck observations that falls within motorized ROS settings is similar among the alternatives, with most rivers falling within a motorized setting. Kelly Creek and the Selway River are the rivers that fall within non-motorized settings in all alternatives. In Alternative W, the North Fork of the Clearwater has some additional rivers with harlequin duck observations that fall within non-motorized settings. In all other alternatives, most rivers with observations are within motorized settings, so there is little difference among the alternatives for motorized suitability.

Alternatives harlequin ducks did not avoid high-quality habitats adjacent to roads and other sites with high recreational use in Glacier National Park (Hansen 2014). However, harlequin ducks have been observed avoiding boats, rafts, pack rafts, and kayaks in breeding stream reaches during incubation and the first four weeks after hatching (Hansen 2014). It is unknown whether these activities have population level effects or reduce distribution. The alternatives that have higher amounts of rural and roaded natural settings would have the potential to increase disturbance because these sites would be more attractive to forest visitors. Disturbance probably does not have population level consequences on harlequin ducks. However, there are standards and guidelines to maintain harlequin duck habitat within the Aquatic Ecosystems section of the Land Management Plan that would mitigate or prevent developments in riparian areas. There are also plan components that prevent the effects of sedimentation into river habitats. The overall consequences of these alternatives would still be relatively low.

Vegetation Restoration, Timber Suitability, and Timber Volume

Vegetation restoration is unlikely to influence riparian habitat directly. Plan direction in the Aquatic Ecosystems and Fisheries section of the Land Management Plan would limit the alteration of riparian areas. The larger effect is the effects of sediment into waterways following vegetation manipulation. Sediment could decrease harlequin duck foraging habitat if it occurs outside of natural levels and periodicity. The watershed condition classes suggest that the most degraded watersheds are within multiple use areas, such as Management Area 3. Watersheds in better condition are those within areas like roadless and wilderness areas. Still, the trend in aquatic conditions is generally upwards, even in multiple use areas, since PACFISH and INFISH protections were instituted. The Land Management Plan provides extensive measures to protect rivers from the effects of sedimentation in the Aquatic Ecosystems section of the plan. While these measures help, they would not prevent all effects, as some increase in sediment could occur from roads and timber production.

The treatment of vegetation includes acres of restoration and acres of timber harvest. Under the No Action Alternative, vegetation treatment includes 40,000 acres annually. All the other alternatives include between 53,000 and 64,500 acres annually. Essentially, these would be composed of a combination of treatment types, which include prescribed fire, mechanical treatments, timber harvest using a variety of methods, and timber production. The purpose of these treatments could be restoration of dominance types, changes to forest size classes, improved forest density, white pine restoration, wildlife habitat treatments, hazardous fuels reduction treatments, wildland fire to achieve land management plan objectives, or timber production.

The timber outputs are expected to be in part a product of these treatments. Under the No Action Alternative, timber production would occur on 4,300 acres annually. Alternative W would include timber production on 12,600 acres annually; Alternative X would include timber production on 14,000 acres; Alternative Y would include timber production on 7,500 acres annually; Alternative Z would include timber production on 3,700 acres; and the Preferred Alternative would include timber production on 8,825 to 10,000 acres.

Timber suitability varies by alternative but the difference between all alternatives is less than 1.5 percent of the Nez Perce-Clearwater. Timber suitability includes lands that are suitable for timber production, suitable for timber harvest to meet other resource objectives, and lands that are unsuitable for timber harvest. Treatments for timber production would occur in areas suitable for timber harvest, which includes most of Management Area 3. There are few rivers with harlequin duck observations in management areas suitable for timber production. Rivers with harlequins in areas suitable for timber production include Red River, Crooked River, South Fork Clearwater River, and North Fork Clearwater, mostly above the confluence with Kelly Creek. However, riparian areas themselves forestwide are not suitable for timber production and receive protection and guidance by plan components found within the riparian management zone (RMZ) section of the plan. They do so because they constrain a number of activities with the potential to impact aquatic and riparian habitats. For example, FW-STD-RMZ-01 limits vegetation management to a specific distance from the edges (either 100 or 150 ft depending on stream category) and only to restore or enhance aquatic and riparian-associated resources. Furthermore FW-STD-RMZ-01, specifies vegetation management may occur in the outer RMZs to meet desired conditions for fuel loading and silvicultural desired conditions, so long as project activities retain functions of the outer RMZ, including sediment filtering, large wood recruitment to streams, and protection of the inner RMZ from windthrow. Guidelines like FW-GDL-RMZ-01, FW-GDL-RMZ-02, FW-GDL-RMZ-03, FW-GDL-RMZ-05, FW-GDL-RMZ-06, FW-GDL-RMZ-09 constrain a number of activities within riparian areas. These plan components protect river habitat and the vegetation surrounding them.

Timber harvest for resource benefits is limited in distribution, mostly occurring within the one-quarter mile designated wild and scenic river corridors. These areas would experience timber harvest mostly from existing roads but would not be conducted for purposes of producing timber. However, the area could be harvested for timber if the project required for another purpose such as to meet vegetation desired conditions or restore or improve wildlife habitat. Many observations of harlequin ducks fall within areas that are suitable for timber harvest but not production. These include the Lochsa River corridor, most of the North Fork Clearwater below the confluence with Kelly Creek, Kelly Creek, and the Selway River outside of the wilderness boundaries. Timber harvest in these areas would require following plan desired conditions, standards, and guidelines found in the aquatic ecosystem section of the plan and would be conducted for purposes other than for timber production. In many cases, these areas would be treated with prescribed fire rather than harvest.

Wilderness areas are not suitable for harvest nor production, and many Idaho Roadless Rule Areas are also not suitable. The Selway River in the Selway Bitterroot Wilderness area and Bear Creek would not be suitable for timber harvest. There would be no effects to harlequin duck habitats from timber harvest in these areas. Instead, vegetation change would mostly occur through wildfire.

Wildfire is a less precise tool and may burn some riparian areas near or on harlequin duck habitat. Prescribed fire, in comparison, is a more controlled but still variable tool. Timber harvest has much more control of where treatments occur and the extent at which these are conducted. The primary factor of these effects is whether riparian areas are treated. The sediment conditions after treatments result in consequences for harlequin ducks. It is unlikely many mechanical vegetation treatments would occur within riparian areas, but fire has the potential to impact some riparian habitats. The results differ as well. Wildfire tends to produce an increased pulse of sediment that then declines as vegetation regrows, whereas sediment load from timber harvest can be a pulse but also a longer-term source of sediments due to associated roads. It is assumed that harlequin ducks and riparian habitats have evolved with fire in these systems. Vegetative restoration under all the alternatives will be unlikely to impact harlequin duck populations due to their dependence on riparian areas and the protections afforded through plan components. In some cases, sediment delivery from these activities may impact water quality for harlequin ducks.

Geographic Areas

Lower Salmon River Geographic Area has limited harlequin duck habitat. Observations have been made only on the Salmon River just outside of the Lower Salmon River Geographic Area. There are currently no documented sightings of harlequin ducks in this geographic area. Desired conditions within this geographic area are not specific to aquatic ecosystems. Instead, the focus of this geographic area is to manage warm dry potential vegetation types, especially Ponderosa pine habitats. Forestwide aquatic guidelines and standards should conserve harlequin duck habitat in this geographic area.

Gospel-Hump Geographic Area contains suitable habitat for harlequin duck, and there have been observations in the vicinity of the South Fork of the Clearwater River. Timber harvest is suitable in the Sourdough, Big Meadows, and Indian Creek areas. Harvest in the Sourdough and Big Meadows areas has guidelines to trend towards achievement of aquatic desired conditions at the HUC12 scale, which should be adequate for harlequin duck conservation. Roadside hazard tree mitigation in the Indian Creek area has the potential to impact harlequin duck habitat if it occurs on roadsides in direct vicinity of Indian Creek.

Pilot Knob Geographic Area is in the vicinity of Leggett Creek on the South Fork of the Clearwater River. There are no recorded sightings of harlequin ducks in the area. Plan components describe conditions that concern cultural resources. Forestwide aquatic guidelines and standards should conserve harlequin duck habitat in this geographic area.

The Lolo Trail National Historic Landmark Geographic Area does not contain observations of harlequin ducks and would have no effects on the species.

Effects of Plan Direction

A summary of environmental consequences to substrate habitats from other resources due to plan direction is included in Table 205.

Table 205. Environmental consequences to harlequin duck substrate habitats from other resources due to plan direction

Resource Area	Environmental Consequences	Explanation
Across the Landscape	Yes	This section also contains a desired condition for riparian vegetation to include native assemblages of hardwood trees, deciduous shrubs, conifers, and, where appropriate, unique coastal disjunct species. It includes an objective to restore riparian areas. These should be beneficial over the long-term for harlequin duck habitat because they reflect the natural range of variation for these habitats. Achievement of this desired condition might require short-term disturbance to some riparian areas to restore or maintain these conditions.
Cave and Karst Features	No	No consequences
Forestlands	Yes	Forestlands plan components were designed to restore the natural range of variation and provide ecosystem integrity for forests, which should provide for the diversity and abundance of wildlife. It sets desired conditions, goals, and objectives to establish size class, density, landscape pattern and composition informed by the natural range of variability. Achieving forestland desired condition would require a number of actions that result in disturbance and forest regeneration. Desired conditions are differentiated by management areas and the actions to achieve desired conditions would also differ. In Management Area 1, disturbance is via natural processes. In Management Area 2 disturbance would be through a combination of natural disturbance, prescribed burning, and limited timber harvest. While in Management Area 3, desired conditions would be accomplished largely through timber harvest. Meeting desired conditions would require increased vegetation manipulation via multiple methods including timber harvest, mechanical treatments, and wildland fire. These treatments would potentially increase sediment within harlequin duck habitat over the short-term. Timber production is often accompanied by road construction which could increase sediment input. However, the aquatic ecosystem plan components reduce, minimize or eliminate these consequences.
Carbon Storage and Sequestration	No	No consequences
Meadow, Grassland, and Shrubland	No	No consequences
Fire Management	Yes	Changes to fire management direction would be positive for harlequin ducks. Historic fire suppression was identified as a threat to this species, and plan direction seeks to allow more flexibility to restore ecosystems with wildland fire. Plan direction encourages more fire. While some harlequin duck habitat may be changed by fire, it is assumed that harlequin ducks evolved with fire as a disturbance.
Invasive Species	Yes	Aquatic and riparian invasive species can affect aquatic and riparian habitats. Plan direction should help address this threat.
Soil Resources	No	No consequences
Aquatic Ecosystems	Yes	Aquatics plan components should conserve harlequin duck habitat. This overarching section contains several subsections that pertain to the protection of aquatic resources.

Resource Area	Environmental Consequences	Explanation
Water and Aquatic Resources	Yes	Aquatics plan components should conserve harlequin duck habitat. Plan components in Water and Aquatic Resource section are designed to provide healthy watershed and aquatic resources, connectivity, and good instream conditions. These plan components should have beneficial consequences for harlequin ducks.
Riparian Management Zone	Yes	Aquatics plan components should conserve harlequin duck habitat. These plan components constrain a number of activities within riparian areas designed to protect riparian areas and aquatic habitats. These plan components prevent or minimize impacts to riparian habitats as well as protect aquatic habitats from sedimentation and contaminants.
Conservation Watershed Network	Yes	Aquatics plan components should conserve harlequin duck habitat.
Infrastructure (Aquatic and Riparian)	Yes	Aquatics plan components should conserve harlequin duck habitat.
Energy and Minerals (Aquatic and Riparian)	Yes	Aquatics plan components should conserve harlequin duck habitat.
Livestock Grazing (Aquatic and Riparian)	Yes	Aquatic plan components should conserve harlequin duck habitat.
Lands and Special Uses (Aquatic and Riparian)	Yes	Aquatics plan components should conserve harlequin duck habitat.
Recreation (Aquatic and Riparian)	Yes	Aquatics plan components should conserve harlequin duck habitat.
Wildlife	No	No consequences
Multiple Use Wildlife	yes	Would encourage management of uplands for big game, which could have downstream effects from sedimentation. These should be short-term. Aquatic ecosystem plan components would prevent or minimize consequences from these activities.
Air Quality	No	No consequences
Tribal Trust	No	No consequences
Cultural Resources	No	No consequences
Municipal Watersheds	No	No consequences
Sustainable Recreation	Yes	These plan components encourage recreational use and development of the Nez Perce-Clearwater. The recreation activities that could arise from these plan components could disturb harlequin ducks and their habitat. However, the combination of aquatic ecosystem plan components, and those from sustainable recreation, should help prevent recreation facilities from altering harlequin duck habitat.
Scenery	No	No consequences
Public Information, Interpretation, and Education	No	No consequences
Infrastructure	No	No consequences
Land Ownership and Land Uses	No	No consequences

Resource Area	Environmental Consequences	Explanation
Ecosystem Services	No	No consequences
Timber	Yes	Timber harvest in the uplands has the probability to contribute sediment in harlequin duck habitat. Riparian Management Zone plan components should help conserve or enhance harlequin duck habitat when these activities occur. The 207-acre maximum patch size limit would increase the size of some openings compared to the 40-acre limit. Larger opening sizes in most cases would generally require less roads for access for harvest. This would result in lower long term sediment contributions. In the short term there would be a temporary increase in water yield which should have negligible or beneficial effects. Openings temporarily increase sediments which could affect foraging habitats until vegetation recovers. With larger opening size the amount of sediment would naturally be larger as well. However, natural disturbances are often much larger than 207 acres and the increase is temporary. However, aquatic plan components were designed to reduce or prevent sediment.
Energy and Minerals	Yes	Mineral activities may impact harlequin duck habitat and disturb them. Mineral activities have the potential to pollute and alter harlequin duck habitat. Mining activities were cited as the cause of extirpation of harlequin ducks in Colorado. The plan's energy and mineral plan components basically follow mining and mineral laws.
Livestock Grazing	Yes	Livestock grazing could impact riparian habitats. However, plan components that direct the intensity or utilization of these habitats would mitigate or prevent consequences of this activity in harlequin duck habitat. Aquatics plan components should conserve harlequin habitat. Livestock grazing components specify that utilization rates are restricted to conserve rangelands, which would help prevent effects to harlequin ducks. Furthermore, aquatic ecosystem (livestock grazing) additionally address impacts from livestock grazing to riparian habitats. In general, livestock grazing is not thought to be a significant threat to harlequin ducks because other than nest sites, ducks are more dependent upon in stream conditions than they are to riparian habitats.
Special Forest and Botanical Products	No	No consequences
Designated Wilderness	Yes	Provides for protection of some harlequin duck habitat. Management emphasizes natural disturbances and preserves wilderness character. Suitability plan components find timber harvest, timber production, road construction, mineral activities (except those existing at the time of designation), construction of new buildings, motorized travel, and mechanized travel unsuitable and restricted in designated wilderness lands. Livestock grazing is suitable so long as it was ongoing when designation happened, which is limited. Prescribed fire is suitable as well. This management direction would prevent many activities that could affect harlequin ducks or their habitat. Therefore, the plan direction has beneficial consequences.
Designated Wild and Scenic Rivers	Yes	Harlequin duck habitat occurs within wild and scenic rivers. Designated Wild and Scenic lands emphasize retain their free-flowing condition, water quality, and the outstandingly remarkable values for which the river was designated, emphasize compliance with their comprehensive management plans, shall protect and enhance their free-flowing character, water quality and outstandingly remarkable values for which the river was designated. Suitability plan components identify timber production unsuitable. Timber harvest, mineral activities, motorized travel, road building, and mechanized travel are conditionally suitable. and would have beneficial effects on harlequin ducks and their habitat.

Resource Area	Environmental Consequences	Explanation
Recommended Wilderness	Yes	Beneficial consequences
Eligible and Suitable Wild and Scenic Rivers	Yes	Beneficial Consequences. Some rivers have harlequin ducks as an outstandingly remarkable value. Eligible and suitable wild and scenic river management would provide protection and management would be added onto protections already afforded through the aquatic ecosystem plan components.
Idaho Roadless Rule Areas	Yes	No consequences or beneficial consequences. Management in Idaho Roadless Rule is focused on maintaining roadless character, emphasizing vegetation conditions within the natural range of variation and promoting wildlife habitat. Suitability plan components address activities like road building, energy and minerals, timber harvest in a manner that would be beneficial or no consequence for harlequin duck habitat. Suitability plan components tier to what is allowed or disallowed in the Idaho Roadless Rule.
Research Natural Areas	No	No consequences
Special Areas	No	No consequences
Lower Salmon	No	No consequences
Gospel-Hump	No	No consequences
Pilot Knob	No	No consequences
Lolo Trail National Historic Landmark	No	No consequences

Cumulative Effects

Cumulative effects are impact on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. For programmatic actions like forest plans, cumulative effects consider the effects of the plan in context with the effects of other programs, plans, initiatives, and actions whose effects overlap in time and space with the proposal. The area for cumulative effects analysis is the Nez Perce-Clearwater's administrative boundary. Other plans that overlap the planning area in space and time include the various state plans, county plans, other federal plans, and other broad scale planning efforts. Plans that pertain to habitats used by the harlequin duck in include Idaho's Water Plan, Idaho's Statewide Wildlife Action Plan, Bull Trout Recovery Plan, and Endangered Species Act Recovery Plan for Snake River Idaho Spring/Summer Chinook and Steelhead Populations. Idaho's Water Plan addresses how the State's water is to be used. This plan is consistent with the Forest Plan for the management of the Nez Perce-Clearwater's water resources. Idaho's Statewide Wildlife Action plan identifies the harlequin duck as a species of greatest conservation need and includes goals and objectives to increase information about harlequin duck populations and seeks to address threats to harlequin duck habitat. The recovery plans for bull trout, steelhead, and Chinook seek to protect and conserve habitat for these species. These plans have beneficial consequences to harlequin ducks and their habitats. Therefore, there are beneficial cumulative effects from these plans and the Forest Plan should complement the goals and objectives of these plans.

Conclusion

The plan's aquatic ecosystem plan components provide a robust framework for protection of aquatic habitats that harlequin ducks use, which should ensure the ecological conditions to provide for harlequin ducks long-term. In addition, the plan's direction for designated wild and scenic rivers currently protects the Lochsa and Selway rivers which combine for the majority of known harlequin duck observations in the plan area (see Table 204). This management includes a combination of plan desired conditions, standards, and suitability of uses that restrict activities that would alter the river's free flowing characteristics, water quality, and protect outstandingly remarkable values. Similarly, plan direction for designated wilderness area provides additional protections for the Selway River. Not all rivers considered are equal in terms of their importance to harlequin ducks. The Preferred Alternative includes rivers like Kelly Creek, Colt Killed Creek, and Fish Creek as suitable for inclusion in the wild and scenic river system, which would provide additional protection for those rivers. Because harlequin ducks are identified as outstandingly remarkable values for these rivers, the plan direction would require projects to protect and enhance harlequin ducks as a standard. The plan's coarse filter plan components, especially for aquatic ecosystem plan components, provides ecological conditions to ensure the long-term persistence of harlequin ducks. For additional analysis related to harlequin duck habitat, see the analysis for Aquatic, Wetland, Water and Riparian habitats section of the Final Environmental Impact Statement above.

Mountain Quail

Mountain quail is a secretive species that lives in dense shrub and forest habitats. They are distributed along the mountains of the Pacific Coast and western Great Basin of North America, with Idaho populations representing the northern and eastern extremes of their range. While populations are secure across much of their range, major declines have occurred in populations in Idaho in the last several decades (U.S. Department of the Interior n.d.). Mountain quail occur in Idaho, centered in the lower Salmon River Canyon and Hells Canyon along the Snake River. Small, isolated populations likely occur in the Boise Mountains and Bennett Hills in southwest Idaho and near Dworshak Reservoir in northern Idaho (U.S. Department of the Interior n.d.). In the plan area, mountain quail observations have been recorded along the Salmon River, in the Lower Slate Creek drainage, in the Allison Creek drainage, near Rapid River, and northward in the area known as the island area of the Nez Perce-Clearwater, which is on the west side of the Salmon River Ranger District. The "island area" refers to Nez Perce-Clearwater lands between the west side of the Salmon River and Snake River that border the Wallowa Whitman National Forest. These areas make up the core of mountain quail habitat in the plan area. Sporadic and older observations have been recorded in the South Fork of the Clearwater drainage, near the Clearwater River on the west side of the plan area, and the lower North Fork Clearwater drainage.

The Idaho Statewide Wildlife Action Plan (Idaho Department of Fish and Game 2017b) estimates that the mountain quail population occupancy in Idaho has declined by 95 percent since 1938. Population declines are often attributed to deterioration and loss of habitat due to intensive agriculture, improper grazing, and fire suppression. However, there is no direct research or evidence linking declines to specific causes. It is also suspected but not confirmed that there may be competition for resources with other game birds introduced to Idaho, particularly California quail and chukar (*Alectoris chukar*). Small, isolated mountain quail populations are potentially at risk due to extreme environmental events, habitat changes, and genetic isolation. Mountain quail were petitioned for listing under the Endangered Species Act in 2000, but the U.S. Fish and Wildlife Service concluded listing was not warranted. Although still classified as a game bird, the hunting season for mountain quail was closed in Idaho in 1984 (Idaho Department of Fish and Game 2017b).

In 2016, the Intermountain Bird Observatory (Miller et al. 2016) conducted targeted surveys for mountain quail on the Nez Perce-Clearwater. Surveys for mountain quail were conducted across a wide stratum of presumed suitable habitat in hopes of discovering mountain quail in previously unknown areas; all habitat types where historical observations have occurred were quantified across the Nez Perce-Clearwater. Out of 54 survey grids, mountain quail were only detected on two survey routes located in the Rapid River area and one survey route in the Slate Creek area. The probability of detecting a mountain quail using call broadcast was calculated to be 0.54, given that one was present. Overall, transect scale occupancy was low at 0.07. The probability of encountering a mountain quail at any given point within the stratum was estimated to be 0.01 (Miller et al. 2016). While the probability of detection was relatively high, mountain quail detections and the probability of occupancy were low. The surveys failed to detect the species within areas where the species had previously been observed in the plan area. These survey results follow statewide trends in mountain quail declines. Given the limited distribution in the plan area and the steep decline in populations in both Idaho and the plan area, mountain quail were identified as a species of conservation concern for the Nez Perce-Clearwater. All the known populations and most observations of mountain quail fall within the Land Management Plan's proposed Salmon River Geographic Area.

The state of knowledge of mountain quail ecology is incomplete. The mountain quail is probably the least-studied upland game bird in the United States because of its secretive habits, low population levels, and use of dense vegetation and rugged terrain (Vogel and Reese 1995c, a, b) Rocklage and Edelmann 2003). Mountain quail inhabit brushy, early successional habitats, often within coniferous forests and on steep slopes. However, in Idaho, they typically occur in dense shrubs in steep riparian draws (Idaho Department of Fish and Game 2017b). In all habitats, mountain quail use areas of dense, tall shrubs within close proximity to water. Mountain quail breed and winter in shrub-dominated communities, often within coniferous forests and on steep slopes (Vogel and Reese 1995c, a, b) Rocklage and Edelmann 2003). The composition of these communities consists of hawthorn, willow, and chokecherry in riparian areas of the intermountain west (Vogel and Reese 1995c, a, b). The species is a year-round resident, but many mountain quail may migrate altitudinally, moving between lower wintering areas and higher forested habitats during the summer Wisdom et al. (2000c, a, 2000d). Diet is dominated by plant material, though invertebrates are very important in the diet of chicks early in life. Perennial forbs and mast-producing shrubs are important food sources (Vogel and Reese 1995c, a, b, Wisdom et al. 2000c, a, b, Rocklage and Edelmann 2003).

Based on these needs, the species requires suitable dense shrub habitats either in non-forested or forested areas as their primary key ecological requirement. In many parts of its range, mountain quail occur in uplands as well as within riparian areas but in Idaho, the shrub habitats the species prefers are often within riparian areas more than in other parts of its range. Therefore, the key common features are shrub habitats in forested, non-forested, and riparian vegetation. For coarse filter analysis, mountain quail were grouped into the non-forested vegetation habitat group and the shrublands subgrouping. The species may also have logically been assigned to the riparian habitat grouping but because of its close association with shrub habitats. The effects of the plan to these habitat groups were analyzed above in the Terrestrial Habitats section of the Final Environmental Impact Statement above.

An interagency team of wildlife biologists from the Idaho Department of Fish and Game, the Nez Perce Tribe, and the Forest Service used the NatureServe methodology to identify threats to mountain quail in the plan area. Threats identified included livestock grazing, fire suppression, invasive animals (potentially California quail or chukar), invasive plant species, natural rarity, climate change resulting in shifting habitats, and drought or temperature extremes. Threats outside the plan area could also impact mountain quail and impact the plan area's ability to support a population of mountain quail. For example, mountain quail often winter at lower elevations off National Forest System lands and impacts to winter habitat could affect the persistence of mountain quail that summer in the plan area. It should be noted that the NatureServe method takes a precautionary approach to unknown information, and several aspects of how mountain quail respond to these threats are unknown. When the severity of a threat is unknown, the method identifies it as a medium threat if the scope is either pervasive or large. Scientific literature suggests that declines in other areas have been associated with degradation of riparian and brush habitat due to livestock grazing, fire exclusion, and water development. The full threats' assessment for mountain quail can be viewed in Appendix C.

The species could be vulnerable to habitat loss and degradation from forest succession, fire exclusion, weed invasion, and natural rarity. The impact of livestock grazing, invasive animals, invasive plant species, introduced genetics, and climate change are unknown, but the scope of these impacts are pervasive, meaning they occur between 71 to 100 percent of the occupied habitat of mountain quail in the plan area. In most cases, the scope is 100 percent for these threats. Livestock grazing can degrade riparian and shrubland habitat depending upon the intensity. The degradation or loss of riparian and shrub habitats could be impactful to the species in the plan area because of the strong affiliation mountain quail have to these habitats. Long-term fire suppression can cause a loss of habitat through forest succession. Interspecific competition from California quail or chukar may also be a factor (Wisdom et al. 2000c, a, b). Of these two species, California quail are the most likely to overlap in habitat use and diet. However, mountain quail and California quail co-occur in other parts of the species' range. Invasive plant species are prevalent among the areas occupied by mountain quail in the plan area, but the effects are unknown. Invasive plant species can dominate areas to the exclusion of native plants and may reduce the plant species mountain quail depend for foraging, nesting, or hiding. Invasive plants like cheat grass can also change fire frequency. Perhaps the largest threat to their continued persistence in the plan area is their limited distribution and natural rarity. The impact of climate change is largely unknown and outside Forest Service control. Because of their migratory habit, factors that cause habitat loss of forestlands could affect the continued persistence of mountain quail in the plan area.

Course filter plan components for mountain quail habitats include those in the Aquatic Ecosystems section for riparian areas, warm dry broad potential vegetation type forests in the Forestlands section, and those in the Meadow, Shrubland, and Grassland section. The threats of invasive plant species are addressed in the Invasive Species section. The conclusions in the analysis of these habitats above in the Final Environmental Impact Statement were that the plan would provide for ecosystem integrity in these habitats. The Land Management Plan includes species-specific plan components for mountain quail in the Salmon River Geographic Area. GA-DC-SR-02 is a desired condition that seeks to specifically address mountain quail habitat. GA-DC-SR-03, as well as FW-DC-FOR-02, and all the plan components under the warm dry potential vegetation type sections specifically address restoration of Ponderosa pine habitats where mountain quail often summer. GA-OBJ-SR-01 is an objective designed to restore mountain quail habitat.

Evidence suggests that mountain quail respond positively to fires. Brunk et al. (2023) studied mountain quail response to fire in California and found that occupancy was positively correlated with high-severity as a function of shrub regeneration, while low-moderate-severity fire had a neutral correlation with occupancy presumably because these fires reduce the understory while retaining canopy.

Ecosystem Plan Components

Plan direction, components and effects to mountain quail are summarized in Table 206.

Table 206. Plan components that provide habitat conditions for mountain quail or address threats

Plan Direction	Plan components	Effects
Desired conditions	FW-DC-TE-01 FW-DC-TE-05 FW-DC-TE-06 FW-DC-FOR-03 MA1-DC-FOR-01 FW-DC-INV-01 Riparian Management Zones desired conditions GA-DC-SR-02 GA-DC-SR-03 FW-DC-FOR-02	Plan components address the warm dry potential vegetation type, which will generally benefit mountain quail, as well as plan components that specifically address mountain quail habitat. Desired conditions direct management to conserve riparian habitats important to mountain quail and address the spread and establishment of noxious plant species that may alter mountain quail habitats.

Plan Direction	Plan components	Effects
Objectives	FW-OBJ-INV-01 GA-OBJ-SR-01	Plan components are specifically designed to restore mountain quail habitat.
Guidelines	FW-GDL-INV-01 FW-GDL-INV-02 Riparian Management Zone guidelines	Protects riparian areas, including those important to mountain quail.
Standards	Riparian Management Zone standards	Protects riparian areas important to mountain quail.

Alternatives that could affect mountain quail habitats include recommended wilderness allocations, eligible and suitable wild and scenic rivers, objectives of acres of treatment or disturbance, timber harvest output, and timber suitability. Alternatives for activities allowed within recommended wilderness would have no effect on mountain quail habitat. The plan components that do not affect mountain quail habitats will not be analyzed in detail.

Modeling

Modeling in SIMPPLLE was improved between the Draft and Final Environmental Impact Statements. Several aspects of mountain quail habitat were modeled. Queries that inform mountain quail habitat include the dry forest-associated species query presented in the analysis for open mature forest above. Second a riparian query habitat query was conducted in SIMPPLLE. The query was revised between draft and final and included a more accurate delineation of riparian areas to better replicate riparian response to disturbance and management zone buffers. The model was calibrated to show the trend in riparian vegetation from natural and man-made disturbances. Disturbance patterns in riparian areas are like adjacent uplands, as found from on-the-ground data. The model was adjusted to reflect this pattern. While the riparian query includes more riparian areas than those occupied by mountain quail, that query also contributes to information related to mountain quail habitat and is analyzed above in the Riparian Habitats section above.

A mountain quail specific habitat query was also conducted in SIMPPLLE, and results are presented here. We assume that nesting habitat, defined as dry forest cover types, within 500 feet of water, in a shrub (that is, 0-4.9-inch DBH) successional stage, is most limiting.

- The query design for mountain quail includes the following layers:
- The spatial footprint from the riparian habitat conservation area (national wetlands inventory and national hydrography dataset) query above will be used for mountain quail, but further limited as follows:
- Habitat type group/cover type: Warm dry forest including the following habitat groups: Include vegetation stage along with habitat type group
    - ♦ NF1B, NF1C, NF2, NF2A, NF2B, NF2D
    - ♦ A2
    - ♦ B1
    - ♦ B2
    - ♦ C1A
    - ♦ C1B

- Tree size class: 0- to 4.9-inch DBH
- Canopy cover less than 40 percent
- Geographical feature: containing perennial water
- This query was limited to the South Fork landscape only

SIMPPLLE modeling conducted by the Ecosystem Research Group suggests that mountain quail habitat would remain static over the next 50 years under all alternatives with little difference between alternatives. The results are reflective of the limited distribution of mountain quail habitat and the narrow geographic distribution of the query which was limited to habitat within a short distance to water.

Recommended Wilderness Alternatives and Consequences

The only recommended wilderness section that contains mountain quail populations is the Rapid River recommended wilderness area. Alternatives W, Y, and Z includes the Rapid River area as recommended wilderness. This area contains populations of mountain quail. While Alternatives W, Y, and Z all contain populations of mountain quail, Alternative Y and W contain an additional area that has multiple observations of mountain quail. Alternative W excludes this portion. Mountain quail appear to respond positively to fire, and mountain quail habitat may need restoration or active management to maintain the populations. If the Rapid River area were selected as recommended wilderness, it would be managed so that natural disturbance would prevail over-active management. Generally speaking, this type of management increases the amount of area that is in an early seral condition because of an increase in fire because of a lack of suppression activities, which would be beneficial to mountain quail. However, management via natural disturbance would be challenging because of the nearby communities and residences in the Riggins Area. Natural disturbances like wildfire might require suppression to prevent threats to life and property in this area even if the Rapid River area were included in recommended wilderness. Additionally, recommended wilderness management might constrain treatment of invasive weeds, therefore, it is unclear if recommended wilderness would be better for mountain quail. The only threat to mountain quail addressed by recommended wilderness management is fire suppression. All other threats are not addressed by recommended wilderness management. However, many active management activities that could restore mountain quail habitat would not be allowed under recommended wilderness management.

Recommended wilderness management would be identified as recreation opportunity spectrum non-motorized setting and would be unsuitable for motorized uses except those explicitly allowed in the Idaho Roadless Rule. Roads have not been discussed in scientific literature as a threat to mountain quail. However, motorized uses may result in loss of habitat from the motorized route footprint, and some individuals might be struck by vehicles. Overall motorized uses are not identified as a threat to mountain quail within published literature, though this might require more study. Therefore, we assume motorized uses have negligible consequences for mountain quail.

Recommended wilderness management would limit timber production and timber harvest. These activities would be beneficial for mountain quail because they would increase the amount of early seral habitat producing the dense shrub conditions that mountain quail favor. Recommended wilderness management would not affect livestock management nor prescribed fire as those would both be suitable within recommended wilderness. Recommended wilderness management under the Preferred Alternative would constrain some mineral activities, construction of new buildings, road construction, recreational vehicle travel, mechanized travel, commercial use of structures, recreational aircraft landings, and over-snow vehicle use. If these activities were found unsuitable in the wreck Rapid River recommended wilderness area they would have slight positive beneficial consequences. However, since these are not considered threats to the mountain quail, these protections would be only slightly beneficial. While pesticide and bio control use would be suitable in recommended wilderness areas, the lack of access would complicate pesticide application to address the threats to mountain quail from invasive plant species.

Overall, if Rapid River were included in recommended wilderness, it would have some slight beneficial consequences but also complicate active management of vegetation through mechanical means and control of noxious weeds. Mountain quail conservation may require the full range of management activities that would be possible if the area were not identified as recommended wilderness. The Preferred Alternative would not include Rapid River as recommended wilderness. The consequences of this for mountain quail are that it would allow the full range of management options to improve and maintain mountain quail habitat.

Eligible and Suitable Wild and Scenic River Alternatives and Management

The plan contains alternatives for eligible and suitable wild and scenic rivers that includes mountain quail habitat. Rivers that are considered eligible or suitable wild and scenic river alternatives that also contain mountain quail habitat include the Salmon River, Slate Creek, and Whitebird Creek. All three of these rivers are eligible under the No Action Alternative. The Salmon River is a Wild and Scenic suitable river in Alternatives W, Y, Z, and the Preferred Alternative, but is not suitable in Alternative X. Neither Slate Creek nor White Bird Creek are identified as suitable in any alternative. No other rivers considered in the alternatives would have consequences for mountain quail because they do not contain mountain quail populations.

Suitable Wild and Scenic River management emphasizes managing for free-flowing characteristics and protecting or enhancing outstandingly remarkable values. This type of management prioritizes the protection and enhancement of these values and disincentivizes activities that do not. Mountain quail were not identified as outstandingly remarkable values because they were not river dependent. However, suitable wild and scenic river management would conserve riparian areas and the river itself as well as the river corridor which would also help conserve quail habitat. Projects to enhance mountain quail habitat would need to be consistent with the direction in the plan for suitable wild and scenic rivers and protect and enhance outstandingly remarkable values to proceed. While projects to improve mountain quail habitat would be possible, it would add additional considerations that might encumber such projects. This would apply to the Salmon River and the one-quarter mile around the river under the Preferred Alternative. Overall, the consequences are positive for mountain quail to include the lower Salmon River as suitable for wild and scenic inclusion.

Recreation Opportunity Spectrum and Motorized Access Alternatives

The recreation opportunity spectrum (ROS) determines the level of recreation one might expect and determines the suitability of motorized uses. Within mountain quail areas, there is little difference between the alternatives because most are currently within motorized ROS settings. Alternatives W, X, Y, and Z are similar to the No Action Alternative for mountain quail. However, in the Preferred Alternative, the settings change from one motorized setting to a different motorized setting with most mountain quail habitat going from either semi-primitive motorized or roaded natural to the rural setting. Areas with mountain quail are within areas where the travel system is already well established so new roads within mountain quail habitat would not be likely. The change would perhaps facilitate an improvement in the condition of existing motorized routes enabling more traffic or higher speeds. Roads and motorized uses have not been identified nor discussed as a threat to mountain quail in the scientific literature. The primary impacts of motorized uses to mountain quail are that individuals could be struck by vehicles, and new road development would reduce mountain quail habitat within the road footprint. The change in the Preferred Alternative might result in slightly increased possibility of road strikes if the road system is improved. However, it would not likely have population level impacts. There are slight consequences to mountain quail from the change in the Preferred Alternative.

Timber Suitability, Vegetative Disturbance, and Timber Volume

Timber suitability varies only slightly by alternative and there is little to no change in timber suitability for the Preferred Alternative. Most mountain quail observations occur within riparian areas which are not suitable for timber production, but some riparian areas are suitable for harvest to meet other resource objectives. Adjacent uplands in many cases are suitable for timber production except in the Rapid River Idaho Roadless Rule Area, which is not suitable for harvest nor production

Alternatives vary how much timber volume is produced and the acres harvested annually. Alternative X has the most while Alternative Z has the least. The Preferred Alternative is intermediate and proposes 8,825 to 10,000 acres compared to the No Action Alternative which is approximately 4,300 acres. In addition, the total amount of disturbance from timber harvest, prescribed fire, wildfire, fuels treatments and more is estimated at 40,000 acres in the No Action Alternative and 53,000 to 64,500 acres in all other alternatives.

Gutierrez (2020) suggested that timber harvest may be beneficial to mountain quail habitat because it would produce shrublands and logging in Pacific Coast region probably increased total amount and distribution of habitat. Most likely the increase in disturbance including timber production would likely be beneficial to mountain quail and increase mountain quail habitat overall.

Environmental Consequences

Environmental consequences of plan direction by other resources to mountain quail are summarized in Table 207.

Table 207. Environmental consequences of plan direction by other resources to mountain quail

Resource Area	Environmental Consequences	Explanation
Terrestrial Ecosystems	Yes	Plan direction that encourages more early seral or shrub habitats would benefit mountain quail. Plan direction under this broad heading that provides ecological conditions for mountain quail include those for Forested lands, Meadow, Grasslands, and Shrublands, fire management, invasive species contribute positively to mountain quail habitat enhancement. These are discussed more in below in their respective row.
Across the Landscape	Yes	FW-DC-TE-04 provides vegetation that reflects natural disturbance regimes, and composition, structure, function, and connectivity of native plant communities are appropriate for a given landscape and climatic setting. Also FW-DC-TE-05 provides native assemblages of hardwood trees, deciduous shrubs, conifers, and, where appropriate, unique coastal disjunct species within riparian habitats. These plan components have beneficial consequences because they were designed to provide good conditions for many species including mountain quail.
Cave and Karst Features	No	No consequences

Resource Area	Environmental Consequences	Explanation
Forested Lands	Yes	Plan direction in the Forested Lands section of the plan encourages providing a variety in vegetation successional stages, and variety in dominance types. Desired conditions for size classes are designed to encourage more vegetation in seral grass/shrub stages in a variety of broad potential vegetation types which would benefit mountain quail and increase habitat. Plan direction encourages appropriate patch size and distribution of habitats which should also benefit mountain quail. Plan direction for warm dry potential vegetation types contribute positively to mountain quail habitat enhancement.
Carbon Storage and Sequestration	No	No consequences
Meadow, Grassland, and Shrubland	Yes	Plan direction for Meadow, Grasslands, and Shrublands contribute positively to mountain quail habitat enhancement. These plan components provide direction to enhance and maintain natural meadows, grasslands, and shrublands including species composition and condition. These plan components are designed to encourage managing these habitats in good condition
Fire Management	Yes	Changes to fire management direction would be positive for mountain quail compared to the No Action Alternative. Fire suppression was identified as a primary threat to this species and plan direction seeks to allow more flexibility to restore ecosystems with wildland fire. Some actions that could occur as a result of the plan direction is that mountain quail habitat could be treated to reduce fuels or burned from prescribed fire in efforts to meet fuels and fire objectives. These actions could result in short term impacts to mountain quail habitat but have longer term benefits for the species.
Invasive Species	Yes	Invasive species can affect the vegetation characteristics for mountain quail. Plan direction should help address this threat because it provides direction designed to reduce weed infestations, and prevent new infestations
Soil Resources	No	No consequences
Aquatic Ecosystems	Yes	Aquatics plan components should conserve mountain quail habitats.
Water and Aquatic Resources	Yes	Aquatics plan components should conserve mountain quail habitats. Plan components are designed to provide healthy watershed and aquatic resources, connectivity, instream conditions. These plan components should have beneficial consequences for mountain quail habitats.
Conservation Watershed Network	Yes	Aquatics plan components should conserve mountain quail habitats. These plan components emphasize intact aquatic resources and restoration, and maintenance of roadways to minimize sediment deliver. Standard FW-STD-CWN-01 requires projects to be designed and implemented in a manner that supports and contributes towards the recovery of federally listed species and the achievement of these desired conditions for aquatic and riparian habitats. Several drainages that have mountain quail populations are identified as conservation watershed networks. These include Slate Creek, White Bird Creek, and Rapid River. These plan components should help provide habitat for mountain quail.

Resource Area	Environmental Consequences	Explanation
Riparian Management Zones	Yes	Aquatics plan components should conserve mountain quail habitats. Riparian plan components are designed to provide good quality riparian habitats. Riparian areas provide mountain quail with important habitat. The plan components emphasize protection, proper function, and restoration of riparian habitats. These plan components would have beneficial consequences to mountain quail.
Infrastructure (Aquatic and Riparian)	Yes	Aquatics plan components should conserve mountain quail habitats. These plan components are designed to ensure that transportation system has minimal impacts on aquatic and riparian conditions. Most plan components focus on maintaining connectivity and reducing sediment input into waterways from infrastructure.
Energy and Minerals (Aquatic and Riparian)	Yes	Aquatics plan components should conserve mountain quail habitats. Plan components are designed to ensure that energy and minerals activities have reduced impacts on aquatic and riparian habitats. They address the manner in which energy and mineral activities are conducted within riparian areas and near aquatic habitats.
Livestock Grazing (Aquatics and Riparian)	Yes	Plan direction provides direction to relocate trailing Constraints in plan components like FW-STD-ARGRZ-01 direct that livestock grazing shall be authorized or reauthorized only when measures are included in the authorization to avoid or mitigate adverse effects to fish and riparian habitat that may result from grazing practices. FW-STD-ARGRZ-02 requires moving livestock trailing, bedding, watering, salting, loading, off road vehicle use for managing or gathering livestock, when these activities impact riparian habitats. FW-GDL-ARGRZ-01 requires minimum stubble heights of a minimum of 4-6 inches for the conservation of riparian areas. While these measures will not prevent all effects from grazing, they should serve to reduce impacts to mountain quail habitat and balance sustainable livestock grazing with riparian vegetation health.
Lands and Special Uses (Aquatic and Riparian)	Yes	Aquatics plan components should conserve mountain quail habitats. These plan components were designed to address impacts from hydroelectric and water development activities.
Recreation (Aquatic and Riparian)	Yes	Aquatics plan components should conserve mountain quail habitats. These plan components were designed to address impacts of recreational facilities to riparian habitats. They address the location and impacts of campgrounds, facilities, and trails. These plan components should reduce impacts of exiting and new recreational features to aquatic and riparian habitats used by mountain quail.
Wildlife	Yes	Wildlife plan components emphasize recovery of federally listed species, sustainable and resilient habitat for of species conservation concern, and connectivity of habitats. These plan components are designed to provide for species of conservation concern including mountain quail.
Multiple Use Wildlife	Yes	Plan components in the multiple uses wildlife section emphasize early seral conditions to provide nutrition. This should result in more mountain quail habitat.
Air Quality	No	No consequences

Resource Area	Environmental Consequences	Explanation
Tribal Trust	Yes	Plan components emphasize providing ecological conditions to ensure the exercise of treaty reserved rights. FW-DC-TT-01 was designed to provide for sustainable diversity of habitats necessary to provide plant and animal species that are of tribal importance. FW-DC-TT-02 is designed to provide habitats that support huntable and harvestable wildlife and resources. These plan components would help ensure habitat conditions for mountain quail and would have beneficial consequences for this species.
Cultural Resources	No	No consequences
Municipal Watersheds	No	No consequences
Sustainable Recreation	No	Plan components in the Sustainable Recreation establish the recreation opportunity spectrum settings which indicate the expected recreational experience and establish motorized use suitability. Recreation opportunity spectrum alternatives were analyzed above. Other plan components address how recreation experiences, facilities, trails, and infrastructure are to be managed. Other than consequences for Recreation Opportunity Spectrum (see above), these plan components would have no consequences for mountain quail.
Scenery	No	No consequences
Public Information, Interpretation, and Education	No	These plan components direct how public information and education efforts and infrastructure are managed. These plan components have no consequences for mountain quail.
Infrastructure	No	These plan components direct how existing roads and infrastructure is to be maintained. These plan components have no consequences
Land Ownership and Land Uses	No	These plan components deal with maintaining and prioritizing ownership and access via right of ways, marking boundaries, and providing for energy and communication infrastructure. These plan components would have no consequences to mountain quail.
Ecosystem Services	No	Ecosystem service plan desired condition encourage clean water, clean air, wood products, forage, hunting, trapping, fishing, fish, cultural values, heritage values, subsistence food gathering, and spiritual values, scenery, recreation, flood control and soil stabilization. Plan guidelines emphasize maintaining motorized access. These plan components would have minimal effect on mountain quail habitat.
Timber	Yes	This activity could change some mountain quail summer habitats. Opening the canopy could improve mountain quail habitat by releasing the understory. Plan components for timber should have beneficial consequences for mountain quail.
Energy and Minerals	No	Plan direction emphasizes providing opportunities for mineral and energy activities and are designed to be consistent with laws pertaining to mineral and energy availability and accessibility. Some mineral activities could occur in mountain quail habitat which could impact mountain quail habitat but is not likely to occur at a scale and time frame to impact mountain quail habitat.

Resource Area	Environmental Consequences	Explanation
Livestock Grazing	Yes	Livestock grazing could impact shrublands or riparian habitats. Plan desired conditions emphasize domestic livestock grazing consistent with the capacity of the land to produce sustained forage for multiple uses. Objectives seek to provide approximately 29,800 to 34,400 animal unit months annually forestwide. The plan provides guidelines to ensure that grazing is conducted sustainably and reduces impacts to natural resources. Guideline FW-GDL-GRZ-01 restricts salting away from riparian habitats. FW-GDL-GRZ-03 constrains the intensity or utilization of rangeland vegetation down to between 35-55%, which would mitigate or reduce the chance that habitats are over used and degrade mountain quail habitat. In addition, livestock grazing would abide by plan components addressing grazing in the Aquatics ecosystem (grazing) components should conserve mountain quail habitats. These plan components would address this threat.
Special Forest and Botanical Products	No	No consequences
Designated Wilderness	No	No consequences
Designated Wild and Scenic Rivers	Yes	Rapid River contains habitat for mountain quail and management would benefit mountain quail.
Lolo Trail National Landmark	No	No consequences
Recommended Wilderness	Yes	Some mountain quail populations occur within some alternatives for recommended wilderness. The Preferred Alternative does not include any recommended wilderness areas with mountain quail populations. Recommended wilderness direction has no consequences for mountain quail.
Eligible and Suitable Wild and Scenic Rivers	Yes	The Salmon River would be suitable under the Preferred Alternative and would contribute to the conservation of some mountain quail habitat. However, habitat treatments to enhance mountain quail habitat would have to be consistent with suitable wild and scenic river direction, which in some cases could constrain these activities.
Idaho Roadless Rule Areas	Yes	Some mountain quail populations occur within some roadless areas. Regulations directing the management of some roadless themes may prevent active management to enhance or restore mountain quail habitat. On the other hand, Idaho Roadless Rule plan direction would also help prevent some activities that could impact mountain quail habitat.
Research Natural Areas	No	No consequences
Lower Salmon	Yes	The Lower Salmon River Geographic Area has specific direction to address mountain quail habitats. These plan components are designed to maintain or improve mountain quail habitat.
Gospel-Hump	No	No consequences
Pilot Knob	No	No consequences
Lolo Trail National Historic Landmark	No	No consequences
Lochsa	No	No consequences
Special Interest Areas	No	No consequences

Cumulative Effects

The area for cumulative effects for mountain quail is the area of the Idaho Department of Fish and Game's Clearwater Region. This area encapsulates much of Idaho's mountain quail populations. The plans that affect mountain quail habitat management include Idaho's Statewide Wildlife Action Plan, land management plans of the Bureau of Land Management (BLM), and management plans for Craig Mountain Wildlife Management Area. County natural resource plans may also apply. For programmatic actions like Forest Plans, cumulative effects are effects of other plans that overlap in space and time with the Forest Plan.

The Idaho Statewide Wildlife Action Plan identifies mountain quail habitat within riverine-riparian forest and shrubland, dry lower montane foothill forest, and lower montane foothill grassland and shrubland habitat types. The Idaho plan has objectives for control of noxious weeds, conducting mountain quail surveys, maintaining and protecting high quality riverine and aquatic riparian habitat, maintaining the conditions of springs and ground water, decreasing or eradicating noxious weeds, improving resilience to climate change, restoring historic fire intervals, maintaining resilient native plant communities, managing livestock to maintain rangeland health, and maintaining responsible rangeland uses. These plans and actions are consistent with the Forest Plan under the Preferred Alternative. Idaho also includes plans for mountain quail in their Idaho Upland Game Management Plan 2019 to 2025 (2019). This plan identifies mountain quail as a game species with a closed season. It identifies needs for surveys for mountain quail.

The BLM's Land Use Management Plan for the Cottonwood District, titled the Cottonwood Resource Management Plan, includes actions to monitor and survey for sensitive species, follow best management practices for sensitive species, and promote sensitive species conservation through land tenure adjustments, conservation easements, restoration projects, and cooperative planning. The plan appendices identify the mountain quail as a Type 3 sensitive species. This plan also emphasizes that the lower Salmon River be managed as a suitable wild and scenic river and emphasizes managing the Salmon River Scenic and Recreational areas to protect the river's outstandingly remarkable values. These plans are consistent with the Forest Plan under the Preferred Alternative and would have no consequences for mountain quail because it would provide management to help ensure long term persistence of mountain quail.

Idaho County's natural resource plan was released in 2016. The plan is comprehensive, addressing many aspects of natural resource management. It includes objectives, desired conditions, guidelines, and standards pertaining to natural resource management. The plan addresses coordination, economics, aquatic ecosystems, terrestrial ecosystems, energy and minerals, livestock grazing, agriculture and irrigation, water rights, recreation, access, communication sites, cultural, cultural geologic and paleontological resources, forest products, and land allocations and their management. The plan emphasizes natural resource management beneficial to the county and its residents. The wildlife portion of Idaho County's natural resource plan contains desires to have wildlife habitat exist in abundance to sustain viable and harvestable populations of big game, furbearers, waterfowl, and upland game species and a diversity of other game and non-game species. Desired conditions also encourage the full breadth of wildlife management tools to manage predators and address wildlife conflicts. It includes objectives to address impacts from federal Endangered Species Act listings. This plan is consistent with the Forest Plan and Preferred Alternative. The Idaho County Natural Resource Plan would have no consequences for mountain quail.

Mountain quail occur on lands administered by the Idaho Department of Lands (IDL). These lands are managed for the primary purpose of providing revenue to support public schools with other uses secondary. IDL lands with mountain quail are located along the Salmon River adjacent to or at lower elevations than Nez Perce-Clearwater lands and within the Craig Mountain Area. The 2020 Idaho Forest Action Plan directs the management of IDL lands and is a long-term, coordinated strategy for reducing threats to Idaho's forests while increasing the social, economic, and environmental benefits they provide. The overarching goals for the plan are to reduce threats and enhance the benefits of Idaho's forests. They include 1) Idaho's forests are diverse and resilient to climatic changes and other threats (fire, insects, disease, noxious weeds, etc.), 2) Forestlands that provide the highest ecosystem benefits are identified, maintained, and enhanced. 3) Forest ecosystems are more resilient to human activities (development, harvest operations, etc.), 4) Forest-based wood products markets are economically vibrant and sustainable, and 5) Idaho has a framework for implementing the Forest Action Plan, to guide project prioritization across boundaries. The plan identifies priority landscape areas and addresses threats to forest health and identifies benefits from forest management. The plan identified and considered areas with high wildlife diversity and species of concern. Goals included specifically for wildlife include a desire to protect and provide habitat for native fish, wildlife, and plants. It also includes goals to promote wildlife connectivity between undeveloped areas. Project ranking priorities include wildlife as a criterion for consideration. These measures would include consideration for mountain quail because mountain quail are identified as a species of greatest conservation need by Idaho's Statewide Wildlife Action Plan. Some actions conducted as a result of the 2020 Idaho Forest Action Plan could affect mountain quail habitat but measures in this plan should help provide and prioritize habitat for mountain quail. Some forestry actions might benefit mountain quail habitat by providing early seral shrub habitats used by mountain quail. Therefore, this plan would have no consequences for mountain quail habitat.

Private lands within the Salmon River area contain populations of mountain quail. These lands are managed in a variety of ways and include development, agricultural uses, forestry, and more. These land uses can impact mountain quail habitat and in particular winter habitats as most private lands occur at lower elevations where mountain quail winter. However, many private lands are managed in a way that sustains mountain quail habitat.

The plan alternatives including the Preferred Alternative would not result in cumulative environmental consequences because the plan contains direction to encourage increasing or maintaining mountain quail habitat that are common in all alternatives.

Conclusion

Mountain quail occur within a limited area of the Nez Perce-Clearwater, primarily along the lower Salmon River canyon. The Land Management Plan identified the Lower Salmon River Geographic Area specifically and contains plan components to help conserve some of the unique wildlife that occurs within this area of the Nez Perce-Clearwater. Included in this suite of species is the mountain quail that occupies riparian habitats within this geographic area. A number of coarse filter ecosystem plan components guide management to provide healthy mountain quail habitat and address threats. For example, plan direction in the Invasive Species section and the Riparian Management Zone section provide additional coarse filter plan direction that should help conserve the habitat for mountain quail. Fire management direction would help ensure that fire operates properly within these areas to the benefit of mountain quail. The Nez Perce-Clearwater can provide for some, but not all, of the habitat required by mountain quail. Mountain quail, in many cases, winter outside the plan area in low elevation riparian areas; mountain quail might not persist without this habitat. These areas are outside of Forest Service control. However, a number of plans from other agencies also provide measures that consider or manage for healthy mountain quail habitat. Thus, the Land Management Plan provides the ecological conditions to contribute to the long-term persistence of mountain quail.

White-headed Woodpecker

Existing Condition

Description and Distribution

The white-headed woodpecker is a conspicuous, small-to-medium-sized woodpecker, with a distribution in south central British Columbia, Washington, Oregon, California, and west central Idaho (Garrett et al. 1996). It has a mostly black body with a white head. Although it is conspicuous, the species is considered uncommon, even in appropriate habitat. In Idaho, they are highly limited by suitable habitat, nesting in forests with large diameter Ponderosa pine trees and snags indicative of old growth systems (Idaho Department of Fish and Game 2017b).

In the plan area, the species is distributed in Ponderosa pine dominated stands and mixed stands of Ponderosa pine and other conifer species. These stands occur in the warm dry potential vegetation type (PVT) and, to a lesser extent, in the warm moist PVT. Warm dry PVTs occur in the Salmon River canyon, the Island, the Middle Fork of the Clearwater River, portions of the Lochsa and Selway Rivers, and a few limited areas on the Palouse Ranger District. See Appendix A for a map of PVTs. Suitable habitat for the species is typically fragmented, making accurate estimation of their range difficult. However, most white-headed woodpecker observations have been located where larger amounts of forests are dominated by Ponderosa pine, such as those in the lower Salmon River corridor, the mouth of the Clearwater River, and the South Fork of the Clearwater River near the western Nez Perce-Clearwater boundary. See Appendix A for a map of the white-headed woodpecker habitat.

Status

The white-headed woodpecker has a NatureServe global rank of G4 and a S2 rank for Idaho. A G4 rank means the species is apparently secure with a fairly low risk of extinction or elimination due to an extensive range or many populations or occurrences, but the species has possible cause for some concern because of local recent declines, threats, or other factors. A S2 rank indicates the species is imperiled because of rarity or because other factors demonstrably making it very vulnerable to extinction or extirpation; species with a S2 ranking typically have only 6 to 20 recorded observations. White-headed woodpeckers are generally uncommon or rare in appropriate habitat in Washington and Idaho and quite rare in British Columbia (Garrett et al. 1996).

The Idaho Statewide Wildlife Action Plan estimated that there are approximately 320 white-headed woodpeckers statewide (Idaho Department of Fish and Game 2017b). Range-wide, the population trend appears to be stable to slightly increasing. The species is identified as a species of Greatest Conservation Need by the State of Idaho (Idaho Department of Fish and Game 2017b). The species has been identified as a Sensitive Species by the Northern Region (Region 1), Intermountain Region (Region 4), and Pacific Northwest Region (Region 6) of the Forest Service. The species is on the U.S. Department of Interior's Bureau of Land Management State Director's Special Status List for Oregon and Washington.

In southcentral Oregon, white-headed woodpeckers are most abundant in old-growth Ponderosa pine forest types and essentially absent from mixed-conifer sites and those that contained younger seral stages (Dixon 1995a). Dixon (1995) calculated population densities based on point-count data of 0.00 to 2.53 birds per 40 hectares (98.8 acres). Densities based on absolute counts of breeding pairs include 0.18 to 0.49 birds per 40 hectares (98.8 acres) in south central Oregon (sample size is 3 counts) and 0.52 to 1.06 birds per 40 hectares (98.8 acres) in central Oregon (sample size is 4 counts). Declines due to forest fragmentation and modification have been noted in Idaho (Blair and Servheen 1995).

Migration and Seasonal Habitats

The white-headed woodpecker is generally sedentary, usually occupies the same home range throughout the year, and returns to the same breeding site year after year; however, limited wandering may occur during the non-breeding season to exploit locally and temporarily available abundant food sources of pine seeds (Garrett et al. 1996).

Historical Habitat Conditions

Before European settlement, habitat conditions for the white-headed woodpecker consisted of Ponderosa pine dominated forests in the warm dry potential vegetation type that were the result of a frequent, low intensity wildfire disturbance regime. Under this disturbance regime, stands can develop into large patches of an open, grown, old forest structure intermixed with smaller openings. These conditions can persist for centuries, provided moisture and temperature regimes do not dramatically change (U.S. Department of Agriculture 2014m).

Trend in Habitat

Ponderosa pine habitats within the plan area have experienced significant departure from their historic range of variability in terms of dominance types, size class abundance and distribution, density, and patch size distribution (U.S. Department of Agriculture 2014m). These changes are consistent with findings of Ponderosa pine habitats from across the Columbia River basin. Wisdom et al. (2000c, a, 2000d) evaluated the change since European settlement in source habitats in the Interior Columbia basin for 91 species of terrestrial vertebrates for which there was ongoing concern about population or habitat status. Species were grouped according to the common habitats they used. Those habitats were evaluated for trends as part of the Interior Columbia Basin Ecosystem Management Project to develop an ecosystem-based strategy for managing Forest Service and Bureau of Land Management lands within the basin. Wisdom et al. (2000b, c, 2000d) found that source habitats for the white-headed woodpecker occupies the same extent as historically, but the old structural stage used by the white-headed woodpecker has become scarce in these habitats throughout much of the Columbia River basin and there has been a gradual shift in stand composition from shade-intolerant tree species, such as Ponderosa pine, to shade-tolerant species, such as Douglas-fir and grand fir.

Habitat Preferences

Throughout the white-headed woodpecker range, their habitat includes an abundance of mature pines with large cones and abundant seed production, a relatively open canopy at 50 to 70 percent, and the availability of snags and stumps for nest cavities. The white-headed woodpecker is most closely associated with mature and old Ponderosa pine forests or mixed forests dominated by Ponderosa pine with species such as Douglas-fir, lodgepole pine, and white pine also present. Although it is associated with Ponderosa pine, it is absent from many areas dominated by Ponderosa pine. In southcentral Oregon, this species selects multistoried old-growth Ponderosa pine forests with canopies greater than 51 percent, a basal area of live trees greater than 12 square meters per hectare, a maximum canopy height of greater than 32 meters, and shrub cover greater than 30 percent (Dixon 1995b). Old-growth Ponderosa pine was also a dominant feature of white-headed woodpecker home ranges in central Oregon, and woodpeckers there preferred larger diameter trees with an average diameter at breast height of greater than 24 inches and a preference for an increasing diameter (Dixon 1995b). Woodpeckers typically excavate nest cavities in large, moderately decayed, Ponderosa pine snags (Dixon 1995a) Buchanan et al. 2003, Mellen-McLean et al. 2013).

Habitat evaluations using multivariate statistics suggest that white-headed woodpecker habitat selection is also influenced by factors at larger scales. Latif et al. (2015) found that the Habitat Suitability Index Modeling suggested that the white-headed woodpecker related positively with the percent Ponderosa pine at the home range and at the landscape scale, moderate levels of canopy cover of approximately 40 percent, and moderate-to-high levels of heterogeneity in forest structure. Areas with a larger percent of the land in mature Ponderosa pine are selected by white-headed woodpeckers. Closed canopy forests with cone-producing pine trees and insects may be important for year-round foraging, particularly outside the breeding season (Garrett et al. 1996) Mellen-McLean et al. 2013).

These birds can thrive in recently burned or cut areas, provided that large standing trees are still present (Idaho Department of Fish and Game 2017b). White-headed woodpeckers have also been found to use recently burned forests of Ponderosa pine (Saab and Dudley 1998, Wightman et al. 2010, Kozma 2011, 2012, Kozma and Kroll 2013, Forristal et al. 2007a). In southcentral Oregon, nest success was higher in burned habitats than unburned habitats (Forristal et al. 2007b, Mellen-McLean et al. 2013).

Studies conducted within the plan area found that the probability of detecting white-headed woodpeckers during surveys was positively related to the amount of Ponderosa pine forest and the number of large snags present in the survey area (Miller and Carlisle 2018) and negatively related to increasing canopy cover in two of three years studied. These surveys were conducted on 404 survey points located within 56 survey grids, with white-headed woodpeckers detected at eight points within five of the 56 survey grids. The probability of encountering a white-headed woodpecker within Ponderosa pine in the plan area was low at 0.01 (Miller and Carlisle 2018).

Diet

The white-headed woodpecker consumes invertebrates and pine seeds. It takes invertebrates off of trunks, branches, and needle clusters of large diameter live trees (Ligon 1973, Raphael and White 1984, Raphael et al. 1987). Pine seeds are obtained from large pinecones, which the white-headed woodpecker takes from predominantly large-diameter live Ponderosa pine trees (Dixon 1995b).

Nesting

Nest placement frequently occurs in open canopy forest patches, often adjacent to relatively closed canopy forests thought to provide critical food resources (Wightman et al. 2010, Hollenbeck et al. 2011). Nests are excavated from moderately decayed dead conifer snags, logs, or prostrate trees. Species of trees reported have included Ponderosa pine, quaking aspen, white fir, Jeffery pine, and red fir. In south central Oregon, all 16 nests studied by Dixon (Dixon 1995a) were in completely dead substrates with 37 percent in snags, 56 percent in stumps, and 6 percent in leaning logs and a mean diameter at breast height that averaged 31 inches. Typically, new nest cavities are excavated each year.

Threats and Stressors

Table 208 includes a summary of threats to white-headed woodpecker identified using the NatureServe methodology threats calculator. Habitat degradation from fire suppression, past timber harvest practices, and changes in precipitation and broad-scale hydrologic regimes represent the primary threats and stressors to the habitats white-headed woodpecker occupy in Idaho (Idaho Department of Fish and Game 2017b). The Idaho Statewide Wildlife Action Plan identifies changes in precipitation and broad-scale hydrologic regimes and emphasizes historic and current fire suppression that cause changes in the fire scope and severity in Idaho (Idaho Department of Fish and Game 2017b). See Appendix C for the full threats evaluation.

Table 208. Threats to white-headed woodpecker identified using the NatureServe methodology threats calculator

Threat	Scope	Severity	Impact level	Reason
Past timber practices (pre-1980s)	Large	Extreme	High	Based on treatments recorded in the FACTS database, area of past timber harvest was estimated to have impacted between 31 to 70 percent of white-headed woodpecker habitat. Severity was identified to be extreme because regeneration harvest was usually without retention of leave trees and snags, effectively eliminating habitat where this activity occurred.
Regeneration harvest (current practices)	Restricted	Serious	Medium	Based on the FACTS database, the area of past timber harvest was estimated to have impacted between 10 and 30 percent of white-headed woodpecker habitat since 1980. Severity was identified to be serious because regeneration harvest usually did not involve retention of leave trees and snags, which left those areas unusable by white-headed woodpeckers.
Historic livestock grazing	Large	Moderate	Medium	Long-term grazing can reduce fuel loads that also can influence fire return intervals, which would influence forest physiognomy that could reduce distribution. Historic grazing was intense and may have reduced competition with grasses, leading to higher shrub abundance and latter fuels in the understory. This grazing was estimated to have occurred over 30 to 70 percent of white-headed woodpecker habitats in the plan area and has left much of the habitat susceptible to stand replacing wildfire.
Fire and fire suppression	Pervasive	Serious	High	This threat has been estimated to have occurred in over 71 percent of the white-headed woodpecker habitat, leaving it susceptible to loss through stand replacing wildfire. The current trend suggests that Ponderosa pine habitat has been lost through succession and subsequent fires burning uncharacteristically hot in areas once dominated by Ponderosa pine and maintained by periodic low intensity fire.
Climate change—habitat shifting and alteration, drought, temperature extremes, changes in precipitation and broad-scale hydrologic regimes	Pervasive	Unknown	Medium[1]	This threat has occurred across nearly all the white-headed woodpecker habitat in the plan area. The severity of which is unknown.

1 - Due to uncertainty, the NatureServe methodology that recommends a medium threat when the severity is uncertain

Fires have historically maintained habitats for white-headed woodpeckers, and fire suppression has resulted in considerable changes to these systems, leaving them susceptible to loss from uncharacteristic wildfire. Changes in fire size and severity pose a threat to the retention of mature trees and large diameter and high-cut stumps (Idaho Department of Fish and Game 2017b). Fire suppression over the past 50 years has altered fire regimes so that Ponderosa pine forests are no longer maintained by frequent natural low intensity fire and are being replaced by Douglas-fir and true fir, such as grand fir, developing in the understory, thus, making these areas susceptible to stand-replacing fires. The mature trees that the white-headed woodpecker depends upon for seed mast and snags for nesting can be lost if fires burn uncharacteristically hot. Fire suppression has affected much of the white-headed woodpecker's habitat in the plan area, and the scope of this threat was estimated to have affected more than 71 percent of the habitat in the plan area; thus, it was identified as pervasive in the threat evaluations for this species.

Local population declines have occurred following the loss of large, open Ponderosa pine forests from timber harvest (Garrett et al. 1996). Logging practices, such as clear-cuts, even-aged stand management, snag removal, salvage logging, and forest fragmentation, have contributed to local declines, especially in the northern half of the species range (Garrett et al. 1996). More specifically, timber harvest practices, such as shorter timber rotations, larger cut units, and reseeding with different species, have reduced the abundance of late-seral Ponderosa pine forests, snags, and coarse woody debris; in addition, these practices have fragmented the landscape and altered forest species composition (Idaho Department of Fish and Game 2017b). The preferred large-diameter trees are prized for their commercial value, and the loss of large-diameter Ponderosa pine poses the greatest threat to this species in Oregon (Garrett et al. 1996). When these practices affect these forests at the landscape scale, they can represent significant threats to the species. For example, old-growth Ponderosa pine has declined 92 to 98 percent in the Deschutes and Fremont-Winema National Forests (Garrett et al. 1996, Dixon 1995b).

Forestry practices like clearcutting, even-age stand management, snag removal, and fire suppression are thought to have contributed to declines California (Kozma et al. 2020). White-headed woodpeckers appear to tolerate some harvest practices as long as it includes retention of large diameter trees, and snags (Kozma et al. 2020). The presence of large and very large trees greater than 21 inches at relatively low levels (between 8.5 and 9.8 trees per acre) intermixed with younger Ponderosa pine or mixed Ponderosa conifer stands may provide suitable habitat for the white-headed woodpecker (Linstrand and Humes 2009, Kozma 2011). Forestry practices designed to restore the historical conditions of Ponderosa pine forest structure and composition increased white-headed woodpecker abundance in Washington under a frequent low intensity fire regime (Gaines et al. 2007, Gaines et al. 2010). These treatments included thinning, understory burning, and retention of large live and dead Ponderosa pine trees.

Changes in precipitation and broad-scale hydrologic regimes, coupled with the effects of fire suppression, have created hazardous fuels conditions throughout the west, and fires are now more severe than they were historically. In dry mixed-conifer forests, decades of fire suppression have resulted in an increase in fuel loading, shifts in species composition toward shade tolerant species less resistant to fire and increases in fire severity. Many legacy stands of Ponderosa pine are at risk of being lost to fire. Because of fire suppression, these stands often have an understory of Douglas-fir, grand fir, or lodgepole pine, which serve as ladder fuels when fire does occur and causes the fires to crown into the mature Ponderosa pine trees.

In the plan area, the NatureServe methodology for analyzing the magnitude of threats (Salafsky et al. 2003) was used to identify the threats for the white-headed woodpecker. The findings are like those identified in the published literature listed above. The NatureServe methodology identified past timber management practices (pre-1980s) as a high threat, regeneration timber harvest practices as a medium threat, historic livestock grazing practices as a medium threat, fire suppression as a high threat, and habitat shift and alteration from climate change as a medium threat. These primary threats affect this species in the plan area. See Appendix C for the white-headed woodpecker threat calculator results.

It should be noted that other forestry practices, such as intermediate treatments, sanitation, salvage logging, or other practices that restore these forests to their historic structural conditions or that retain large live trees and snags, are not considered significant threats because these practices are beneficial. This species persists in burned or cutover forests with residual snags and stumps; thus, populations are more tolerant of disturbance than those species associated with closed-canopy forests (Garrett et al. 1996, Raphael and Morrison 1987).

Measures Proposed and Taken to Prevent Effects and Restore Habitats

The proposed conservation strategy for Idaho (Blair and Servheen 1995) involves management of white-headed woodpecker habitat, primarily Ponderosa pine forest, through modifications in existing timber harvest and fire suppression, along with programs of snag retention and monitoring of woodpecker abundance and habitat response. Specific snag retention recommendations include 45 suitable large snags to maintain a target population of five pairs of white-headed woodpeckers per 40 hectares. These numbers equate to about 0.46 snags per acre and are like those reported by (Bollenbacher et al. 2009a) as the average number of snags larger than 20 inches diameter at breast height (DBH) in the Ponderosa pine forest types.

Casey et al. (Casey et al. 2012, 2011, Casey and Altman 2007) identified the following attributes to describe optimal Ponderosa pine breeding habitat for white-headed woodpeckers:

- late-successional forests in patches greater than 250 acres with moderately open canopy cover of 20 to 60 percent
- greater than 40 percent shrub cover
- greater than 1.6 snags per acre with a greater than 18 inches DBH
- greater than 1 snag per acre with a greater than 28 inches DBH

Restoration Needs in the Plan Area

The extent of Ponderosa pine dominated forests within the warm dry potential vegetation type and other potential vegetation types has been reduced from its natural range of variability because of encroachment from Douglas-fir and grand fir. Thus, restoration across the plan area landscape should restore the amount of this forest type in the warm dry potential vegetation type. Increasing dominance of Ponderosa pine, especially those with larger trees, should increase the distribution of white-headed woodpeckers in the plan area long-term. Additionally, existing Ponderosa dominated stands should be restored to their natural range of structure, including lower density and larger size class, through practices that replicate a low intensity, high frequency disturbance regime. The pace of restoration would need to be urgent enough to prevent loss by uncharacteristic wildfire in encroached stands that have existing large and old Ponderosa pine trees. These treatments would need to retain large and very large live and dead trees to provide for the key ecological requirements for the white-headed woodpecker. This restoration would need to be conducted largely through timber harvest in Management Area 3, prescribed fire in Management Area 2, and wildfire in Management Area 1. For example, restoration treatments in Ponderosa pine forests that included thinning, understory burning, and retention of snags in the eastern Washington Cascades had a positive effect on white-headed woodpecker presence and abundance (Gaines et al. 2007, Gaines et al. 2010). Restoration of Ponderosa pine habitats includes understory thinning to reduce ladder fuels and restoring density to historic conditions through prescribed fire to reinstate the natural disturbance regime.

Effects of the Plan Components and Alternatives

Management Areas

Management areas strongly influence the effects to the white-headed woodpecker in the plan area because they direct or influence actions or prohibit activities over broad areas of the Nez Perce-Clearwater. Thus, they influence the scope of impacts in the plan area. Chapter 1 of this document describes the management areas and how they are managed. This direction is summarized here for evaluation of effects. White-headed woodpecker observations have mostly occurred in Management Area 3, though warm dry habitats that could contain white-headed woodpeckers also occur within Management Areas 2 and 1. Broad direction within these areas influences the types of management these habitats could undergo. Management Area 3 has the most potential for restoration, while Management Area 2 and 1 have fewer options. Active restoration is likely needed, in many cases, for restoration of the open Ponderosa pine dominated forests preferred by white-headed woodpeckers.

Coarse Filter Plan Components

The coarse filter plan components emphasize restoration of the conditions needed to restore Ponderosa pine forest structure, dominance types, and densities. This restoration includes objectives, goals, desired conditions, standards, and guidelines that will restore potential vegetation types that contain Ponderosa pine dominated habitats, such as warm dry and warm moist potential vegetation types (PVTs); thus, restoring habitat for the white-headed woodpecker. Specifically, plan components include measures to restore structure, function, composition, and connectivity of warm dry PVTs and will restore habitat for white-headed woodpeckers. Forestlands desired conditions for warm dry PVTs emphasize restoring the structure of Ponderosa pine by reducing density and increasing the extent of Ponderosa pine dominance types. The following table identifies the plan components that were designed to provide ecological integrity of the warm dry PVT and maintain or restore the ecological conditions needed to provide for a viable population of white-headed woodpeckers that will persist long-term in the plan area. These plan components will direct management to provide for the white-headed woodpecker through coarse filter habitat requirements. Table 209 identifies specific plan components that apply forestwide that would contribute to white-headed woodpecker habitat. Some plan objectives that contribute to white-headed woodpecker habitat restoration vary by management area and alternative (see Table 210). The objectives vary by alternative because the alternatives vary the pace at which vegetation desired conditions are achieved. Alternatives with a faster pace towards the desired conditions would be better for white-headed woodpecker because of the emphasis in the plan on restoring Ponderosa pine dominance and structure, and because the risk of losing mature and old Ponderosa pine to wildfire due to fuel build up and encroachment by other tree species.

Table 209. Plan condition, components, and effects that pertain to white-headed woodpecker habitat management

Plan Component	Plan components	Effects
Desired Conditions	FW-DC-TE-01 FW-DC-TE-05 FW-DC-FOR-02 FW-DC-FOR-03 FW-DC-FOR-04 MA1-DC-FOR-01 MA2-DC-FOR-01 MA3-DC-FOR-01 FW-DC-FOR-05 MA1 and MA2-DC-FOR-06 MA3-DC-FOR-02 FW-DC-FOR-06 FW-DC-FOR-07	These plan components direct management to maintain or restore the integrity of ecosystems, including the structure, function, composition, and connectivity of habitats that the white-headed woodpecker uses. They specifically address potential and existing Ponderosa pine dominated forest structure, function, composition, and connectivity. For example, FW-DC-FOR-03 specifies a desired condition to increase Ponderosa pine dominance in each of the three broad management areas. FW-DC-FOR-04 specifies a desired structure within stands including live legacy trees and snags from past disturbance persisting well into the next generation including primarily the largest Ponderosa pine, and they are present and distributed across the habitat type

Plan Component	Plan components	Effects
	MA1-DC-FOR-02 MA2-DC-FOR-02 MA3-DC-FOR-03 FW-DC-FOR-08 MA1 and MA2-DC-FOR-07 MA3-DC-FOR-04 MA1 and MA2-DC-FOR-08 MA3-DC-FOR-06 MA3-DC-FOR-10 MA3-DC-FOR-11 GA-DC-SR-02	groups. MA1-DC-FOR-01, MA2-DC-FOR-01, and MA3-DC-FOR-01 describe the desired stand density which would be consistent with white-headed woodpecker habitat preferences. FW-DC-FOR-05 describes the dominance types within the warm dry broad potential vegetation type, which suggests a desire to increase the amount of Ponderosa pine dominated stands which will also increase white-headed woodpecker habitat. Other plan components similarly direct the Nez Perce-Clearwater to maintain or restore white-headed woodpecker habitat. Plan components in the Lower Salmon Geographic Area emphasize managing for Ponderosa pine ecosystems that support species like white-headed woodpecker.
Guidelines	MA3-GDL-FOR-02 MA3-GDL-FOR-03 MA3-GDL-FOR-04 MA3-GDL-FOR-05	Some old growth types were historically Ponderosa pine forests but have become encroached by grand fir or Douglas-fir. Treatments that remove these species can be used to restore old growth dominated by Ponderosa pine. Without these treatments, old growth Ponderosa pine is susceptible to loss from wildfire. These plan components guide treatment in old growth forest types, including old growth Ponderosa. These guidelines allow active management, with limitations, in old growth Ponderosa pine to restore white-headed woodpecker habitat. They also require retention of snags that would provide habitat for white-headed woodpeckers.
Standards	MA3-STD-FOR-01	Would prevent old growth Ponderosa pine and other types from meeting the definition of old growth when managed. This standard would help conserve habitats for white-headed woodpeckers when these stands are managed.

Table 210. Objectives that support white-headed woodpecker habitat restoration objectives, by broad potential vegetation group and alternative

MA3 Warm Dry PVT Group	MA3 Warm Moist PVT Group	MA2 Warm Dry PVT Group
MA3-OBJ-FOR-01W	MA3-OBJ-FOR-02W	MA2-OBJ-FOR-01W
MA3-OBJ-FOR-01X	MA3-OBJ-FOR-02X	MA2-OBJ-FOR-01X
MA3-OBJ-FOR-01Y	MA3-OBJ-FOR-02Y	MA2-OBJ-FOR-01Y
MA3-OBJ-FOR-01Z	MA3-OBJ-FOR-02Z	MA2-OBJ-FOR-01Z

Effects of Alternatives

From the forestwide perspective, the amount of white-headed woodpecker habitat in the plan area includes about 49,690 acres. About 52 percent is in Management Area 3 and subject to timber production. Eighteen percent is in Management Area 2, which may be managed with treatments designed to restore the natural range of variation, often through prescribed fire or harvest for other resource objectives. About 30 percent of the white-headed woodpecker habitat is in wilderness, which is not actively managed. Thus, about 82 percent of the white-headed woodpecker habitat in the plan area could be impacted with some form of treatment. The most potential for intense management would be within the 52 percent of habitat in Management Area 3. Effects of actions in white-headed woodpecker habitat would be analyzed separately in project level analysis, and it is assumed that the plan direction noted above would apply to these treatments; thus, conserving, and in many cases restoring, white-headed woodpecker habitat in the plan area.

Adjustments to the SIMPPLLE model were made to address fire assumptions. The adjustments in the model changed the outcome of model results. The SIMPPLLE model suggests that the habitat for the white-headed woodpecker in closed dry forest increases under the No Action Alternative, Alternative X, and Alternative Z, and a decrease in this forest type under Alternatives P, W, and Y. The modest shift from closed to open forest under Alternatives P, W, and Y suggests that vegetation management activities are contributing positively to this shift in stand structures and suggests that long-term habitat sustainability is improving. These modeled outcomes suggest that habitat for dry forest-associated species such as the flammulated owl, white-headed woodpecker, and pygmy nuthatch is not being placed at risk by these management alternatives. There is a decrease in open dry forest habitat under all alternatives over the five decades. These results seem counterintuitive since all alternatives emphasize restoring large, open stands of Ponderosa pine. Declines in habitat are likely due to much higher anticipated levels of high severity wildfire, attributable to 70 years of accumulating fuels from successful past wildfire suppression. While the modeled decline of this habitat is alarming, the fact that the decline within wilderness and Idaho Roadless Rule Areas is no less than that within the lands managed for multiple uses. Other Management Areas suggests that the decline is both inevitable and unavoidable due to long-term fuel accumulations resulting from fire suppression. The amount of Ponderosa pine dominated forest increased in all alternatives over time, and since white-headed woodpeckers can use both closed and open forest structure, these trends in stand conditions would still sustain white-headed woodpecker habitat long term. Modeling also suggests that large and very large trees would also increase on a forestwide level and within all potential vegetation types. Overall, these trends would be positive for white-headed woodpecker

The alternatives that most affect the white-headed woodpecker are those that alter or manage forested habitats, particularly Ponderosa pine habitats. These would include management for vegetation and fire treatments to achieve vegetation desired conditions. The alternatives suggest achieving vegetation conditions at different rates. Those with faster rates of attainment would increase Ponderosa pine dominance types faster than those with slower rates of attainment. The faster rate would help to slow the loss of these stands to stand replacing wildfire. Since all the alternatives attempt to achieve the same desired vegetation conditions, all the alternatives are designed to eventually achieve higher amounts of Ponderosa pine habitat with an increased resilience to wildfire loss.

The alternatives for recommended wilderness, wild and scenic river suitability, and the recreation opportunity spectrum would have little impact on white-headed woodpeckers. Naturally, areas with more white-headed woodpecker habitat included in recommended wilderness would be slightly more beneficial for this species long term because fires from natural starts are allowed to burn restoring the natural disturbance patters of that these systems. However, it would also preclude active restoration needed to prevent potential loss from fuel build up resulting in uncharacteristic fire that could result in loss of mature Ponderosa pine trees. Most of the areas considered as recommended wilderness do not have white-headed woodpecker habitat, however. The exception is the Rapid River area, which could benefit white-headed woodpecker habitat by reducing the impacts of timber harvest in that area; it would also preclude restoration actions that may benefit white-headed woodpeckers.

The white-headed woodpecker is not a river dependent species and therefore, wild and scenic river suitability would have little effect on white-headed woodpeckers. Similarly, the alternatives that include the recreation opportunity spectrum classifications would have little effect on white-headed woodpeckers, with the exception that motorized access would allow firewood collection of Ponderosa snags. These activities would occur from existing roads and trails but are limited to the areas along roadsides. These activities may remove snags for white-headed woodpeckers. However, Ponderosa pine is not the most preferred tree species for firewood, though some people would collect some Ponderosa pine for firewood. Tree species more preferred for firewood include western larch, Douglas-fir, and lodgepole pine.

No Action Alternative

Under the No Action Alternative, vegetation conditions will continue to be departed from their historic natural range of variability. This is because the No Action Alternative directs management to manage the Nez Perce-Clearwater in the way that causes the departure in the first place. Restoration activities would continue at a lower rate, shade tolerant species would continue to be favored, and landscape pattern and patch size would continue to be departed. Similarly, fires would continue to be suppressed in much of the Nez Perce-Clearwater and would not move towards the natural range of variability. This direction would not restore Ponderosa pine habitats at a rate needed to restore the historical dominance of Ponderosa pine, nor maintain the open structure of past Ponderosa pine habitat. While these trends would continue, natural fire is projected to trend the Nez Perce-Clearwater back towards desired conditions regardless of restoration efforts. The land allocations would remain as currently composed.

Alternative W

Alternative W proposes an aggressive schedule to restore the natural range of variability. The aggressive schedule for restoration would best restore Ponderosa pine habitat to prevent loss from fuel build up and subsequent uncharacteristically hot fire. It also proposes the most recommended wilderness, which would only be slightly more protective than other alternatives because there is no white-headed woodpecker habitat in recommended wilderness areas. Alternative W recommends the Rapid River area as recommended wilderness which contains the most white-headed woodpecker habitat of the potential recommended wilderness areas considered in the alternatives. The Meadow Creek recommended wilderness area also contains limited amounts of white-headed woodpecker habitat. This alternative would include both of these areas as recommended wilderness. However, there is not much difference between management of Idaho Roadless Rule areas and recommended wilderness. The primary difference is whether timber harvest is suitable to meet other resource objectives. Timber harvest to meet other resource objectives is not suitable in recommended wilderness areas, therefore, restoration would need to occur via prescribed fire or more likely via wildfire. However, in much of the Nez Perce-Clearwater areas, fire would be the main operative disturbance, which would better restore size class, patch distribution, and forested habitats in most dominance types. Since Ponderosa pine forests have fuel build up as a result of fire exclusion, they would potentially burn hotter resulting in crowning and loss of mature trees. However, the modeling predicts that the trend towards these conditions will happen regardless of the alternatives. Alternatives of activities allowed within recommended wilderness would have little to no effect on white-headed woodpeckers. This alternative prohibits most activities in recommended wilderness except the use of motorized tools for the public and administrative uses. These would have no effect on white-headed woodpeckers.

Alternative X

Alternative X proposes the most aggressive schedule of disturbance to restore the natural range of variability. The aggressive schedule for restoration would best restore Ponderosa pine habitat to prevent loss from fuel build up and subsequent uncharacteristically hot fire, therefore, this would be the best alternative for restoring the structure and dominance types of white-headed woodpecker. Regardless of the alternative selected, the trend in the Nez Perce-Clearwater predicted by the SIMPPLLE model is that forest conditions will continue to trend towards similar conditions across all alternatives by Decade 5. Therefore, the effects to most of these habitats are similar in all alternatives because the desired conditions for forestlands do not vary. This alternative would be only slightly less protective than the other alternatives for wildlife habitats because Idaho Roadless Rule areas are fairly restrictive and would protect many of these habitats whether they are wilderness or not. All activities suitable within roadless rule areas would also be suitable within the various areas considered as recommended wilderness under this alternative. However, none of these activities would have much effect on white-headed woodpecker habitat, except that perhaps motorized suitability could allow some limited firewood gathering that might reduce some snags along existing roads or motorized trails.

Alternative Y

Alternative Y recommends lower amounts of recommended wilderness and is intermediate in the amount of vegetation management proposed. This alternative has a considerably slower rate of treatment to achieve desired vegetation conditions. This alternative achieves fewer acres of open forest structure in the dry broad potential vegetation type by the end of the 5-decade period in the SIMPPLLE model. This alternative would be only slightly less protective than the other alternatives for wildlife habitats because Idaho Roadless Rule areas are fairly restrictive and would protect many of these habitats. Regardless of the alternative selected, the trend in the Nez Perce-Clearwater predicted by the SIMPPLLE model is that forest conditions will continue to trend towards similar conditions across all alternatives by Decade 5. The effects to most of these habitats are similar in all alternatives.

Alternative Z

Alternative Z is intermediate in the amount of recommended wilderness it provides. The amount of recommended wilderness has little effect on the habitat for wildlife species over Idaho Roadless Rule areas. In some cases, recommended wilderness areas replicate natural disturbance patterns better than Idaho Roadless Rule areas. Alternative Z would best provide for species that use snags and dead trees as habitat because it would require the retention of 10-inch snags and larger. These measures would increase the number of snags retained by about a hundred snags in each potential vegetation type or dominance type within each 100 acres treated. Additionally, it would provide for those species that select smaller snags as preferred habitats. Regardless of the alternative selected, the trend in the Nez Perce-Clearwater predicted by the SIMPPLLE model is that forest conditions will continue to trend towards similar conditions across all alternatives by Decade 5. Therefore, the effects to most of these habitats are similar in all alternatives.

Preferred Alternative

The Preferred Alternative selects a pace to achieving desired vegetation conditions within 40 years. The desired vegetation conditions include an increase in Ponderosa pine dominance types both through the removal of encroaching vegetation and through harvest and planting of Ponderosa pine. The Land Management Plan also provides a timber harvest amount that may also remove some mature Ponderosa pine. Overall, Ponderosa pine increases as the total amount of large and very large Ponderosa pine increases. This should be beneficial to white-headed woodpeckers. A faster pace towards desired vegetation conditions is more beneficial to white-headed woodpeckers than a slower pace. The Preferred Alternative takes a more intensive approach that would restore these habitats more quickly. Under this alternative, white-headed woodpecker habitat increases because of forest management.

Effects to White-headed Woodpecker from Other Resources

Effects to white-headed woodpeckers from other resources resulting from plan direction are included in Table 211.

Table 211. Effects to white-headed woodpeckers from other resources resulting from plan direction

Resource Area	Environmental Consequences	Explanation
Terrestrial Ecosystems	Yes	Plan direction for warm dry potential vegetation types contributes positively to white-headed woodpecker habitat enhancement.
Biophysical Features	No	No consequences

Resource Area	Environmental Consequences	Explanation
Forestlands	Yes	Plan direction for warm dry potential vegetation types contributes positively to white-headed woodpecker habitat enhancement. Plan direction to conserve old growth Ponderosa pine habitats, along with the ability to alter them to change dominance to Ponderosa pine, would help to conserve white-headed woodpeckers.
Carbon Storage and Sequestration	No	No consequences
Meadow, Grassland, and Shrubland	No	No consequences
Fire Management	Yes	Changes to fire management direction would be positive for white-headed woodpecker compared to the No Action Alternative. Fire suppression was identified as a primary threat to this species and plan direction seeks to allow more flexibility to restore ecosystems with wildland fire.
Invasive Species	No	No consequences
Soil Resources	No	No consequences
Aquatic Ecosystems	No	No consequences
Water and Aquatic Resources	No	No consequences
Conservation Watershed Network	No	No consequences
Riparian Management Zones	No	No consequences
Infrastructure (Aquatic and Riparian)	No	No consequences
Energy and Minerals (Aquatic and Riparian)	No	No consequences
Lands and Special Uses (Aquatics and Riparian)	No	No consequences
Livestock Grazing (Aquatic and Riparian)	No	No consequences
Recreation (Aquatics and Riparian)	No	No consequences
Wildlife	Yes	Plan direction would provide for white-headed woodpeckers.
Multiple Use Wildlife	No	No consequences
Multiple Uses Elk	No	No consequences
Air Quality	No	No consequences
Tribal Trust	No	No consequences
Cultural Resources	No	No consequences
Municipal Watersheds	No	No consequences
Sustainable Recreation	No	No consequences
Scenery	No	No consequences
Public Information, Interpretation, and Education	No	No consequences
Land Ownership and Land Uses	No	No consequences

Resource Area	Environmental Consequences	Explanation
Infrastructure	No	No consequences
Suitability	No	No consequences
Ecosystem Services	Yes	Providing the opportunity to collect firewood could affect some white-headed woodpecker habitat features along roadways.
Timber	Yes	This activity could change some white-headed woodpecker habitats. Some timber production practices, especially those that regenerate mature Ponderosa pine, would be detrimental to white-headed woodpecker habitat and would take a long time to recover.
Livestock Grazing	Yes	Livestock grazing could impact shrublands or riparian habitats. However, plan components that direct the intensity or utilization of these habitats would mitigate or prevent consequences of this activity in white-headed woodpecker habitat. Aquatics plan components should conserve White-headed woodpecker habitats. These plan components would address this threat.
Energy and Minerals	No	No consequences
Special Forest and Botanical Products	No	No consequences
Designated Wilderness	Yes	Beneficial effects on white-headed woodpecker habitats.
Wild and Scenic Rivers	No	No consequences
Lolo Trail National Landmark	No	No consequences
Recommended Wilderness	Yes	Some white-headed woodpecker populations occur within some alternatives for recommended wilderness. Plan components directing management of recommended wilderness may prevent active management to enhance or restore white-headed woodpecker habitat.
Idaho Roadless Rule Areas	Yes	Some white-headed woodpecker populations occur within some roadless areas. Regulations directing management of some roadless themes may prevent active management to enhance or restore white-headed woodpecker habitat.
Research Natural Areas	No	No consequences
Lower Salmon	Yes	The Lower Salmon River Geographic Area has specific direction to address white-headed woodpecker habitats.
Gospel-Hump	No	No consequences
Pilot Knob	No	No consequences
Lolo Trail National Historic Landmark	No	No consequences
Special Interest Areas	No	No consequences

Conclusion

The effects to white-headed woodpeckers and their habitat from the suite of plan components vary across the range of alternatives within the Land Management Plan, mostly in the pace to achieving desired vegetation conditions. Prescribed fire, fuels treatments, and harvest will become an increasingly important tool for managing the Nez Perce-Clearwater and achieving desired ecosystem conditions. The action alternatives vary the intensity and acres of treatment used for fuels treatments, prescribed burning, vegetation restoration, and harvest but do reflect an increase in these activities from the current pace of treatments. The amount of recommended wilderness area and wild and scenic river suitability matter little to white-headed woodpeckers. Plan direction would move away from historical approaches of managing towards fire suppression to an approach that trends towards conditions that would benefit white-headed woodpeckers. Coarse filter plan components are the primary means to conserve white-headed woodpeckers, and the modeling supports the conclusion that the species would benefit from the proposed management and alternative selected.

Threatened, Endangered, Candidate, and Proposed Wildlife Species

The following analysis addresses the effects to federally listed threatened, endangered, candidate, and proposed (TECP) species and their habitat from the suite of plan components and range of alternatives considered in the Land Management Plan. This analysis will evaluate how the suite of plan components and alternatives provide for ecosystem integrity as it relates to federally listed wildlife and how the plan components and alternatives contribute to the recovery of federally listed threatened and endangered species and conserve proposed and candidate species.

Data was obtained from the most recent list of threatened, endangered, and candidate species via the U.S Fish and Wildlife Service's Information for Planning and Consultation (IPaC) database, accessed multiple times throughout the planning process. The most recent list updated list was obtained prior to closure on the biological assessment from the U.S. Fish and Wildlife Service's Idaho Department of Fish and Wildlife Office via the IPaC obtained on June 2, 2023, Project Code: 2023-0088941 (USFWS 2023). Information to develop plan components and complete the analysis was derived from various sources, including recovery plans, petitions for listing, 12-month findings, and other documents produced by the U.S. Fish and Wildlife Service. Plan components for lynx are identical to those in the Northern Rocky Mountains Lynx Direction (U.S. Department of Agriculture 2007d).

The Land Management Plan establishes direction for various wildlife habitats in relation to structure, function, composition, and connectivity. The plan also includes direction for the protection, enhancement, and restoration of threatened and endangered species and their habitats. The Land Management Plan interdisciplinary team worked closely to integrate plan direction during the development of the plan components, especially wildlife, vegetation, fire, and access or recreation.

Providing for ecological integrity is an outcome of the Land Management Plan. It starts with a comparison of the current abundance and condition of various habitats with ecological reference conditions (historic range of variability) based on knowledge of the past and an understanding of ecological processes, such as fire, flooding, insects, and disease. This coarse filter approach delivers ecological conditions that provide for the diversity and abundance of wildlife. The coarse filter approach is reflected in the Forestlands' desired conditions in the Land Management Plan. The coarse filter approach forms the foundation of the analysis for each species.

The best available scientific information about federally listed threatened, endangered, proposed, and candidate species was reviewed to understand how the required ecological conditions and ecological integrity contribute to the recovery or conservation of these species. In doing so, key ecosystem characteristics required by each species and key threats and stressors were identified and evaluated to determine whether they were in effect on the Nez Perce-Clearwater under the 1987 Plans and, if so, to what extent.

Generally, plan components were first developed to offer coarse filter ecosystem characteristics to deliver ecological conditions that would provide for ecological integrity and contribute to the recovery of threatened or endangered species and conserve candidate species. When ecological conditions were insufficient to contribute to the recovery of federally listed threatened or endangered species or conserve candidate species, species-specific plan components were developed where appropriate. The species-specific plan components include desired conditions, goals, objectives, suitability, standards, and guidelines.

A spatial and temporal analysis provided the basis for conclusions about the effects of plan direction and plan components on threatened, endangered, candidate and proposed (TECP) species. In general, the analysis area for environmental consequences for these species includes the National Forest System lands within the Nez Perce-Clearwater. Areas selected for analysis of cumulative effects were large enough to include the consequences of activities on all lands but not large enough to obscure effects. The cumulative effects for each species are identified in their respective sections.

A thorough review of scientific information was completed, and the best available scientific information was used to inform the planning process and develop plan components. Key information on the population, life history, and status of TECP animal species on the Nez Perce-Clearwater was obtained from a variety of sources. Part 219.3 of the 2012 Planning Rule requires the responsible official to use the best available science to determine what is most accurate, reliable, and relevant. For the best available scientific information, the Nez Perce-Clearwater used available peer-reviewed articles and data in which reliable statistical or other scientific methods were used to establish the accuracy or uncertainty of any findings (Forest Service Handbook 1909.12 Zero Code 07.12). For best relevance, the Nez Perce-Clearwater used studies conducted in proximity to the plan area in north central Idaho, eastern Washington, eastern Oregon, western Montana, or western North America in habitat conditions like those that occur in the plan area. If these were not available, articles were selected that considered ecological processes or conditions relevant to the analysis area. The Nez Perce-Clearwater attempted to avoid professional opinion or publications that have not been peer-reviewed when peer-reviewed information was available. However, in accordance with 2012 Planning Rule directives on sources of scientific information, scientific information that may be considered the best available scientific information may include expert opinions, panel consensuses, inventories, or observational data prepared and managed by the Forest Service, other federal agencies, universities, national research networks, other reputable scientific organizations and data from public and governmental participation. In some cases, there is opposing, incomplete, or unavailable scientific information about a species or its habitat. This was also considered in accordance with requirements of the National Environmental Policy Act. Data and information gaps exist, but the breadth and depth of the available scientific information is sufficient to determine the key stressors and plan components to address those key stressors.

Existing Condition

The Nez Perce-Clearwater queried the U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) database for a list of federally listed species and is included below (Table 212). Because of the size of the spatial data used in the request, queries were requested separately for the Nez Perce and Clearwater National Forests, but the species lists for the two forests were the same.

Table 212. List of wildlife species in the plan area identified as federally listed by the U.S. Fish and Wildlife Service

Common name	Latin name	Federal listing	Comments
Grizzly Bear	*Ursus arctos horribilis*	Threatened; No Critical Habitat Designated; Plan Area Contains Part of the Bitterroot Recovery Zone	Transitory grizzly bears may be present in portions of the Plan Area. The Plan Area does not have a population of grizzly bears
Canada Lynx	*Lynx canadensis*	Threatened; No Critical Habitat Designated	Clearwater National Forest is occupied, Nez Perce National Forest is unoccupied. Transitory

Common name	Latin name	Federal listing	Comments
			lynx may be present within any portion of the Plan Area
North American Wolverine	*Gulo gulo*	Proposed Threatened; No critical habitat has been designated for this species.	Occupies the Nez Perce-Clearwater National Forest
Northern Idaho Ground Squirrel	*Urocitellus brunneus*	Threatened; No critical habitat has been designated for this species.	Does not occur on the Nez Perce-Clearwater National Forest (but does occur in Idaho County).

Bull trout, whitebark pine, and Spalding's catchfly were also identified as occurring within the plan area but are addressed in other sections. The Northern Idaho Ground squirrel (*Urocitellus brunneus*) is included in the list of threatened and endangered species received from U.S. Fish and Wildlife Service, but this species is not known to occur within the plan area. While there is no established population of grizzly bears, they may be present in the Nez Perce-Clearwater. Furthermore, the plan area contains portions of the Bitterroot Recovery Zone, and the grizzly bear has been a subject of interest from the public in comments and will be addressed below.

Past resource use and the exclusion of fire for almost 100 years has caused changes in some wildlife habitats. As documented in the Land Management Plan analysis, defining and measuring the status of ecosystems now and comparing them to desired future conditions is the foundation for sustainability of ecosystems on the Nez Perce-Clearwater. The vegetation features assessed as “key indicators” for wildlife considered include changes in forest composition, structure, and pattern. These features are very much related to the quality and quantity of wildlife habitats.

The allocation of lands on the Nez Perce-Clearwater has been divided in the past by congressional or agency designations, such as designated wild and scenic rivers, designated wilderness, and Idaho Roadless Rule areas. Thus, the bulk of the land area consists of these designated areas. While many people are interested in what happens in the managed front, about two-thirds of the Nez Perce-Clearwater is influenced by these designations. It made sense during the development of the plan to identify these different areas as management areas. The distribution of the various management areas has greater influence on the overall impact of the management of the Nez Perce-Clearwater on wildlife. See the Land Management Plan for the management area descriptions.

Lynx

On March 24, 2000, the U.S. Fish and Wildlife Service published the final rule listing the contiguous United States distinct population segment of Canada lynx as a threatened species (65 FR 16052). In its analysis of threats to the species, the U.S. Fish and Wildlife Service concluded that the single factor threatening the distinct population segment was the inadequacy of existing regulatory mechanisms, specifically the lack of guidance for conservation of lynx in National Forest System land, resource management plans, and Bureau of Land Management land use plans. The U.S. Fish and Wildlife Service prepared a recovery outline for the Canada lynx (U.S. Department of the Interior 2005a). A recovery outline is intended to provide interim guidance for consultation and recovery efforts until a formal recovery plan has been approved. No recovery plan has been developed for lynx. The recovery outline did not establish recovery goals but did identify a preliminary set of objectives and potential recovery actions for each area. Under the recovery outline, lynx habitat was stratified into core, secondary, and peripheral areas based on lynx occupancy, reproduction, and use, as documented by historical and current records. The U.S. Fish and Wildlife identified core areas where there was strong evidence of long-term persistence of lynx populations, including both historical records of lynx occurrence over time and recent evidence of presence and reproduction within the past 20 years. Both the Nez Perce and Clearwater National Forests are secondary areas for Canada lynx, as identified by the U.S. Fish and Wildlife Service (U.S. Department of the Interior 2005a).

The Northern Rockies Lynx Management Direction (NRLMD) amended 18 forest plans for the national forests in Idaho, Montana, Utah, and Wyoming, including the Nez Perce-Clearwater (U.S. Department of Agriculture 2007c). The amendment adopted forest plan components applicable to vegetation management, livestock grazing, human uses, and linkage areas to conserve and promote the recovery of the lynx by reducing or eliminating adverse effects from land management activities on National Forest System lands while preserving the overall multiple-use direction in existing plans. In March of 2007, the U.S. Fish and Wildlife Service issued a biological opinion on the effects of the Northern Rocky Mountains Lynx Amendment on the distinct population segment of Canada lynx in the contiguous United States. In its 2007 biological opinion, the U.S. Fish and Wildlife Service concluded that the level of adverse effects to lynx that may result from implementation of the NRLMD are not reasonably expected to either directly or indirectly appreciably reduce the likelihood of survival and recovery of the lynx distinct population segment in the wild by reducing the reproduction, numbers, or distribution of lynx (Interagency Lynx Biology Team 2013). The Clearwater National Forest was considered occupied while the Nez Perce National Forest was considered unoccupied. Both national forests are considered secondary habitat for Canada lynx. The effects were considered differently between the national forests—the effects on the Clearwater National Forest were evaluated for resident lynx while the effects on the Nez Perce National Forest were considered for transient lynx.

Methodology and Analysis Process

Canada lynx use of habitat within their home range is dependent upon vegetation condition. Lynx analysis units are landscape units that approximate the size of a female lynx's annual home range and encompass all seasonal habitats. These may also contain areas of non-lynx habitat, such as open meadows, especially in mountainous regions (Interagency Lynx Biology Team 2013). The existing vegetation condition of Canada lynx habitat is estimated for each lynx analysis unit on the Nez Perce-Clearwater based upon past vegetation treatments and historic fire occurrence data.

For the Land Management Plan, habitats across the Nez Perce-Clearwater have been grouped into broad potential vegetation types (PVTs). These are groupings based upon habitat types. PVTs serve as a basis for describing certain ecological conditions across the Nez Perce-Clearwater and are useful in understanding the various ecosystems and their potential productivity, natural biodiversity, and the kinds of processes that sustain these conditions. PVTs are based upon vegetation potential, whereas dominance types describe existing vegetation.

In 2014, as part of the Land Management Plan process, the mapped lynx habitat was revised to develop consistent mapping criteria across both the Nez Perce and Clearwater National Forests and to include the best available scientific information concerning lynx population dynamics, distribution, habitat use, competitor interactions, prey species, and human interactions that have become available since 2007. This mapping was also completed in coordination with the U.S. Fish and Wildlife Service and was based upon broad PVTs. This process resulted in the revised mapping of 78 lynx analysis units across the Nez Perce-Clearwater (U.S. Department of Agriculture 2014d). The revised lynx analysis units will be used to display the amount, relative quality, and distribution of lynx habitat across the Nez Perce-Clearwater. See the 2014 Nez Perce-Clearwater Forest Plan Assessment (U.S. Department of Agriculture 2014d) for more details on this and other aspects of the methodology and analysis process. This analysis and change in lynx analysis units is in line with guidance within the Northern Rockies Lynx Management Direction (NRLMD) with review and approval by regional staff.

After this mapping effort, the Nez Perce-Clearwater experienced large wildfires between 2015 and 2018. The amount of habitat currently unsuitable for lynx required updating to have an accurate accounting of effects and modeling with PRISM and SIMPPLLE. Therefore in 2018, the Nez Perce-Clearwater updated the habitat spatial data to update the amount of habitat currently unsuitable within lynx analysis units (Lutes 2019). The update consisted of using the Forest Service Activity Tracking System (FACTS) database to update areas currently unsuitable due harvest activities and updating the amount of habitat that changed from unsuitable to suitable as a result of forest aging and used burn severity data from sources, such as Rapid Assessment of Vegetative Condition after Wildfire (RAVG), Burned Acres Reflectance Classification (BARC), or Monitoring Trends in Burn Severity (MTBS), to identify areas of potential lynx habitat which burned at moderate to severe levels which were considered currently unsuitable for lynx. For more detailed information about the lynx habitat mapping process see the Nez Perce-Clearwater National Forest' Forest Plan Assessment (U.S. Department of Agriculture 2014d) and the U.S. Department of Agriculture's 2019 Lynx Habitat Mapping Update 2018 Process Steps (Lutes 2019).

In Olson (2021) and others developed a refined model of lynx habitat across the northwestern United States using environmental predictors and GPS data from lynx populations in Washington, Montana, and Wyoming. This model indicates high relative probability of lynx habitat on the Idaho and Montana sides of the Lolo Pass area, south of Powell in the Wind Lakes, Kooskookia Meadows, and Elk Summit Area. This habitat model is currently under review for use as a habitat analysis and management tool within the Northern Region. If adopted, lynx analysis unit boundaries may be re-delineated to better line up with the new model.

PRISM modeling was used to estimate forest growth, trends, and yield. The PRISM results were then run through SIMPPLLE to project out 50 years on how the Nez Perce-Clearwater will interact with wildfire, insects and disease, and vegetation management under the alternatives. The SIMPPLLE model is a spatially explicit model that uses logic pathways to predict how forests respond over time to succession, wildfires, and insect and disease risks based on cover types, size classes, crown closure, aspect, and slope (Chew, Moeller, and Stalling 2012). This model was used for assessments of the natural range of variation and the potential future consequences of alternatives. For the Final Environmental Impact Statement, SIMPPLLE model pathways and assumptions were updated to better reflect the northern Idaho climate, tree growth, dominance type behavior, and fire behavior. The updated models and assumptions provided improved estimates of the natural range of variability and vegetation and responses to management. The changes are described in the Forestlands section and appendices.

Information Sources and Incomplete or Unavailable Information

A synthesis of information on lynx biology and ecology that is relevant to lynx at the national scale can be found in *Ecology and Conservation of Lynx in the United States* (Ruggiero and McKelvey 1999) and in the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013). The final rule listing lynx (65 FR 16052) and the notice of remanded determination (68 FR 40076) evaluated population status and threats for the contiguous United States distinct population segment. The recovery outline (U.S. Department of the Interior 2005a) provided preliminary recovery objectives and actions based on an understanding of current and historical lynx occurrence and lynx population dynamics in the contiguous United States.

At the forest scale, some information used to assess lynx habitat is incomplete or unavailable. At any given point in time in a forest stand's development, it may provide habitat in a suitable condition, or it may provide lynx habitat in a temporarily unsuitable condition, depending upon the existing vegetation condition. Vegetation condition is dependent upon time due to disturbances, such as fire and timber harvest, and the rate of forest succession. Satellite imagery and forest databases can be used to accurately classify recently harvested and burned areas, which helps to identify areas that provide lynx habitat in an unsuitable condition on a temporary basis. However, satellite imagery is poor at detecting the dense horizontal cover that provides snowshoe hare habitat in a multistory forest structure, which is an important feature of lynx foraging habitat, and downed woody material for denning habitat. Therefore, no forestwide estimates were made for these components of lynx habitat. During site-specific planning, habitat types used for the modeling and mapping of lynx habitat are verified and refined and lynx habitat is further characterized to estimate the amount and distribution of foraging and denning habitat components.

In February 2009, the U.S. Fish and Wildlife Service designated revised critical habitat in Montana, Wyoming, Idaho, Washington, and other states. Critical habitat was not designated on the Nez Perce or Clearwater National Forests. On September 26, 2013, the U.S. Fish and Wildlife Service published a proposed rule for revised critical habitat in the Federal Register (50 CFR Part 17—Canada Lynx). No critical habitat was proposed for the Nez Perce-Clearwater in the proposed rule.

Analysis Area and Temporal Scale of Analysis

The period considered for the analysis of indirect effects of the alternatives is the anticipated life of the Land Management Plan, which is about 15 years. However, because lynx habitat is dynamic, the anticipated vegetation and changing climate conditions were evaluated over longer time periods. The SIMPPLLE model was used to estimate the natural range of variation as it would have influenced forest ecosystems on the Nez Perce-Clearwater going back about 1,000 years (See Appendix B). The effects of the alternatives on lynx habitat were modeled over the next 50 years by the Ecosystem Research Group in 2019. The Ecosystem Research Group modeled several scenarios for comparison purposes, including a warmer, drier climate over the next five decades and acres burned. Lynx habitat on the Nez Perce-Clearwater is subdivided into lynx analysis units for the analysis of effects on Canada lynx. Lynx habitat within the U.S. Fish and Wildlife Service Northern Rockies Geographic Area has been divided into lynx analysis units to facilitate analysis, management, and monitoring. A detailed description of how lynx habitat and lynx analysis units were mapped can be found in the 2014 Assessment (U.S. Department of Agriculture 2014d) and a summary of those efforts are presented below. A map of the lynx analysis units and lynx habitat are found within the Final Environmental Impact Statement Appendix A.

The area used for the analysis of indirect effects on Canada lynx is the Nez Perce-Clearwater's modeled lynx habitat (U.S. Department of Agriculture 2014d). Habitat mapping criteria were developed to represent important life history characteristics, including foraging and denning. Lynx analysis unit delineations and habitat mapping actions directed by the Canada Lynx Conservation Assessment and Strategy (Ruediger et al. 2000a) were completed for both the Nez Perce and Clearwater National Forests. Mapping of primary habitat was based on forest types necessary to support lynx survival and reproduction specific to each geographic area (Ruediger et al. 2000b, Sandberg et al. 2002). The Nez Perce National Forest initially mapped lynx habitat between 2000 and 2002 and then revised the mapped habitat in 2004. The Clearwater National Forest revised its mapped lynx habitat in 2007. This mapping was completed in coordination with the U.S. Fish and Wildlife Service. The area of lynx habitat modeled and mapped by the Nez Perce-Clearwater in 2014 was 1,457,768 acres.

The size of the lynx analysis unit reflects female home range size in the geographic unit. Enough habitat must be present within the lynx analysis unit to support a female lynx. For example, in the western United States, it appears that at least 10 square miles of primary vegetation must be present. The arrangement of habitat within the lynx analysis unit should take into consideration the daily movement distances of resident females. Since the lynx analysis unit represents a hypothetical female home range and is the basis for analysis, it can be larger and contain more lynx habitat than an actual home range.

Lynx analysis units on the Nez Perce-Clearwater are in accordance with guidance provided in the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) and the Northern Rockies Lynx Management Direction. There are 79 lynx analysis units that are wholly or partially within the Nez Perce-Clearwater. These lynx analysis units encompass a total of about 2,505,072 million acres on the Nez Perce-Clearwater. Changes to lynx analysis units may only be made if site-specific habitat information demonstrates it is needed and after review by the Forest Service Northern Region Regional Office. As there is no critical habitat for lynx in the plan area, there are no effects to critical lynx habitat.

The Northern Rockies Geographic Area encompasses 18 national forests and an estimated 18.5 million acres of lynx habitat in Montana, Idaho, Wyoming, and Utah. The Northern Rockies Geographic Area provides context for the analysis of cumulative effects. Adjoining areas in Canada were also considered with respect to connectivity. See Appendix A for a map of the lynx habitat and linkages.

Forest and Lynx Ecology

Across their range, lynx typically occur in boreal and subalpine coniferous forests dominated by subalpine fir and spruce in landscapes with gentle topography (Squires et al. 2013). On the Nez Perce-Clearwater, the cool moist and cold potential vegetation types (PVTs) are capable of growing subalpine fir, Engelmann spruce, and lodgepole pine, but the dominance type and structural stage can change over time due to factors, such as fire, insects and disease, vegetation management, and forest succession (U.S. Department of Agriculture 2014l). Engelmann spruce and subalpine fir tree species may also be found in other forest dominance types because they are very shade tolerant and commonly occur in mid-story and understory tree canopy layers with western larch, lodgepole pine, and Douglas-fir in the overstory. Lodgepole pine has been found to be an important component of mixed conifer stands in lynx habitat (Holbrook, Squires, Olson, DeCesare, and Lawrence 2017). Lodgepole pine is a fire adapted species that can dominate after wildfire. It can also be a component in mixed conifer stands. Lynx modeling incorporated these broad PVTs within the cold and cool moist broad PVTs as modeled lynx habitat.

During the winter and early spring, availability of den sites is important to lynx. Boutros et al. (2007) and Moen et al. (2008) found that coarse downed woody material provides kittens with protection from extreme temperatures, precipitation, and predators (Interagency Lynx Biology Team 2013). Lynx dens are typically found in multistory stands of spruce-fir forests with dense horizontal cover and abundant coarse downed woody material. Squires et al. (2008) found that 80 percent of dens were in mature forest stands and 13 percent in mid-seral regenerating stands. Young stands that were either naturally sparse or mechanically thinned were seldom used for denning. Denning habitat is generally abundant across the coniferous forest landscape of north central Idaho and is not likely to be limiting for lynx (Squires et al. 2008, 2010, Squires et al. 2006).

In Montana, Squires et al. (2010) reported that horizontal cover was denser at lynx kill sites than along travel paths. They further reported that lynx kill sites were associated with a higher proportion of spruce-fir overstory than lodgepole pine overstory and that neither snow depth nor snow penetrability influenced lynx kill sites. In Ruggiero et al. (2007), Hodges reported that snowshoe hare abundance is also positively associated with dense horizontal cover. In western Montana, Griffin and Mills (2007) found the highest snowshoe hare densities in regenerating conifer stands that had a high density of saplings, defined as more than 2,267 stems per acre, in mature multistory conifer stands that had abundant saplings. Hare abundance was negatively affected in stands treated with traditional pre-commercial thinning prescriptions that reduced stem densities to about 263 to 526 stems per acre (Griffin and Mills 2007).

Squires et al. (2010) compared lynx resource selection in summer versus winter, including lynx success in capturing snowshoe hares, their primary prey. During winter, lynx foraged primarily in mid- to high-elevation forests at 4,134 to 7,726 feet composed of mature large-diameter trees with a diameter at breast height greater than 11 inches. In a comparison of use versus availability within a lynx home range, Squires et al. (2010) found that lynx selected forests with relatively denser horizontal cover, more abundant hares, and deeper snow. They preferred forests that had a multistory structure with dense horizontal cover provided by the young trees in the understory and conifer boughs touching the snow surface, which could support snowshoe hare populations at varying snow depths throughout the winter. Engelmann spruce and subalpine fir were the dominant tree species in forests used by lynx, but these forests contained a mix of other conifer species, including lodgepole pine, western larch, and Douglas-fir. Squires et al. (2010) stated that the primary limiting factor for Canada lynx in northwest Montana appears to be suitable winter foraging habitat.

During the summer months, lynx in Montana broaden their preferred habitat use to include more of the early-successional forest stand initiation structural stage with dense horizontal cover provided by abundant shrubs, spruce and fir saplings, and small-diameter trees (Squires et al. 2010). These conditions can occur in forests burned by wildfire, regenerated by insects or disease, or regenerated by timber harvest. Squires et al. (2010) found that lynx used slightly higher elevations during the summer but, as in winter, were located below the alpine zone and above the low-elevation dry forests dominated by Ponderosa pine. The low-elevation Ponderosa pine forests were not modeled as potential lynx habitat on the Nez Perce-Clearwater.

Young regenerating stands of 20 to 40 years can support high densities of snowshoe hares before growing into a structure that no longer provides the needed dense horizontal cover. A regular influx of this “early stand initiation stage” of forest succession created by processes such as fire or vegetation management can help to enhance snowshoe hare production. Cheng et al. (2015) studied snowshoe hare densities in areas of Glacier National Park that were burned by wildfire in 1988 and 1994. Hare pellet densities in lodgepole pine stands were 10 times higher 17 years post-fire at the time of their study than in the 11-year post-fire forests or other mature forests. Their “best” model for habitat predicted that the mean pellet density for 17-year-old lodgepole forests equates to hare densities nearly three times the threshold believed necessary to support lynx populations. Among the continuous habitat parameters measured in the Cheng et al. (2015) study, only understory cover at a height of 0 to 20 inches above the ground surface and percent canopy cover were identified as predictors of hare density. Mean pellet density increased slowly with understory cover up to 80 percent, above which pellet densities declined (Cheng et al. 2015). Mean pellet densities increased from 10 percent canopy closure to 70 percent canopy closure when other variables were held at typical values. Cheng et al. (2015) stated that snowshoe hares’ association with diregenerating lodgepole pine forests is transient because these forests will eventually grow tall enough and dense enough to no longer provide the habitat conditions selected by snowshoe hares.

At the landscape scale, a mosaic of forest structure, from young regenerating to mature multistory stands, is recommended to provide for the habitat needs of lynx (U.S. Department of Agriculture 2020a). Kosterman et al. (2018) collected field data on denning and offspring survival in northwest Montana from 1998 to 2012, studying the relationship between female lynx reproductive success and habitat composition and arrangement at the scale of a lynx home range on the Kootenai and Lolo National Forests. Kosterman et al. (2018) found that abundant and connected mature forests and intermediate amounts of small-diameter regenerating forests defined whether the female produced kittens or not. Small-diameter regenerating forests were described as “smaller sized” trees with an approximate diameter at breast height of 3.93 to 5.9 inches, intermediate canopy cover, and high horizontal cover. Reproductive success was highest for females with small-diameter regenerating forests between 12 to 20 percent and higher connectivity of mature forest. Reproductive success remained high when forests had small-diameter sized trees up to 20 percent and then declined slightly beyond 20 percent. Kosterman et al. (2018) suggested that in addition to the connectivity of mature forest, the amount of small-diameter regenerating forests aids the reproductive success of female lynx.

The Canada lynx range extends from Alaska, across much of Canada, except for the coastal forests, with southern extensions into parts of the western United States, the Great Lakes region, and the northeast. Lynx distribution is closely tied to the distribution of snowshoe hares and boreal forests (McKelvey, Aubry, and K. 1999). The Nez Perce-Clearwater is in the U.S. Fish and Wildlife Service's Northern Rocky Mountain Region of the contiguous distinct population segment of Canada lynx.

Snowshoe hares are the primary winter prey of lynx (Squires and Ruggiero 2007), as they are throughout the range of lynx (Ruggiero et al. 1999). Lynx are highly specialized predators of snowshoe hares with unique adaptations that include a lightweight body frame and large paws that enable them to travel on top of deep snow. In their study of lynx winter diets in northwest Montana, Squires et al. (2013) described 86 lynx kills that included 7 prey species. Snowshoe hares contributed about 96 percent of prey biomass, whereas red squirrels, the second most common prey, provided only about 2 percent of prey biomass (Squires et al. 2006).

Lynx do not occur everywhere within the range of snowshoe hares in the contiguous United States, as discussed in both Bittner and Rongstad (1982) and McCord and Cardoza (1982). This may be due to inadequate abundance, density, the spatial distribution of hares in some places, the absence of snow conditions that would allow lynx to express a competitive advantage over other hare predators, or a combination of these factors (U.S. Department of the Interior 2014c). In the southern part of its range, the low densities of lynx populations are likely a result of naturally patchy habitat and lower densities of their snowshoe hare prey (Adams 1959, Griffin and Mills 2004, Koehler et al. 1979, Mills et al. 2005).

The most commonly reported causes of Canada lynx mortality include (1) starvation, especially of kittens, and (2) human-caused mortality, including trapping and shooting (Interagency Lynx Biology Team 2013). Predation of lynx by mountain lion, coyote, wolverine, gray wolf, fisher, and other lynx has been confirmed (Interagency Lynx Biology Team 2013). Squires and Laurion (1999) reported that two out of six mortalities of radio-collared lynx in Montana were due to mountain lion predation.

About 0.23 percent, or about 3,352.8 acres, of lynx habitat in lynx analysis units was treated by regeneration harvest on the Nez Perce-Clearwater since 2000 (FACTS data, accessed August 2019). Holbrook et al. (2018) evaluated lynx resource use of silviculture treatments over a temporal gradient of 1 to 67 years after treatment. They found that, while lynx used treatments, lynx use was low until approximately 10 years of age for all forest treatment types, including thinning, selection cuts, and regeneration cuts. Furthermore, cumulative use in both winter and summer by lynx reached 50 percent at approximately 20 years after a thinning treatment.

While it took about 20 years for lynx to begin using regeneration and selection cuts (Holbrook et al. 2018), it took approximately 34 to 40 years after a selection or regeneration cut for cumulative lynx use to reach 50 percent. Lynx use of regeneration cuts in the winter was best explained by time since treatment. In summer, the composition and abundance of forest structural stages surrounding a particular treatment also influenced lynx use (Holbrook et al. 2018). Lynx appeared to use regeneration and selection cuts similarly over time, suggesting that the difference in vegetation impact between these treatment methods makes little difference relative to potential impacts to lynx.

Holbrook et al. (2017) found that snowshoe hares were associated with horizontal cover and that hare use increased with increasing amounts of horizontal cover. Horizontal cover increased with the abundance of subalpine fir and Engelmann spruce forests. Holbrook et al. (2017) also demonstrated a relationship between the abundance of lodgepole pine and snowshoe hare abundance in addition to horizontal cover. Snow depth was an important covariate to predict snowshoe hare occupancy, and snow depth is predicted to decrease under future climates. Their data indicated that dense horizontal cover within multistoried forests with a substantial component of medium-sized trees of 5 to 10 inches produced the highest use by snowshoe hares (Holbrook, Squires, Olson, Lawrence, and Savage 2017). Results from their data support conclusions like previous studies in that disturbing multistoried forests with high stem densities, particularly in the understory, by cutting or burning would likely have a negative effect on snowshoe hares in the short-term but may benefit them in the future (Holbrook, Squires, Olson, Lawrence, and Savage 2017).

Under some conditions, motorized over-snow vehicle use may have detrimental effects on lynx. In the past, some researchers have speculated that compacted trails could indirectly affect Canada lynx by serving as travel routes that might enable competing predators, such as coyotes, to access snowshoe hare prey in lynx habitat (Murray and Boutin 1991, Murray et al. 1994, Ruggiero et al. 1999). However, in its remanded determination (68 FR 40076), the U.S. Fish and Wildlife Service (2003) found no evidence of competition between lynx and other predators or no evidence that it exerts a population-level impact on lynx if competition exists. Therefore, the U.S. Fish and Wildlife Service did not consider compacted trails to be a threat to lynx. Additionally, Kolbe et al. (2007) completed a study of the effect of snowmobile trails on coyote movements in lynx habitat in northwest Montana. They reported that coyotes in their study area were primarily scavengers in winter since snowshoe hare kills composed only three percent of coyote feed sites. Furthermore, coyotes did not forage closer to compacted snowmobile trails than random expectation and the overall influence of snowmobile trails on coyote movements and foraging success appeared to be minimal (Kolbe et al. 2007). However, because snow compaction results varied across the 18 national forests encompassed by the Northern Rockies Lynx Management Direction, guideline HU G11 specified that designated over-the-snow routes or designated play areas should not be expanded outside baseline areas of consistent snow compaction unless designation serves to consolidate use and improve lynx habitat. Squires et al. (2010) reported on the effects of snowmobiling on Canada lynx in their Seeley Lake, Montana study area. They were unable to quantify the number of snowmobiles using National Forest System roads in lynx home ranges, but one primary groomed trail was used by approximately 130 snowmobiles per day. They reported that they found no evidence that lynx selected areas away from National Forest System roads or groomed snowmobile trails during winter.

Effects of winter recreation on lynx were studied in Colorado. Olson et al. (2018) tracked 18 lynx and concurrently tracked snowmobilers and backcountry skiers. They found that lynx decreased their movement rate in areas with high-intensity back-country skiing and snowmobiling and adjusted their temporal patterns so that they were more active at night in areas with high-intensity recreation but did not find consistent evidence of spatial avoidance of recreation. Lynx exhibited some avoidance of areas with motorized recreation but selected areas near non-motorized recreation trails. Lynx did avoid high intensity use ski resorts, especially when use was intense. Olson et al. (2018) concluded that lynx did not exhibit strong negative responses to dispersed recreation but instead altered their behavior and temporal patterns in a nuanced response to recreation, perhaps to decrease direct interactions with recreationists. Based on observed avoidance of developed recreation, Olson et al. (2018) concluded that there may be a threshold of human disturbance above which lynx cannot coexist with winter recreation.

Affected Environment—Canada Lynx Habitat

The lynx recovery outline (U.S. Department of the Interior 2005a) stratified lynx habitat into three categories: core, secondary, and peripheral. Core areas are places where long-term persistence of lynx and recent evidence of reproduction have been documented and where the quality and quantity of habitat provides for both lynx and snowshoe hare. The lynx recovery outline emphasized focusing conservation efforts on core areas to ensure the continued persistence of lynx in the contiguous United States. Six core areas were identified in the recovery outline while other areas were identified as secondary habitats for lynx. The Nez Perce-Clearwater is located entirely within secondary areas.

Specimen records of lynx in Idaho during the early 1900s are relatively common (McKelvey, Aubry, and K. 1999). McKelvey et al. (1999) reported 22 museum specimens of lynx from 1874 to 1917, all of which were collected north of the Snake River plain in Idaho. Thirteen other verified records prior to 1960 were also from the north central and northern regions of the state (McKelvey, Aubry, and K. 1999). There are 35 verified records from 1960 to 1991 with most coinciding with lynx eruptions in the 1970s.

Idaho Department of Fish and Game personnel surveyed 20 routes that had adequate snow conditions from 2004 to 2006 and detected no lynx (Interagency Lynx Biology Team 2013). From 2010 to 2013, the Idaho Department of Fish and Game conducted forest carnivore surveys in the Selkirk, Purcell, and West Cabinet Mountains, finding one male lynx in the Selkirk's in 2010 and one male lynx in the Idaho Purcell Mountains in 2011. In 2012, a lynx was found on the Salmon-Challis National Forest. One lynx was also found in northern Idaho in 2013. In February of 2014, a lynx was captured and collared in the West Cabinet Mountains. Lucid et al. (2016) surveyed for multiple species between 2010 and 2014 in a multi-basin initiative in the Panhandle region of Idaho. During these surveys, Lucid et al. (2016) detected two male and three female Canada lynxes within the Purcell, Cabinet, and Selkirk Mountains. Lynx were not detected in the Coeur d'Alene or Saint Joe National Forests (Lucid et al. 2016).

Using protocol developed by Squires et al. (Squires et al. 2004, Squires et al. 2012), snow track surveys in 2007 (Ulizio et al. 2007) and again in 2013 (Stone et al. 2013) on the Nez Perce National Forest did not detect lynx. In 2013, an experienced lynx tracking crew covered all routes twice, which strengthens the detection probability that can suggest absence with 95 percent certainty if present, or conversely (Squires et al. 2012). Much of the surveyed area appears to be suitable habitat that supports snowshoe hare and the lack of detection suggests that lynx are rare or infrequent to the Nez Perce National Forest. Following the protocol established by McKelvey et al. (1999), five transects hair snare surveys during the summer and fall of 2008 on the Nez Perce National Forest also did not detect lynx (Bonn 2008).

Lynx are wide-ranging animals. The presence of a population would be detected given the vast network of roads and trails given the lynx-specific survey work conducted on the Nez Perce National Forest and extensive surveys for other species using hair snares, snow track surveys, and camera stations conducted on the Clearwater National Forest, such as the U.S. Fish and Wildlife Service grizzly bear survey between 2008 to 2009, the Forest Service fisher survey between 2002 to 2014, and the Idaho Department of Fish and Game yearly aerial surveys for many species. Historical sightings that have been confirmed may be the result of transient lynx moving through the Nez Perce-Clearwater, but the infrequency of such reports suggests that lynx are incidental to the area (Ulizio et al. 2007).

In the Northern Rockies Lynx Management Direction (NRLMD), the Nez Perce National Forest was reportedly unoccupied while the Clearwater National Forest was considered to be occupied based on the best scientific information available at the time of the NRLMD Forest Plan Amendment. However, due to inconsistencies on the status of lynx presence or occupancy on the Nez Perce National Forest, the U.S. Fish and Wildlife Service sent a letter addressed to Forest Supervisor Rick Brazell on December 10, 2012, stating that "there is consensus that transient lynx may be present on the Nez Perce National Forest, at least occasionally" (U.S. Fish and Wildlife Service, 2012).

The U.S. Fish and Wildlife Service referenced two pieces of information to come to this conclusion:

- Ulizio et al. (2007) noted "historical sightings that may have been confirmed may be the result of transient lynx moving through the forest, but the infrequency of such reports suggests lynx are incidental to the area."
- McKelvey et al. (1999) reported numerous verified historical records from Idaho County.

The letter also stated that the issue of lynx occupancy on the Nez Perce National Forest is a separate but related matter that is not the focus of this letter and did not change the Nez Perce National Forest status as "unoccupied" (U.S. Fish and Wildlife Service, 2012). Therefore, under the NRLMD, the Nez Perce National Forest is considered unoccupied, and the Clearwater National Forest is considered occupied. The U.S. Fish and Wildlife Service has determined that lynx "may be present" on both national forests, and both are secondary areas. While lynx have occasionally been sighted on the national forests, currently, little evidence exists of a resident lynx population or reproduction on the Nez Perce-Clearwater due to the infrequent nature of lynx observations. The 2005 Canada Lynx Recovery Area map identified the Nez Perce-Clearwater as a "secondary" Canada lynx area (U.S. Department of the Interior 2005b). The U.S. Fish and Wildlife Service's 2014 reexamination of critical habitat for lynx concluded that the lands in the Nez Perce and Clearwater National Forests "were likely not occupied by lynx at the time of listing and are not currently occupied by lynx populations" (79 FR 54818 2014).

Nevertheless, since there were two observations since 1999, the Clearwater National Forest met the criteria for identification by the U.S. Fish and Wildlife Service to be considered occupied. Still, lynx occurrences on the Nez Perce-Clearwater are, at best, limited and, even in the occupied portion of the national forest, lynx observations are sporadic, uncommon, or rare. However, there is no evidence that lynx cannot migrate into the Nez Perce-Clearwater from other areas, as most observations have been thought to be transient individuals. More research is needed to understand why lynx have not re-established populations across the plan area in seemingly suitable wilderness and roadless habitats. This is especially puzzling considering that SIMPPLLE modeling suggests that subalpine fir and Engelmann spruce dominance types, known to be preferred by lynx, are currently thought to be above the high end of the natural range of variation.

The NRLMD applies to forests occupied by lynx, as stated in the NRLMD Record of Decision (U.S. Department of Agriculture 2007f). This included the Clearwater National Forest. The Record of Decision also suggested that "…the direction should be 'considered' for unoccupied units but would not have to be followed until such time as lynx occupy the unit. The Nez Perce, Salmon Challis, Beaverhead-Deerlodge, Bitterroot, Ashley, and Bighorn National Forests and the disjunct mountain ranges on the Custer, Gallatin, Helena, and Lewis and Clark National Forests are unoccupied based on the best scientific information available at this time." At this time, the Nez Perce National Forest is considered unoccupied, and the Northern Rockies Lynx Management Direction will be considered when managing lynx habitat, recognizing that lynx may be present.

Compared to cores areas, secondary areas are defined as having fewer and more sporadic records of lynx occurrence, and the quality and quantity of habitat to support populations of snowshoe hares and lynx in secondary areas is questionable (U.S. Department of the Interior 2005b). The snow in lynx habitats on the Nez Perce-Clearwater may be subjected to more freezing and thawing than in the northern portion of lynx range. Crusting or compaction of snow may reduce the competitive advantage that lynx have in soft snow with their long legs and low-foot loadings (Ruggiero et al. 1999). At lower snow depths, an increase in competition for prey occurs and there is an increase in potential predation on lynx.

In the southern part of the range of Canada lynx, which includes parts of Idaho, lynx population density and productivity are lower than in the northern part of its range; harvest may be an additive source of mortality, and lynx may be highly vulnerable to overexploitation (Koehler 1990). State wildlife management agencies regulate the trapping of furbearers. Trapping and snaring of lynx is currently prohibited across the contiguous United States. Incidental trapping or snaring of lynx is possible in areas where regulated trapping for other species, such as wolverine, coyote, fox, fisher, marten, bobcat, and wolf, overlaps with lynx habitats (Squires and Laurion 1999). A trapped lynx can be released but there is potential for accidental injury or mortality (Kolbe et al. 2003). The magnitude of illegal shooting of lynx is unknown. Incidents have been reported throughout the range of the species. Devineau et al. (2010) reported a substantial number of shootings of lynx during the first 10 years after their reintroduction into Colorado, with 14 known shootings and 5 probable shootings out of 102 known mortalities. Aubry et al. (1999) hypothesized that human-caused mortality, such as illegal or incidental harvest, could significantly reduce lynx population numbers in southern regions. The state wildlife agencies have taken actions to reduce incidental or illegal trapping and shooting. State wildlife agencies work to reduce lynx mortality by disseminating information to the public and providing hunters with guides to the identifying characteristics of lynx.

An important consideration for the long-term persistence of lynx in the Northern Rockies is maintaining connectivity with lynx populations in Canada (Interagency Lynx Biology Team 2013). Squires et al. (2013) combined resource selection, step selection, and least-cost path models predict movement corridors for lynx in the Northern Rockies. The models identified a few corridors that extend south from the international border with Canada but those fall outside of the plan area. Lynx are managed provincially in Canada, with each province responsible for its own management program, harvest (trapping) policies, and conservation strategies. Lynx are considered secure in all provinces except New Brunswick and Nova Scotia (Bell et al. 2016).

Lynx Habitat Distribution and Management Area Direction

Modeled lynx habitat occurs on an estimated 1,457,768 acres of Nez Perce-Clearwater lands (Table 213). Within the Nez Perce-Clearwater, approximately 40 percent of modeled lynx habitat falls within designated wilderness, 43 percent falls within Idaho Roadless Rule areas, and about 17 percent falls within the areas managed for multiple uses. Under the alternatives, the amount of designated wilderness and Idaho Roadless Rule areas will not change. Nor will the Idaho Roadless Rule themes and associated direction change. The Idaho Roadless Rule includes several themes, which varies the management activities allowed and the purpose for which those activities may be conducted. See the Designated Areas section for a description of the Idaho Roadless Rule themes and associated direction. All recommended wilderness areas under the alternatives fall within Idaho Roadless Rule areas. After the alternatives are selected, the Nez Perce-Clearwater will make a recommendation to the Chief of the Forest Service recommending a change in the Idaho Roadless Rule theme to the wildland recreation theme for any areas identified as recommended wilderness, if needed. The Idaho Roadless Rule theme of wildland recreation is the most restrictive theme. As Idaho Roadless Rule area direction already restricts many activities in all themes, a change to recommended wilderness would result in only slightly more restrictive management and slightly more protections for lynx. Management Area 2 would be composed of Idaho Roadless Rule areas, recommended wilderness, suitable wild and scenic rivers, and proposed research natural areas. Management Area 3 includes general forest managed for multiple uses.

Table 213. Amount and percentage of lynx habitat by management area under the No Action Alternative

Management Areas	Acres of Lynx Habitat	Percent of Lynx Habitat
Designated Wilderness	615,893	40
Idaho Roadless Rule Area	607,309	43
General Forest	234,567	17
Grand Total	**1,457,768**	**100**

The acres of lynx habitat and percent of lynx habitat within different management direction areas are shown in Table 213. Designated wilderness, Idaho Roadless Rule, and recommended wilderness areas are managed more restrictively than general forest areas. Prohibited, restricted, or reduced activities in designated wilderness areas include timber production, timber harvest, road building, developments, motorized recreation or access, and other developments. Note that livestock grazing does occur within designated wilderness areas as guided by the wilderness plans and enabling legislation. Similarly, Idaho Roadless Rule areas restrict roads and vegetation management. Thus, about 83 percent of lynx habitat is protected from many human-caused threats. Limited access lowers the influence of factors like incidental trapping. The distribution of lynx habitat within the different land allocation areas sets the scope of impacts. That leaves only about 17 percent of lynx habitat acres subject to general forest management, which emphasizes multiple uses. Examples of activities allowed in general forest areas include timber production, fuels treatments, wildlife habitat management, range improvements, motorized recreation, special uses, and developed campgrounds.

Dynamics of Habitat for Snowshoe Hare and Lynx on the Nez Perce-Clearwater

Historically, fire, insects, and disease have been the primary processes that have affected forest vegetation in lynx habitat, reverting the vegetation to an early stage of succession or creating openings within the forest canopy. Immediately after a disturbance, forest areas are not yet able to support snowshoe hares and lynx because of the lack of live trees and shrubs so these areas are in a temporarily unsuitable condition. The Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f) defines lynx habitat in an unsuitable condition as being in the stand initiation structural stage where trees have not grown tall enough to protrude above the snow in winter, which the typical average time on the Nez Perce-Clearwater is estimated to be less than approximately 25 years. As a result, trees in this structural stage are too short or too open to provide dense seedling-sapling forage for snowshoe hares during winter but the trees will become taller and denser as the forests go through vegetative succession.

As vegetation regrows after a disturbance, the burned or harvested areas first develop into summer hare habitat. Then, after between 20 to 30 years, trees and some shrubs will have grown tall enough to have branches at the snow surface and be dense enough to provide winter food and cover for hares, depending upon site condition. During the next couple of decades, this stage of forest succession will likely continue to provide winter snowshoe hare habitat, but this depends upon the species composition and density of regenerating trees. As trees continue to grow, forests may move into the “stem exclusion” structural stage where food for hares is lacking. In this stage, tree branches grow out of reach of the hares, tree crowns close, and understory trees and shrubs decline due to too much shade. The denser the regenerating forest stand, the faster trees, such as lodgepole pine, lose their lower live branches and grow out of reach of hares.

Subalpine fir is the indicated climax species across most of the Nez Perce-Clearwater cold and cool moist potential vegetation types. Given enough time, these shade-tolerant species will eventually dominate. However, both subalpine fir and Engelmann spruce are intolerant of drought and fire due to their shallow roots, thin bark, and tree crowns that extend to the ground, making them susceptible to being killed by even low-severity fires. Though they may regenerate into the opening created by a fire, they have comparably slow growth rates and are soon overtopped by other early-successional species, such as lodgepole pine or western larch. However, their shade tolerance allows them to persist indefinitely and, eventually, they will dominate the site over many decades to centuries unless there is a fire event or other stand-replacing disturbance that re-initiates succession with early-successional species.

On the Nez Perce-Clearwater, the prevalence of subalpine fir and spruce-dominated forests is closely tied to the frequency of fire. More frequent fires will reduce the presence and dominance of these species and long fire-free intervals and the lack of a seed source of other species will favor their dominance. Forests dominated by subalpine fir and Engelmann spruce tend to support higher-severity fires due to the lower fire frequency, higher tree densities, multiple canopy layers, and greater litter depths and fuel loads typical in these stands. These stand-replacing fires make lynx habitat temporarily unsuitable. The multistory forest conditions that typically develop in subalpine fir and Engelmann spruce-dominated forests are also highly susceptible to damage from western spruce budworm. In contrast to stand-replacing wildfires, beetles may only kill some of the overstory trees, allowing the understory to respond.

Past Disturbances and Natural Range of Variation

The U.S. Forest Service's SIMPPLLE model (SIMulating Patterns and Processes at Landscape scaLEs) was used to model the natural range of variation for lynx habitat. The Ecosystem Research Group provided the Nez Perce-Clearwater with an assessment of SIMPPLLE model outputs (See Appendix B).

Preliminary modeling results suggest the acreage of lynx habitat in a temporarily unsuitable condition across the Nez Perce-Clearwater fluctuated a great deal from decade to decade. Preliminary modeling results of the natural range of variability for lynx habitat suggests that lynx habitat is currently near the high end of its natural range of variation. It is out of balance with dominance types and size classes and has shifted from what they were prior to European settlement. For example, modeling results suggest that subalpine fir and Engelmann spruce dominate a slightly higher proportion of the modeled lynx habitat today than it did pre-settlement. Similarly, modeling results suggest that slightly less of the forest in lynx habitat is in a younger size class than it was before widespread fire suppression. There are currently more stands of the 5- to 14.9-inch size class than historically. Likewise, there are fewer stands within the 0- to 4.9-inch, 15- to 19.9-inch, and 20 plus inch size classes than there were under natural disturbance.

Fires are a natural driver of forests in the Nez Perce-Clearwater. The Nez Perce-Clearwater has experienced many large fires since record keeping began. Most of the currently unsuitable habitat within the plan area is the result of wildfire with very few acres created by vegetation management. This is because most of the lynx habitat falls within designated wilderness and Idaho Roadless Rule areas.

The 2014 Assessment (U.S. Department of Agriculture 2014l) provides the number and acres of currently unsuitable habitat by lynx analysis unit; the amount of lynx habitat within Idaho Roadless Rule areas, designated wilderness areas, and general management areas; and the lynx habitat subject to timber management, including the amount of lynx habitat by timber suitability.

The SIMPPLLE model was also used to estimate the maximum and minimum amounts of the stand initiation structural stage, which may have provided hare habitat, occurring historically due to naturally occurring fires. Modeling indicates that the stand initiation phase and stand initiation hare habitat are well below historic levels. This is because the stand initiation phase occurs for a relatively short period of time following major disturbances, such as stand-replacing fire; it typically begins once small trees and shrubs have regenerated but may only last another decade or two until the stand moves into stem exclusion condition, depending upon factors such as elevation and stem density.

Like effects from wildfire, regeneration harvest units do not develop into stand initiation snowshoe hare habitat until 20 years post-harvest on average. The stand initiation structural stage has also been created in lynx habitat by vegetation management activities, including timber harvest.

Existing Vegetation Conditions

To provide context, the following text discusses existing vegetation conditions relative to the Northern Rockies Lynx Management Direction (NRLMD) vegetation standards. Within the lynx analysis units on the Nez Perce-Clearwater, an estimated 1,457,479 acres provide potential lynx habitat where NRLMD management direction applies. The remainder of Nez Perce-Clearwater lands occur at low elevations lacking deep, fluffy snow or are inclusions that are not capable of producing boreal forest habitat, such as dry forest types and non-forested lands. See Appendix A for a map of the distribution of lynx habitat within the three management areas.

Under the NRLMD standard VEG S1, if more than 30 percent of the lynx habitat in a lynx analysis unit is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages.

As of 2019, only one out of 106 lynx analysis units on the Nez Perce-Clearwater were modeled as having more than 30 percent of lynx habitat being in an early stand initiation condition as a result of stand-replacing wildfires and vegetation management (Table 214). These areas are estimated to be in early stand initiation, which does not yet provide winter snowshoe hare habitat. The only lynx analysis unit with more than 30 percent identified as currently unsuitable occurs entirely within designated wilderness. Only nine lynx analysis units are over 20 percent in early stand initiation and all of them are located in-part or wholly within designated wilderness. Of these nine, all the early stand initiation is the result of wildfire.

Overall, wildfire has clearly been the driver in creating substantial acreages on the Nez Perce-Clearwater in a condition where they do not yet provide winter snowshoe hare and lynx habitat. The total amount of habitat in an unsuitable condition forestwide is about 110,431 acres, or about 7.5 percent, of all the lynx habitat in the plan area. None of the lynx analysis units are estimated to exceed VEG S1 due to regeneration harvest on National Forest System lands. The percentage of lynx habitat affected by regeneration harvest has generally been minor in comparison to wildfire.

Table 214. Summary of 2018 lynx analysis units (LAU)

Forest[1]	LAU	Total Lynx Habitat Acres	Percent Currently Unsuitable	Wilderness[2]	Roadless[3]	Acres to 30%
CLW	1	0	0%	None	None	N/A[4]
CLW	2	0	0%	None	None	N/A
CLW	3	5	0%	None	None	N/A
CLW	4	11,953	0%	None	None	3,586
CLW	5	20,943	0%	None	None	N/A
CLW	6	24,495	0%	None	None	6,148
CLW	7	19,004	2%	None	None	5,701
CLW	8	2,713	0%	None	None	7,414
CLW	9	5	0%	None	None	N/A
CLW	10	0	0%	None	None	N/A
CLW	11	0	0%	None	None	N/A

Forest[1]	LAU	Total Lynx Habitat Acres	Percent Currently Unsuitable	Wilderness[2]	Roadless[3]	Acres to 30%
CLW	12	1	0%	None	None	N/A
CLW	13	10,140	5%	None	None	2,325
CLW	14	11,541	0%	None	None	3,.462
CLW	15	14,845	0%	None	None	4,454
CLW	16	9,598	0%	None	None	2,879
CLW	17	12,771	4%	None	None	3,380
CLW	18	16,838	4%	None	None	3,573
CLW	19	6,320	0%	None	None	1,896
CLW	20	12,500	0%	None	None	3,750
CLW	21	6,369	0%	None	None	1,911
CLW	22	16,015	0%	None	None	4,805
CLW	23	18,423	3%	None	None	3,573
CLW	24	20,061	0%	None	None	6,018
CLW	25	15,278	7%	None	None	3,573
CLW	26	25,645	6%	None	None	6,241
CLW	27	20,975	10%	None	None	4,144
CLW	28	25,904	3%	None	None	3,573
CLW	29	19,244	12%	None	None	3,368
CLW	30	12,012	2%	None	None	3,573
CLW	31	13,857	2%	None	None	3,573
CLW	32	11,314	0%	None	None	3,394
CLW	33	10,075	0%	None	None	3,.022
CLW	34	7,373	0%	None	None	2,212
CLW	35	14,076	14%	None	None	2,253
CLW	36	17,257	0%	None	None	5,177
CLW	37	13,418	1%	None	None	3,573
CLW	38	20,677	9%	None	None	4,324
CLW	39	3,793	15%	None	Completely - P, SAHTS	586
CLW	40	13,840	2%	None	None	3,573
CLW	41	16,794	1%	None	None	3,573
CLW	42	13,409	0%	None	None	4,023
CLW	43	19,015	1%	None	None	3,573
CLW	44	16,450	7%	None	None	3,838
CLW	45	16,823	25%	Mostly within the Selway-Bitterroot Wilderness	Partially - BCR	848
CLW	46	14,381	14%	None	None	2,311
CLW	47	11,555	6%	None	None	2,768
CLW	48	25,038	10%	None	None	5,068
CLW	49	19,264	13%	None	None	3,338

Forest[1]	LAU	Total Lynx Habitat Acres	Percent Currently Unsuitable	Wilderness[2]	Roadless[3]	Acres to 30%
CLW	50	22,774	24%	Partially within the Selway-Bitterroot Wilderness	Partially - WLR, P	1,468
CLW	51	20,013	7%	None	None	4,598
CLW	52	17,599	23%	Partially within the Selway-Bitterroot Wilderness	Partially - BCR, WLR	1,194
CLW	53	16,401	21%	Completely within the Selway-Bitterroot Wilderness	None	1,518
CLW	54	19,003	18%	None	None	2,213
NEZ	2070502	4,419	24%	Completely within the Frank Church of No Return Wilderness	None	253
NEZ	2070601	20,384	29%	Partially within the Frank Church of No Return Wilderness	Partially - P	223
NEZ	2070602	14,386	32%	Completely within the Frank Church of No Return Wilderness	None	-245
NEZ	2070603	6,576	18%	None	None	810
NEZ	2070702	33,915	16%	None	None	4,677
NEZ	2070703	8,931	9%	None	None	1,854
NEZ	2070705	10,350	5%	None	None	2,580
NEZ	2070706	3,994	2%	None	None	1,123
NEZ	2070804	7,193	10%	None	None	1,438
NEZ	2071001	15,921	7%	None	None	3,699
NEZ	2071002	11,369	29%	Partially within the Gospel-Hump Wilderness	Partially - BCR	100
NEZ	2071003	10,142	4%	None	None	2,663
NEZ	2071004	5,270	12%	None	None	924
NEZ	2071101	6,520	2%	None	None	1,837
NEZ	2071102	14,601	4%	None	None	3,794
NEZ	2090204	5,626	22%	None	Partially - BCR	449
NEZ	2090401	16,038	3%	None	None	4,261
NEZ	2090402	10,889	2%	None	None	3,043
NEZ	2090502	19,954	2%	None	None	5,671
NEZ	3010501	18,653	10%	None	None	3,686
NEZ	3010503	6,872	1%	None	None	1,997
NEZ	3010602	10,589	15%	None	None	1,598
NEZ	3010603	11,016	4%	None	None	2,878
NEZ	3010604	16,348	7%	None	None	3,825
NEZ	3010701	9,268	0%	None	None	2,780
NEZ	3010702	8,730	1%	None	None	2,515
NEZ	3010703	7,465	2%	None	None	2,068
NEZ	3010704	7,585	1%	None	None	2,192
NEZ	3010705	8,164	0%	None	None	2,428
NEZ	3010706	11,870	6%	None	None	2,839

Forest[1]	LAU	Total Lynx Habitat Acres	Percent Currently Unsuitable	Wilderness[2]	Roadless[3]	Acres to 30%
NEZ	3020101	11,208	5%	None	None	2,819
NEZ	3020102	12,857	17%	None	None	1,673
NEZ	3020103	13,216	7%	None	None	2,992
NEZ	3020104	18,482	5%	None	None	4,655
NEZ	3020105	13,582	14%	None	None	2,155
NEZ	3020106	14,656	9%	None	None	3,042
NEZ	3020107	24,523	18%	None	None	3,033
NEZ	3020109	29,853	6%	None	None	7,222
NEZ	3020110	11,273	5%	None	None	2,862
NEZ	3020202	15,685	3%	None	None	4,212
NEZ	3020203	15,684	8%	None	None	3,515
NEZ	3020204	12,287	7%	None	None	2,826
NEZ	3020301	23,241	23%	None	Mostly - BCR	1,551
NEZ	3020302	17,965	8%	None	None	3,965
NEZ	3020304	23,146	3%	None	None	6,289
NEZ	3020305	28,445	2%	None	None	7,993
NEZ	3020402	31,411	1%	None	None	9,097
NEZ	3050102	21,003	11%	None	None	4,035
NEZ	3050302	11,883	1%	None	None	3,449
NEZ	3050401	15,612	10%	None	None	3,045
NEZ	3050601	20,732	0%	None	None	6,173
NEZ	3050602	18,334	1%	None	None	5,379

1 - CLW = Clearwater (occupied) portion of the national forest, NEZ = Nez Perce (unoccupied) portion of the national forest

2 - SBW = Selway-Bitterroot Wilderness, FRCNR = Frank Church-River of No Return Wilderness, GH = Gospel-Hump Wilderness,

3 - BCR = Roadless, Backcountry Recreation Theme, P = Roadless, Primitive Theme, WLR = Roadless, Wildlands Recreation, SAHTS = Special Area of Historic or Tribal Significance

4 - N/A = not applicable

Under the Northern Rockies Lynx Management Direction (NRLMD) standard VEG S2, no more than 15 percent of lynx habitat on National Forest System lands can be regenerated by timber management projects within a lynx analysis unit in a 10-year period unless it meets criteria applicable to the wildland urban interface. Since 2000, only 0.23 percent of all lynx habitat in the plan area has been treated by timber activities (FACTS database, accessed August 2019).

Table 214 displays the condition of lynx analysis units based on the forestwide lynx model. All of the lynx analysis units over 15 percent fall entirely or partially within either designated wilderness or Idaho Roadless Rule areas where timber management is not allowed or is restricted. Thus, none of lynx analysis units over 15 percent were the result of timber management. Since the Forest Plan was amended to include the NRLMD in 2007, none of the lynx analysis units have had more than 15 percent of lynx habitat acres regenerated by timber management projects in the last decade. At a forestwide scale, the numbers presented above suggest a lack of sufficient disturbance in lynx habitat for lynx kitten production in the future because a stand must go through early stand initiation before it can become small-diameter forest as described in Kosterman (2018).

Table 214 also shows the amount of lynx habitat within each lynx analysis unit, the size of each lynx analysis unit and the amount of habitat estimated as currently unsuitable on the Nez Perce-Clearwater. In addition, the table shows whether the lynx analysis unit is in designated wilderness or Idaho Roadless Rule areas.

It is assumed that forests burned by stand-replacing wildfire from 1993 to 2018 are not yet winter snowshoe hare habitat. Acres burned by wildfire are estimates for comparison with standard VEG S1. These percentages are estimates based upon forest-scale data and need to be verified at the project level.

Acres are based on the Forest Service Activity Tracking System (FACTS) database, which does not include decisions not yet implemented. This percentage is shown for comparison to standard VEG S2, which requires 15 percent or less in a 10-year period unless exempted for fuels reduction projects in the wildland urban interface.

In its biological opinion on the Northern Rockies Lynx Management Direction (NRLMD)(U.S. Department of the Interior 2017c), the U.S. Fish and Wildlife Service concluded that there was a potential for incidental take to occur in lynx habitat, mostly due to the exemptions and exceptions to the vegetation standards which could diminish the value of lynx habitat and impair feeding and reproduction by adult female lynx and the survival of kittens. Because of the difficulty of determining the incidental take of lynx, the U.S. Fish and Wildlife Service used the total estimated acreage of the exemptions and exceptions as a surrogate measure.

As defined under the Endangered Species Act, take means "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Incidental take is an unintentional but not unexpected taking. Take and incidental take are common terms used when discussing federally listed species.

The amount of incidental take was anticipated to be represented by fuels treatments on up to 6 percent, or 729,000 acres, of lynx habitat across the entire Northern Rockies analysis area over 10 years and by precommercial thinning for other resource benefits on up to 64,320 acres, less than 0.5 percent, of snowshoe hare habitat (lynx foraging habitat) over a 10-year period. The U.S. Fish and Wildlife Service provided reasonable and prudent measures and terms and conditions to minimize incidental take. Standards VEG S1, VEG S2, VEG S5, and VEG S6 include an exemption for fuels treatments to protect communities at risk in lynx habitat within the wildland urban interface. Such fuels treatments may not occur on more than 6 percent of lynx habitat on each National Forest considered “occupied,” as defined in the NRLMD, which limits fuels treatments to about 44,607 acres on the Clearwater National Forest (U.S. Department of the Interior 2017c). Since 2007, the Nez Perce-Clearwater has used none of the exempted acres allowed under that take statement. Instead, all fire and fuels projects have abided by the NRLMD standards and guidelines and consulted on individual projects. The incidental take statement was amended by the U.S. Fish and Wildlife Service to extend exempted acres for an additional five years in the Forest Service’s Northern Region (U.S. Department of the Interior 2012).

Annual monitoring and reporting are a requirement of the NRLMD biological opinion (U.S. Department of the Interior 2017c) to ensure that the level of incidental take is not exceeded. None of the lynx analysis units exceeded the VEG S2 standard of 15 percent in the last 10 years because the Nez Perce-Clearwater did not use the exemptions.

Standard VEG S5 also contains six listed exceptions that allow for precommercial thinning in lynx habitat to meet other specific resource objectives. VEG S6 contains several listed exceptions for vegetation management projects that reduce snowshoe hare habitat in multistory mature or late-successional forests.

The estimated acres that would possibly be treated through precommercial thinning exceptions are shown in Appendix K of the Final Environmental Impact Statement for the Northern Rockies Lynx Management Direction. For the Clearwater National Forest, the estimated number of acres to be thinned under the exceptions to the vegetation standards was 5,510 acres over a 10-year period in the Clearwater National Forest and 12,370 acres in the Nez Perce National Forest, totaling approximately 0.4 percent of the lynx habitat on the Nez Perce-Clearwater. Combined these total 17,880 acres. The acres treated by thinning in lynx habitat on the Nez Perce-Clearwater from 2007 to 2019 was 17,257 acres, which is about 1.1 percent of the lynx habitat in the Nez Perce-Clearwater. According to the updated lynx habitat model, only 1380 acres of these treatments were considered as causing unsuitable lynx habitat (FACTS database, accessed August 2019). The allowable level of incidental take has not been exceeded for the northern Rockies analysis area (U.S. Department of Agriculture 2017d) nor for the Nez Perce-Clearwater.

Winter Recreation

In 2017, the Clearwater National Forest issued the decision for its motorized winter recreation plan, as part of the Clearwater Travel Plan (USDA, 2017). The decision clarified where, when, and under what conditions motorized over-snow vehicles are allowed on the Clearwater National Forest. The decision abided by Northern Rockies Lynx Management Direction (NRLMD) guideline HU G11:

> Designated over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction, unless designation serves to consolidate use and improve lynx habitat. This may be calculated on a lynx analysis unit basis, or on a combination of immediately adjacent lynx analysis units.

The motorized winter use on the Clearwater National Forest is thus consistent with the NRLMD guidelines. At the time, there were 115 miles of groomed over-snow vehicle baseline routes in lynx habitat within the Clearwater side of the national forest and no additional groomed routes were proposed in lynx habitat. The Nez Perce National Forest has not yet undergone travel planning for motorize winter recreation. Currently, all areas that are not designated wilderness are open to motorized over-snow travel. Therefore, there are no designated play areas nor designated over-the-snow routes within the Nez Perce portion of the national forest. Furthermore, the Nez Perce National Forest is considered open to motorized winter travel unless designated closed. The 1987 Forest Plans did not use the winter recreation opportunity spectrum (ROS) to identify areas suitable for motorized uses, and therefore the winter r ROS settings proposed in the alternatives are a new concept in the Land Management Plan. Instead under the No Action Alternative the ROS was a guide towards which to manage but was not a constraint on activities.

Table 215 provides a summary of acres and percent lynx habitat by winter ROS for the No Action Alternative, while Table 216 summarizes the percent of current lynx habitat within motorized and non-motorized winter ROS settings. No additional groomed routes in lynx habitat are proposed in any action alternative. Instead, the alternatives and plan will identify where motorized uses could be suitable, but the authorization of those uses would require a subsequent site-specific analysis and consultation before it could be authorized.

Table 215. Acres of lynx habitat and percent of total lynx habit by winter recreation opportunity spectrum (ROS) setting under the No Action Alternative. Note that the winter recreation opportunity spectrum did not identify uses as not suitable for motorized uses.

Winter ROS Setting	No Action Alternative	Percent habitat
Primitive	581,905	40
Roaded Natural	28,892	2
SPM	736,803	51
SPNM	110,168	8

Table 216. Amount of lynx habitat within motorized and non-motorized winter recreation opportunity spectrum (ROS) settings

Winter ROS Setting	Percent Current Condition
Non-motorized	48
Motorized	52

Habitat Connectivity

The Northern Rockies Lynx Management Direction (NRLMD) identified lynx linkage areas, which are intended to maintain connectivity and allow for the movement of lynx between blocks of habitat that are otherwise separated by intervening non-habitat areas, such as basins, valleys, and agricultural lands or places where habitat naturally narrows due to topographic features. The NRLMD contains plan components requiring conservation measures in lynx linkage areas, including objectives, standards, and guidelines. These linkage areas were initially identified on the basis of expert opinion and were coarsely mapped at a broad scale. Linkage areas on the Nez Perce-Clearwater are shown in Appendix A. Subsequently, Squires et al. (Squires et al. 2013) used telemetry data for 64 lynx monitored from 1998 to 2007 to create a broad-scale resource selection model that predicted probable lynx habitat and "putative movement corridors" across the species' distribution in the northern Rocky Mountains. This analysis included quantification of the relative likelihood of lynx crossing major highways—one of the major hypothesized anthropogenic threats to lynx connectivity. The areas where Squires et al. (2013) mapped lynx connectivity did not include the Nez Perce-Clearwater. Most of the lynx sightings on the Nez Perce-Clearwater appear to be observations of transient individuals, suggesting that lynx move through the plan area.

Squires et al. (2013) stated "given that increased traffic and urbanization are projected for the northern Rockies, mitigation such as land purchases and conservation easements may be necessary to preserve connectivity among lynx populations." Private land development, especially along highway corridors in mountain valleys, may also fragment habitat and impede the movement of lynx. The Nez Perce-Clearwater does not have jurisdiction over state or federal highways or lands under other ownerships, such as private, state, and tribal. The Forest Service can support habitat connectivity through its management of National Forest System lands by encouraging or acquiring conservation easements along highways or cooperating in identifying appropriate locations for installation of highway crossing structures. The Forest Service can also seek to acquire parcels that could aid in connectivity for wildlife. Activities of other ownerships are discussed in the analysis of cumulative effects.

Key Indicators for Analysis

Resource elements discussed in the analysis are based upon anthropogenic influences identified in the 2013 Lynx Conservation Assessment and Strategy, which relates to risk factors and habitat effectiveness. The analysis determines effects from the alternatives based on how plan components change the scope, severity, or both for these threats as described above. Table 217 provides a summary of key indicators for assessing effects to lynx.

Table 217. Key indicators for assessing effects to Canada lynx

Resource element	Indicator
Amount and proportion of lynx habitat within different management areas by alternative	The amount of lynx habitat by alternative that falls within Management Area 1, Management Area 2, and Management Area 3. Management areas set broad direction for large portions of the Nez Perce-Clearwater and largely control potential effects.
Vegetation management	Terrestrial ecosystems and Canada lynx habitat diversity. Amount of lynx habitat suitable for timber production. Changes in vegetation conditions modeled in SIMPPLLE.
Fire management	The amount of lynx habitat through time susceptible to uncharacteristic wildfire under future climates. Changes in vegetation conditions modeled in SIMPPLLE.
Habitat fragmentation	Anticipated changes to Canada lynx habitat connectivity linkage areas.
Recreation	Suitability for motorized over-snow vehicle use and Canada lynx habitat from winter recreation opportunity spectrum.
Minerals	Distribution or suitability of minerals operations in Canada lynx habitat.
Forest/backcountry roads	Forest/backcountry roads and indirect effects of motorized access on the risk of trapping and shooting.
Livestock grazing	Livestock grazing and vegetation change in Canada lynx habitat.
Driver/Stressor	Anticipated changes in climate and effects on Canada lynx habitat.

Consequences Common to All Alternatives

All alternatives would retain the management direction in the Northern Rockies Lynx Management Direction (NRLMD) for the conservation of lynx, as implemented in FW-STD-WL-01 in the Land Management Plan and Appendix 8. FW-STD-WL-01 states that “Canada lynx habitat shall be managed in accordance with Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f) and Record of Decision.” This language means that the plan will direct management to be consistent with the NRLMD, until such time as it is amended or changed in the future through National Environmental Policy Act and U.S. Fish and Wildlife Service consultation and will remain in place until that happens. However, Land Management Plans that are revised under the 2012 Planning Rule apply a different definition of the plan components and how they are applied compared to those under the 1982 Planning Rule, which was the rule under which the NRLMD was originally developed. The consultation with the U.S. Fish and Wildlife Service on this Land Management Plan and future implementation of NRLMD under the revised plan assumes that the new definitions for plan components and how they are to be applied will be consistent with the 2012 Planning Rule.

The habitat direction from the NRLMD is retained in the Land Management Plan through standard FW-STD-WL-01. The plan will carry forward the objectives, standards, and guidelines that were developed to conserve lynx; however, the use of the terms “standards” and “guidelines” in the NRLMD is consistent with the definitions of these terms as used in the Land Management Plan. The definition of “objectives” as used in the NRLMD is consistent with the definition of “desired conditions” found in the Land Management Plan. The NRLMD plan components in this appendix are incorporated throughout the Land

Management Plan (for example, in the terrestrial ecosystems and vegetation, wildlife species, recreation, and infrastructure sections).

The effects of the Northern Rockies Lynx Management Direction (NRLMD) are discussed as consequences common to all alternatives. The NRLMD can be found in Appendix 8 of the Land Management Plan. Plan components in the Land Management Plan are common to all alternatives, except for those related to nonconforming uses allowed in recommended wilderness, those for retention of snags during vegetation management, and objectives for the achievement of the rate of attainment of desired vegetation conditions.

The Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) identified anthropogenic influences that may affect lynx and lynx habitat, sorted into either the "upper tier" or the "lower tier." The upper tier includes the anthropogenic influences that are of greatest concern to the conservation of the lynx: vegetation management, prescribed fire, fragmentation of habitat, and climate change. The lower tier of anthropogenic influences includes recreation, primarily snowmobiling; minerals and energy management; forest and backcountry roads and trails; grazing by domestic livestock; and mortality due to incidental trapping or illegal shooting. It is thought that the lower tier activities could affect individual lynx but are not likely to have a substantial effect on lynx populations; these are of less concern for conservation of the species.

Key Stressors

Key stressors are discussed in the "Affected Environment" section and are summarized below.

Vegetation and Timber Management

Vegetation management activities, such as timber harvest, planting, and thinning, can affect lynx habitat conditions, such as forest composition, structure, dominance type, size class, and distribution. Specifically, timber management can affect the amount and distribution of dense horizontal cover providing snowshoe hare habitat, the amount and availability of large downed wood providing denning habitat, and the development of multistory hare habitat used by lynx for winter foraging (Interagency Lynx Biology Team 2013). The allocation of management areas can affect where timber management occurs. Only about 17 percent of the lynx habitat on the Nez Perce-Clearwater is outside of Idaho Roadless Rule areas and wilderness areas, meaning only about 17 percent is in a management area that allows timber production.

The Land Management Plan was developed to be consistent with the direction within the Idaho Roadless Rule for all alternatives, so each alternative applies constraints of the Idaho Roadless Rule. While timber harvest is allowed in Idaho Roadless Rule areas, timber production is not. Roadless Rule areas are considered suitable for timber harvest for specific purposes but do not allow timber production. Timber harvest is only allowed in some Idaho Roadless Rule themes. The most permissive theme is the backcountry restoration theme. Timber harvest can be conducted in the backcountry restoration theme, but it is only allowed in specific situations and for specific purposes. Timber cutting, sale, or removal is prohibited in Idaho Roadless Rule backcountry restoration except:

- To reduce hazardous fuels conditions outside a community protection zone if the project generally retains large trees as appropriate for the forest type and consistent with land management plan.
- To reduce hazardous fuel conditions outside a community protection zone where there is a significant risk that a wildland disturbance event could adversely affect an at-risk community or municipal water supply.

- In a portion of a backcountry/roadless area that has been substantially altered by construction of a forest road and timber cutting, prior to October 16, 2008.
- To improve threatened, endangered, proposed, or sensitive species habitat.
- To maintain or restore the characteristics of ecosystem composition, structure, or processes.
- To reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply.
- For personal or administrative use or where incidental to the implementation of an activity not prohibited.
- Where cutting, sale, or removal is incidental to the implementation of a management activity not otherwise prohibited by this subpart.

These actions must be approved by the regional forester and:

- Maintain or improve one or more of the roadless characteristics.
- Maximize the retention of large trees as appropriate for the forest type to the extent these trees promote fire-resilient stands.
- Are consistent with land management plan components.

Wildland recreation is the most restrictive and timber harvest is allowed only as follows:

Timber cutting, sale, or removal is prohibited except for personal or administrative use or where incidental to the implementation of an activity not prohibited.
Other Idaho Roadless Rule area themes fall between the backcountry restoration and wildland recreation themes for timber harvest in terms of what is allowed and why it is allowed. The Final Environmental Impact Statement for the Idaho Roadless Rule projected that 0.01 percent of the lands managed under Idaho Roadless Rule would be affected by timber removal or road construction in the first 15 years. For the nearly 1,500,000 acres of roadless areas on the Nez Perce-Clearwater, this would total 1,500 acres over the 15-year period, or approximately 100 acres per year (U.S. Department of Agriculture 2008b). In the 10-year period from October 2008 to September 2018, approximately 1,800 acres have been affected through community protection zone fuels reduction, fuel breaks constructed during wildfires, and removal of post-fire roadside hazard trees. This estimate of 1,800 acres in the first 10 years is greater than the Idaho Roadless Rule projection. However, several extreme fire seasons have occurred during that time, and much of the tree removal has been tied to fire and post-fire hazard activities. If there is conflicting direction, the Idaho Roadless Rule will take precedent. While these numbers account for timber harvest, treatments to restore forest composition, structure, function, and connectivity are expected, as outlined in the objectives in the Forestlands section of the plan.

The amount of lynx habitat by Idaho Roadless Rule theme is shown in Table 218. Idaho Roadless Rule areas prevent the development of new roads, which makes much of the timber inaccessible or largely economically infeasible. Thus, vast areas of the Nez Perce-Clearwater have significant mechanisms to prevent impacts to lynx habitat from timber management. Neither timber harvest nor timber production are allowed in wilderness areas nor in recommended wilderness. Approximately 43 percent of lynx habitat forestwide is protected from timber harvest in Idaho Roadless Rule areas and approximately an additional 40 percent is located in designated wilderness. Timber production is not allowed in about 56 percent of lynx habitats and timber harvest is restricted, reduced, or limited in an additional approximate 30 percent.

Table 218. Acres of lynx habitat in each roadless rule theme and percent of lynx habitat forestwide that falls into each theme

Idaho Roadless Rule Area Theme	Acres of Lynx Habitat in Each Roadless Rule Theme	Percent Lynx Habitat[1]
Backcountry Restoration	327,452	22.46
Land Management Plan Special Area	2,680	0.18
Primitive	154,873	10.62
Special Area of Historic or Tribal Significance	20,506	1.41
Wildland Recreation	119,642	8.21
Total	**625,153**	**42.88**

1 - Lynx habitat in each theme divided by total amount of lynx habitat in the plan area

About 17 percent of lynx habitat occurs within the general forest Management Area 3. Not all of the 17 percent of lynx habitat in Management Area 3 is suitable for timber production because areas, such as riparian zones or steep slopes, are not suitable. Table 219 shows the amount of lynx habitat on the Nez Perce-Clearwater proposed in the different timber suitability categories, and Table 220 shows the percent of lynx habitat by timber suitability category. The alternatives only vary slightly for timber suitability. Under the Preferred Alternative, approximately 14 percent is suitable for production, 12 percent is suitable for harvest to meet other resource objectives while approximately 73 percent is unsuitable. Even when suitable, plan components in the Northern Rockies Lynx Management Direction constrains timber activities in lynx habitat.

Table 219. Acres of lynx habitat by timber suitability category

Timber Suitability within Lynx Habitat	No Action Alternative Acres Lynx Habitat	Alternative P Acres Lynx Habitat	Alternative W Acres Lynx Habitat	Alternative X Acres Lynx Habitat	Alternative Y Acres of Lynx Habitat	Alternative Z Acres Lynx Habitat
Not Suitable for Timber Production or Harvest	1,084,339	1,091,437	1,183,858	1,081,950	1,101,785	1,133,915
Suitable for Timber Harvest for Other Resource Objectives	191,772	184,225	91,795	193,151	174,191	144,702
Suitable for Timber Production	211,759	212,209	212,217	212,769	211,894	209,253

Table 220. The percent of lynx habitat by timber suitability category

Timber Suitability within Lynx Habitat	No Action Alternative % of lynx habitat	Alternative P % of lynx habitat	Alternative W % lynx habitat	Alternative X % of lynx habitat	Alternative Y % of lynx habitat	Alternative Z % of lynx habitat
Not Suitable for Timber Production or Harvest	73%	73%	80%	73%	74%	76%
Suitable for Timber Harvest for Other Resource Objectives	13%	12%	6%	13%	12%	10%

Timber Suitability within Lynx Habitat	No Action Alternative % of lynx habitat	Alternative P % of lynx habitat	Alternative W % lynx habitat	Alternative X % of lynx habitat	Alternative Y % of lynx habitat	Alternative Z % of lynx habitat
Suitable for Timber Production	14%	14%	14%	14%	14%	14%

Plan direction for timber management is associated with plan direction for achieving the desired vegetation conditions outlined in the Forestlands section; however, there are also plan components specific to timber production. The primary driver of timber harvest under the plan is to achieve desired conditions in Forestlands section 2.1.3. However, timber harvest is only a subset of the methods that will be used to achieve desired vegetation conditions. Other methods include prescribed fire, wildfire managed to achieve land management plan objectives, fuels treatments, and wildlife habitat restoration.

Currently, plan direction under the Northern Rockies Lynx Management Direction (NRLMD) governs many vegetation and timber management activities forestwide. Standards and guidelines in the NRLMD provide protection or reduces the impact to lynx from timber harvest. Direction from the NRLMD vegetation standard Veg S2 currently limit the scope of timber management to no more than 15 percent of lynx habitat within a lynx analysis unit within a 10-year period and standard Veg S1 limits vegetation management projects to no more than 30 percent total of a lynx analysis unit may be in a in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat. Standard Veg S5 prevents precommercial thinning projects and Veg S6 prevents impacts to multi-story habitat. Thus, the scope of this threat in the plan area is constrained by 1) wilderness and roadless direction and 2) the NRLMD. Combined, using the nature serve method, the scope of timber management is probably slight (less than 10 percent of lynx habitat) and at most is restricted (between 11 and 30 percent) NRLMD would apply regardless of which alternative is selected.

Timber management within lynx habitat has been avoided since the Canada lynx was listed. A query of the Forest Service's Facts Activities database (accessed August 2019) shows that, since 2000, only 3,295 acres of total lynx habitat have been impacted by timber harvest, which is less than one percent of the lynx habitat in the plan area.

Timber harvest can have temporal and physical effects on lynx habitat. Squires et al. (2010) suggests seasonal patterns in resource selection of Canada lynx in the Northern Rockies. During winter, lynx preferentially foraged in mature, multilayer forests with Engelmann spruce and subalpine fir in the overstory and mid-story. Forests used during winter were composed of larger diameter trees with higher horizontal cover, more abundant snowshoe hares, and deeper snow compared to random availability. Multilayer, spruce-fir forests provided high horizontal cover with tree branching that touched the snow surface. Lynx were insensitive to snow depth or penetrability in determining where they killed prey. During summer, lynx broadened their resource use to select younger forests with high horizontal cover, abundant total shrubs, abundant small-diameter trees, and dense saplings, especially spruce-fir saplings. Lynx avoided recent clear-cuts or other open patches.

Squires et al. (2010) recommended that management maintain habitat mosaics, which should include abundant multistory mature spruce-fir forests with high horizontal cover that are spatially well-distributed. Potential treatments for timber production and other vegetation treatments, if conducted in lynx habitat, would reduce winter foraging habitat for lynx for about 40 years. Depending upon the shape and size of these treatments, lynx might be reluctant to cross these openings but could go around them. Any opening would have to be required to have regional forester approval if larger than 375 acres.

Potential treatments would also increase summer habitats and provide diversity in stand structure. Such treatments would need to be conducted consistent with Northern Rockies Lynx Management Direction (NRLMD) plan components. The impacts of timber management on lynx habitat depends upon the type of treatments conducted, the time frames considered, and the forest type it is conducted in. Holbrook et al. (2017) found that lynx used timber treatments but took longer to achieve 50 percent use of regeneration and selection cuts between 34 and 40 years than thinning in about 20 years. Thus, full use of timber treatments by lynx can take as long as 40 years and varies by treatment type. These results show that, when timber management happens, it can result in loss of habitat in the short-term, depending on treatment. Within the scope, the severity of this threat when it happens, given a 15-year timeframe assumption for assessment, is classed as a serious threat within its scope using the nature serve method of assessing threats. The combined scope and severity assessment of threat impacts using the NatureServe methodology for identifying the magnitude of threats is estimated to be a medium threat with a scope of restricted and severity of serious when it happens.

Although standards and guidelines carried forward from the 2007 NRLMD provide direction for many aspects of land management, the action alternatives have additional plan components that integrate Canada lynx habitat with desired conditions for vegetation that are tied to potential vegetation types (PVTs) within the context of the natural range of variation (NRV). The following paragraph discusses the effects of these plan components on Canada lynx.

Desired conditions in all the alternatives are aligned with conservation measures for vegetation management in the core habitat listed in the 2013 Lynx Conservation and Assessment Strategy (Interagency Lynx Biology Team 2013). Desired conditions for vegetation patterns are tied to fit the NRV within PVTs. The majority of modeled Canada lynx habitat is in the cool moist and cold broad PVT groups, which correspond to boreal forest habitat types capable of growing spruce fir and lodgepole pine types.

A desired condition is a description of specific social, economic, or ecological characteristics of the plan area, or a portion of the plan area, toward which management of the land and resources should be directed. Desired conditions are not commitments or final decisions approving projects and activities. The desired condition for some resources may currently exist but for other resources they may only be achievable over a long time. Forestwide desired condition FW-DC-WL-03 promotes providing the structure and pattern of forest vegetation across the landscape to contribute to structure and connectivity by PVT. Implementation of desired conditions should direct management actions in a way that would promote proper structure and distribution to promote connectivity for lynx habitats.

Lynx habitat primarily occurs within the cool moist and cold broad PVTs. Desired conditions in Sections 2.1.3.3 and 2.1.3.4 would direct management of cold and cool moist PVT groups. They outline the desired composition of dominance types in the cool moist broad PVTs. The desired conditions are lower than the NRV. For example, according to SIMPPLLE modeling, the NRV for subalpine fir and Engelmann dominance types in the cool moist broad PVT is 39 to 63 percent, with an average of 52 percent. Under warmer, drier conditions the NRV modeling suggested the range for the cool moist broad PVT was between 32 to 56 percent as could potentially be expected in future climates. The current conditions for the dominance of subalpine fir and Engelmann spruce dominance types are approximately 71 percent and 50 percent in the cool moist broad and cold broad potential vegetation types, respectively. Comparatively, the desired condition range is 25 to 35 percent. Management towards these desired conditions would reduce the amount of subalpine fir and Engelmann spruce dominance types, which would potentially impact lynx habitat use because lynx preferentially use Engelmann spruce and subalpine fir dominated forests (Holbrook, Squires, Olson, DeCesare, and Lawrence 2017). The degree of impact would depend on the impact these changes have on snowshoe hares, their primary prey.

The habitats in which hares occur in northern and southern forests vary in terms of species composition, stand structure, and the amount of disturbance from fire or harvest, leading to speculation that hare dynamics are related to habitat structure and the degree of interspersion of different habitat types rather than tree species (Hodges 1999). It is now well established that snowshoe hare abundance is associated with horizontal cover.

Agee (1999) evaluated the disturbance ecology of North American Boreal Forests for lynx. Across much of the range of lynx in North America, a high severity fire regime occurs, and succession follows a series of paths from early to late successional communities. Within a given forest type, many potential sequences may be possible: a function of fire duration and soil heating, species composition at the time of the fire, post-fire climate, biotic interactions, and other factors. The rate of succession will also vary depending on site conditions. After a stand replacement event, the post-fire sere will include an herbaceous stage; a shrub and sapling stage; a dense, small tree stage; a transition stage, often a hardwood to conifer transition but in others just a shift in conifer species; and a mature or old growth stage.

Agee (1999) went on to suggest the nature of disturbance also can influence the outcome of species compositions. If the overstory is removed through blow down or insect outbreaks, the remaining understory of shade tolerant species would dominate; whereas, if the understory is disturbed as occurs during fires, then overstory species (typically shade intolerant species) will come to dominate. Across the range of western boreal forests, many fire return intervals are long enough that relatively short-lived lodgepole pine may be removed from the stands by mountain pine beetles before another fire event occurs. In such cases, the old growth dominant Engelmann spruce and subalpine fir may compose the dominant tree component but, when burned, the spruce and fir are killed, and the species do not quickly re-establish. The seeds of both species are large, so they are not easily dispersed by wind, and they do not easily establish on freshly burned sites. Tree colonization may take decades to centuries, although spruce or fir will immediately regenerate occasionally.

The natural landscapes of the boreal forest within which lynx have successfully existed have been profoundly affected by disturbance, primarily by fire. Although most of the lynx range is included in the high-severity fire regime, there is considerable range in the frequency with which fire occurred on these landscapes and, because of that, a wide variation in successional stages present. Further variation has occurred due to local site conditions, intensity and duration of the fire, forest age at the time of fire, and post-fire climate. Mimicking this pattern of natural disturbance has been suggested as a way to maintain biodiversity in managed forests.

For the boreal forest, there are several general principles that must be addressed in landscape management plans when incorporating harvest or fire disturbance (Agee 1999):

- The habitat will be a product of the cumulative effect of all disturbances. The substitution of logging for fire, for example, is only meaningful if fire can be successfully removed from the environment and, even then, logging will not totally mimic fire as a disturbance process because of roading and coarse woody debris differences.
- Typical models used for fire history studies suggest that fire selected a range of stand ages to burn. Harvesting only the oldest ages will decrease the average stand age of the landscape and will remove the complex boreal stand structure that may be critical for lynx denning. Young and old stands need to be part of any landscape disturbance plan.

- Size and juxtaposition of stands is critical. Most fires are small. Most of the landscape, however, is affected by larger fire patches, with unburned areas inside the fire perimeter (stringers, islands, fire skips).

Desired conditions in the cold and cool moist potential vegetation types would, over time, direct management to reduce dominance types from Engelmann spruce and subalpine fir to other types. As subalpine fir and Engelmann spruce dominance types decrease, lodgepole, western larch, whitebark pine, and white pine dominance types would increase over the long term. Nevertheless, all of the cool moist and cold potential vegetation types are considered lynx habitat and would still be lynx habitat even if the dominance type changes. Based upon SIMPPLLE modeling, the plan components and alternatives would change only a low percent of the spruce-fir habitats into other types mostly because of constraints of treatments in areas not suitable for timber harvest. A small percent change is expected in these types. While the dominance type may change, Engelmann spruce and subalpine fir will still be components of these stands and will move through succession through time to provide for lynx and snowshoe hares.

In designated wilderness, the desired conditions would be achieved through natural processes, which would be in about 43 percent of lynx habitat. Similarly, in Idaho Roadless Rule areas, the desired condition would be largely achieved through a combination of planned and unplanned wildland fire. Planting in these areas would be minimal. Most likely, fire would reset succession and may shift dominance types. For example, dominance may shift from spruce-fir to lodgepole as a result from burning a spruce-fir stand that has a lodgepole pine component. Through time, spruce and fir would proceed through succession back into a spruce-fir dominated stand. Species without a seed bank, such as western larch, western white pine, and whitebark pine, would have to be replanted to change the dominance type. Desired conditions for dominance type may be challenging in Idaho Roadless Rule and wilderness areas because of the restrictions on timber management and planting.

If the natural range of variation modeling is a good representation of the true range, then current conditions for subalpine fir and Engelmann spruce dominance types are well above the natural range of variability. For example, current dominance in the cool moist broad potential vegetation type is currently at 71 percent, while spruce fir dominance in the cold potential vegetation type is at approximately 50 percent forestwide. Thus, a natural decline is expected because of wildfire and vegetation treatments.

The Northern Region Existing Vegetation Classification System (Barber et al. 2011) explains how dominance types are classified. According to that document, dominance is the extent to which a given species has an influence in a setting or map feature because of its size, abundance, or coverage. In the Northern Region, canopy cover, basal area, or trees per acre are used to determine dominance. A dominance type is determined by the species with the greatest abundance of canopy cover, basal area, or trees per acre within a setting or map feature. The species that determine the dominance type are always of the same lifeform. Therefore, it is first necessary to identify the dominant lifeform and tree lifeform subclass before determining dominance type. Dominance, in this context, is determined by 60 percent plurality. Plurality refers to the plant species that has the most canopy cover, basal area, or trees per acre in a setting. Tree dominance group 60/40 is based on two thresholds of tree abundance: 60 percent and 40 percent. If the single most abundant tree species comprises at least 60 percent of the total abundance of the classification attribute, the class assigned is the species code. While a species may dominate 60 percent of the stand, an additional 40 percent of the stand would contain other species. Thus, even though dominance type may change, species like Engelmann spruce and subalpine fir will still be components of stands in cool moist and cold potential vegetation types and should provide the horizontal cover needed for snowshoe hares. Desired conditions in the cool moist and cold potential vegetation types suggest a range of size classes. Lynx research suggests that a mix of connected mature and advanced regeneration forest provide conditions for female reproduction (Kosterman and Holbrook 2019). These size classes were based on the range of conditions modeled as the natural range of variation in SIMPPLLE. Modeling suggests that grass-forb-shrub conditions ranged from between 2 to 25 percent, and size classes in the 0- to 4.9-inch ranged from 7 to 28 percent. Holbrook et al. (2019) suggested that stands must go through these stages to become advanced regeneration conditions. Combined, these size classes suggest that more early seral conditions were present than allowed under the Northern Rockies Lynx Management Direction (NRLMD).

The rate at which restoration occurs varies within the alternatives. Alternative W seeks to achieve desired conditions in 30 years, Alternative X in 20 years, Alternative Y in 50 years, and Alternative Z in 100 years. The No Action Alternative would continue at the same pace of the forest over the past three years. At this rate, it is like Alternative Z in its timeframe to achieve desired conditions. PRISM modeling was used to estimate the acres of treatment required by alternative to achieve these desired conditions. See the Forestlands section for additional details. In roadless and wilderness areas, which combined make up more than 80 percent of the lynx habitat in the plan area, wildland fire is the primary disturbance projected to be needed to meet vegetation desired conditions for dominance types. Long-term management towards these desired conditions may decrease dominance types preferred by lynx in multistoried spruce fir dominated forests but would be within the natural range of variability.

The Preferred Alternative selected a range of vegetation treatment amounts to reflect the realities of the internal capabilities of the Forest Service to achieve restoration. The Preferred Alternative would provide a potential timber sale quantity of between 190 to 210 million board feet annually, which would represent approximately 8,825 to 10,000 acres of treatment each year. Most of that production would come from Management Area 3 but only a portion of it would come from lynx habitat. The acres of disturbance or restoration required to achieve desired conditions within the Preferred Alterative timeframe would be between 54,000 and 64,500 acres annually.

The NRLMD standards and guidelines would be followed in conducting these treatments. Thus, only 30 percent of a lynx analysis unit could be unsuitable and only 15 percent could be in an unsuitable condition within a 10-year period for lynx. These constraints were programed into PRISM for all alternatives; thus, the amounts of treatments under all alternatives meet the NRLMD guidelines. The NRLMD does not have any constraints on changing dominance types within lynx habitat. During modeling, the NRLMD constraints maintained subalpine fir and Engelmann spruce dominance types despite the desired condition ranges.

Desired conditions FW-DC-FOR-10 and MA1 and MA2-DC-FOR-04 address within-stand conditions in the cool moist broad potential vegetation type and contain specific language to promote spruce and fir dominated stands to achieve a multistoried condition, which was written specifically to address lynx habitat needs. These desired conditions would allow maintenance of multistoried stand conditions within spruce and fir dominated stands in the cool moist group.

Preliminary modeling for most of the action alternatives project forest conditions in the future and will trend slightly towards less dominance of subalpine fir and Engelmann spruce dominance types, with a slight increase in both the 0- to 4.9-inch and greater than 15-inch size classes over the next 50 years. Kosterman (2018) found that the number of small diameter trees at the landscape scale, defined as 3.93- to 5.9-inch diameter at breast height, influence whether lynx produce kittens and the probability a female having kittens increased until there was about 20 percent of the landscape in this size class, beyond which probability of a litter decreased but only slightly. The Land Management Plan size class breaks do not match up with those in Kosterman (2018) but size classes from 0- to 4.9-inch would contain trees that size, as would the 5-to-14.9-inch size classes. Most of this change is projected to occur following wildland fire, as well as through forest succession because of the distribution among land designation types, such as Idaho Roadless Rule and designated wilderness. The shift in dominance types would most likely slightly trend from spruce-fir dominated stands towards an increase in lodgepole pine, whitebark pine, and some larch. However, Engelmann spruce and subalpine fir will remain as a component of these stands and still contribute to lynx and hare habitat. All of these changes are trending towards or within the natural range of variability for lynx habitat. These changes occur under all action alternatives but at different rates. These conclusions are based upon preliminary modeling results from SIMPPLLE, and the model is currently being refined.

Holbrook (2017) showed that female lynx exhibited decreasing use of stand initiation structures by up to a maximum availability of 25 percent. Stand initiation structures, as defined in their paper, include very young stands, generally five years old and younger, with very few trees and open canopies resulting from recent disturbances, such as timber harvest or severe fire. The Northern Rockies Lynx Management Direction (NRLMD) Standard VEG S1 limits disturbances from timber harvest or prescribed fire that result in the stand initiation (SI) structural stage not yet providing snowshoe hare habitat during winter to no more than 30 percent of mapped lynx habitat within a lynx analysis unit. However, stand initiation structures, as defined in this paper, and the stand initiation structural stage defined in the NRLMD are not the same; stands in the stand initiation structural stage as defined in the NRLMD, and that apply to Standard VEG S1, approach 20 to 25 plus years of age before moving to young regenerating stands that provide snowshoe hare habitat during winter. Thus, the stand initiation structure class defined in this paper is a subset of the stand initiation structural conditions used in NRLMD Standard VEG S1 to establish the 30 percent stand initiation condition threshold.

The terms Kosterman et al. (2018) used to describe habitat use by lynx are very similar to those used in Holbrook et al. (2017). However, forest structural classes described in both papers and the classes described in Kosterman (2018) are not the same as those structural classes used to define and develop objectives, standards, and guidelines in the Northern Rockies Lynx Amendment. The forest structural classes described include sparse, stand initiation, advanced regeneration, and mature. Forest structural classes used in the NRLMD are based on structural stages defined by Oliver and Larson (1996) and do not “crosswalk” well with the structural classes used in Holbrook (2017a) or those in the Kosterman thesis (2014) or Kosterman et al. (2018). Staff in the Forest Service Northern Region Regional Office are working with research scientists at the Rocky Mountain Research Station to better interpret the structure classes used in these studies with how they compare with those used in the NRLMD.

Of the five structure classes used to define habitat conditions in Kosterman et al. (2018), the open, sparse, and small-diameter regeneration forest classes are most likely to meet the unsuitable habitat conditions that define the 30 percent threshold in standard VEG S1. Mean values within female lynx core use areas determined by Kosterman et al. (2018) for the open, sparse, and small-diameter classes where 4 percent, 10 percent, and 13 percent, respectively, and, collectively, would equal approximately 27 percent. Per structural class definitions in Table 1 of Kosterman et al. (2018), the open and sparse structural classes lack horizontal cover and do not provide habitat for snowshoe hare; thus, both classes meet the unsuitable definition described in standard VEG S1. However, it is unclear if the same is true for the small-diameter class defined by Kosterman et al. (2018); this class provides dense horizontal cover for snowshoe hare, but it is not known if this class includes young trees tall and dense enough to provide habitat during winter. In addition, structural habitat conditions described in Kosterman et al. (2018) occurred within known female lynx core use areas; such conditions may not be the same within the larger home range or lynx analysis units used in the Northern Rockies Lynx Management Direction (NRLMD) to approximate home ranges. Thus, because of the habitat differences and uncertainties described, it is unclear how, or if, the conclusions in Kosterman et al. (2018) stating the probability of producing a litter was highest for females that had core-use areas with approximately 12 to 20 percent of small-diameter regenerating forest relates to the 30 percent stand initiation structural stage threshold described in the NRLMD standard VEG S1. As stated previously, staff in the Forest Service Northern Region Regional Office are working closely with research scientists at the Rocky Mountain Research Station to better interpret, understand, and crosswalk structural conditions described in research papers with those used to define management direction provided in the NRLMD.

FW-DC-TBR-03 is a desired condition that states “Dead or dying trees in excess of those needed for snags, snag recruitment, and course wood material are salvaged, where practicable, in areas suitable for timber production (see MA3-GDL-FOR-05 for requirements).” While the amount of salvage harvest is not predictable, new research suggests that beetle killed trees provide conditions selected by lynx.

Squires (2020) provides the first assessment of how Canada lynx, a specialized forest carnivore, navigated a disturbed landscape created by an extensive bark-beetle outbreak. The field study was conducted in the San Juan mountains of southern Colorado on public lands administered as the Rio Grande National Forest and investigated the influence of large-scale disturbance on movements, habitat use, and the complexities of resource selection by Canada lynx in spruce-fir forests affected by spruce beetles (*Dendroctonus rufipennis*), a species of bark beetle. While the Canada lynx has occupied boreal and subalpine montane forests structured by natural disturbance processes for millennia, lynx at the southern range periphery might be particularly sensitive to large-scale fire and insect disturbances that alter forest structure and composition for potentially many decades. These large-scale disturbances also pose contemporary challenges for forest managers administering this disturbed landscape and balancing resource needs of Canada lynx with forest management activities like timber salvage.

The investigators predicted that Canada lynx would:

- Select for patches of live canopy cover with dense sub-canopies of Engelmann spruce and subalpine fir and mature green forests, to the extent possible, when confronted with a highly altered landscape from spruce beetle impacts.
- Select forest stands with higher understory (high horizontal cover) compared to random locations within home ranges and along movement paths.
- Exhibit a functional response and become increasingly selective for forest structures associated with horizontal cover (that is, high subcanopy cover) in areas where horizontal cover was sparsely distributed.

Contrary to the initial prediction in this study and previous research in the northern Rocky Mountains demonstrating the importance to Canada lynx of mature live-forest structures, lynx in beetle-impacted forests in the study area selected home ranges, use-areas within home ranges, and movement paths in forests with higher tree mortality and generally larger diameter trees than expected under random conditions. Overall, Canada lynx preferentially selected forest stands composed of large-diameter and abundant beetle-killed trees with developed live Engelmann spruce and subalpine fir understories.

Field data collected at lynx locations in home ranges indicated they generally selected stands with greater live components of subalpine fir and live canopy of Engelmann spruce at a finer resolution within the disturbed landscape. Areas selected by lynx within home ranges supported approximately 2.5 times the number of live subalpine fir trees from 3–8.9 feet diameter at breast height compared to areas randomly available. Canada lynx were found to select areas with higher Engelmann spruce and subalpine fir subcanopy at a landscape extent, while selecting for areas within home ranges with higher horizontal cover. Lynx in winter exhibited particularly strong positive functional responses for horizontal cover, canopy cover of live Engelmann spruce, and for larger beetle-killed trees of approximately 20 centimeters in diameter. Similarly, lynx selected forest patches of large-diameter beetle-killed trees when they were rare in home ranges and used them in proportion to their availability when they were abundant. Study results and mapping products demonstrated that forests with extensive overstory mortality are heterogenous in the subcanopy and not "dead" to Canada lynx. Within the landscape of high beetle mortality, lynx at a finer scale selected stands with subcanopies dominated by Engelmann spruce and subalpine fir beneath the changed overstory. Collectively, the authors conclude that (1) Canada lynx actively use and select forests impacted by spruce bark beetles, (2) the live trees remaining are important to maintain lynx habitat, and (3) horizontal cover from Engelmann spruce-subalpine fir subcanopy are strongly selected by Canada lynx within the context of spruce-beetle impacted forests.

It is not possible to predict the amount of salvage that would occur in lynx habitat under the plan. If this activity occurred, it could reduce habitat selected by lynx. Complex socioeconomic interactions between natural disturbance processes and the desire to promote timber salvage can result in a cascade of ecological and environmental consequences in actively managed landscapes post-disturbance.

Consequences of Other Vegetation Management Treatments

The U.S. Fish and Wildlife Service's biological opinion on the Northern Rockies Lynx Management Direction (NRLMD) (U.S. Department of the Interior 2017c) stated that limited exceptions to vegetation standards VEG S5 and VEG S6 could occur for other resource benefits, such as to restore western white pine and whitebark pine, which is a threatened species under the Endangered Species Act. Under all of the alternatives, the estimated acres that could have vegetation management treatments under the numbered exceptions to standards VEG S5 and VEG S6 was estimated to be 1,930 acres for white pine under Appendix K of the NRLMD. It was estimated to be 1,650 acres for restoration of western larch on the Clearwater National Forest and 120 acres on the Nez Perce National Forest.

Plan components in the NRLMD provide for the conservation of Canada lynx and their habitat. They are aligned with the conservation measures for vegetation management in core habitat listed in the 2013 Lynx Conservation and Assessment Strategy (Interagency Lynx Biology Team 2013) at the forestwide scale, considering exceptions allowed by the incidental take statement.

In summary, standard VEG S1 limits regeneration by vegetation management projects if more than 30 percent of the lynx habitat in a lynx analysis unit is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat with certain exceptions or exemptions allowed under the incidental take statement. Only 1 out of 106 lynx analysis units on the Nez Perce-Clearwater were modeled as having more than 30 percent of lynx habitat being in an early stand initiation condition as a result of stand-replacing wildfires. VEG S1 limits adverse effects to lynx because regeneration by vegetation management projects cannot occur until vegetation regrows into snowshoe hare habitat. As a result of recent large wildfires, an additional nine lynx analysis units are over 20 percent in early stand initiation and all of them are located in-part or wholly within designated wilderness or roadless areas.

Standard Veg S1 suggests that a departure from the 30 percent limit in the standard is possible. The following is the standard Veg S1: "Unless a broad scale assessment has been completed that substantiates different historic levels of stand initiation structural stages, limit disturbance in each lynx analysis unit as follows: If more than 30 percent of the lynx habitat in an lynx analysis unit is currently in a stand initiation structural stage that does not yet provide winter snowshoe hare habitat, no additional habitat may be regenerated by vegetation management projects." SIMPPLLE modeling of the Nez Perce-Clearwater would qualify as a broad scale assessment that substantiates different historic levels of stand initiation structural stages. For example, SIMPPLLE model results suggest that the amount of stand initiation structural stages grass-forb-shrub and 0- to 4.9-inch diameter at breast height size classes ranged from between 2 and 38 percent across the planning area.

Standard VEG S2 limits regeneration by vegetation management projects to no more than 15 percent of lynx habitat on National Forest System lands within a lynx analysis unit in a 10-year period with certain exceptions or exemptions allowed under the incidental take statement. By limiting the rate of regeneration harvest in each lynx analysis unit, these standards would contribute to a mosaic of habitat over time, which would benefit lynx by supporting the distribution of prey resources within a lynx analysis unit and across the landscape. Projections for acres harvested by PRISM modeling considered the limits imposed by VEG S1 and S2 of a maximum of 30 percent unsuitable in a lynx analysis unit and no more than 15 percent unsuitable in a 10-year period. These were imposed upon the amount of vegetation management and prescribed burning within analysis units by incorporating those as constraints in the model. The number of acres treated in the PRISM outputs projected under each alternative include those constraints and abide by VEG S1 and VEG S2. Therefore, each alternative provides ecological conditions for lynx through time. While PRISM can project growth, forestry outputs and general trends in vegetation, it does not project these spatially nor consider the stochastic nature of fires given the assumptions in the model and plan objectives. SIMPPLLE modeling projects these spatially and simulates fires stochastically through multiple runs. Potential multi-storied lynx habitat is abundant, although projected to decline. Modeled multi-storied hare habitat declines slightly in all alternatives by time step 5 with minimal differences between alternatives. There is very little difference in how the alternatives affect multi-storied habitat, with only 24,268 acres difference between Alternative Z (the most disturbance) and X (the least disturbance). The lack of differences between alternatives suggests that the decline is inevitable and unavoidable due to increasing wildfires. The level of habitat at decade 5 is still relatively abundant compared to the natural range of variation, suggesting that the availability of multi-storied habitat is not a limiting factor to lynx recovery on the Nez Perce-Clearwater.

Standard VEG S5 limits precommercial thinning projects during the stand initiation structural stage until the stand no longer provides winter snowshoe hare habitat with certain exceptions or exemptions allowed under the incidental take statement. The intent is to maintain the habitat conditions that are expected to produce high densities of snowshoe hares, which would benefit lynx by supporting high-quality habitat. There are six exceptions to standard VEG S5 that could be used to meet other resource objectives. The exceptions to VEG S5 for precommercial thinning are anticipated to result in the short-term loss of lynx foraging habitat in some treated stands, which could have an adverse effect on lynx survival and reproduction by reducing prey resources, but this effect is limited in intensity and extent. Precommercial thinning at administrative sites and for research or genetic tests would generally have little or no adverse effect on lynx because few acres are involved, and the acres impacted are widely distributed. Thinning to enhance whitebark pine and aspen would benefit other wildlife species and would occur on a limited number of acres of lynx habitat, resulting in a minor adverse effect on lynx. Daylight thinning would be allowed around individual western white pine in a manner that retains most winter snowshoe hare habitat. Daylight thinning might reduce lynx habitat quality in the short-term but might allow the development of multiple dense canopy layers in the long-term. Standard VEG S6 limits vegetation management projects that would reduce winter snowshoe hare habitat in multistory mature or late-successional forests with certain exceptions or exemptions allowed by the standard. Timber harvest would be allowed in areas that have the potential to improve winter snowshoe hare habitat that presently have poorly developed understories and do not provide winter snowshoe hare habitat, benefiting lynx by developing forests with a dense understory to support their snowshoe hare prey. The effects of the numbered exceptions to VEG S6 would create short-term loss of hare habitat quality or quantity but these are anticipated to be minor because they are limited in intensity and extent. Implementation of standard VEG S6 would benefit lynx by retaining and developing important winter habitat over much of the Nez Perce-Clearwater.

As stated in the Land Management Plan Appendix 8, VEG O1, VEG O2, and VEG O4 encourage management of vegetation to mimic or approximate natural succession and disturbance processes while maintaining lynx habitat components. Guideline VEG G1 encourages the development of projects that are designed to recruit a high density of conifers, hardwoods, and shrubs where such habitat is scarce or not available. Guideline VEG G5 is to provide habitat for alternative prey species, particularly red squirrel, in each lynx analysis unit. Guideline VEG G10 states that all the vegetation standards should be considered when designing fuel treatment projects within the wildland urban interface to promote lynx conservation and that this consideration should be explained in the project National Environmental Policy Act documentation. Guideline VEG G11 describes how denning habitat should be retained and distributed in each lynx analysis unit. These guidelines benefit lynx by encouraging practices that create or maintain lynx habitat components and would continue to be considered as site-specific projects are developed under all the alternatives. Plan components provide for a mosaic of habitat conditions over time that support dense horizontal cover and high densities of snowshoe hare with winter snowshoe hare habitat provided by the stand initiation stage and by mature multistory conifer vegetation in support of lynx conservation. Analysis of Forest Inventory and Analysis data on snags and large downed woody material for the Nez Perce-Clearwater Land Management Plan shows that the availability of snags and large downed woody material was similar in wilderness and non-wilderness (Bollenbacher et al. 2009a), suggesting that snags for denning habitat will be present in both wilderness and non-wilderness. Snag retention guidelines in the Forestlands section will help ensure that there are snags for lynx denning.

Guideline VEG G11 of the Northern Rockies Lynx Management Direction requires considerations for denning habitats when working in lynx habitat. Plan guidelines require minimum snag densities under all alternatives but differ at the scale they apply, and the size of snags required to be retained. Alternatives W, X, and Y would require snags be retained from 15 inches with some proportion of those snags being greater than 20-inch diameter at breast height (DBH) and larger. Alternative Z requires retention of snags 10-inch DBH and larger with some proportion of those snags required to be 15-inch and larger and some 20-inch and larger. Under Alternative Z, the number of snags would be from between 600 and 700 snags per 100 acres 10-inch DBH and larger depending upon potential vegetation type.

The numbers for snags in the guideline are based upon the average number of snags reported by broad potential vegetation type in northern Idaho, as stated in Bollenbacher et al. (2009). For north Idaho forests, this represents between 600 and 700 snags per 100 acres of 10-inch diameter at breast and larger in the subalpine habitat type group, as in Alternative Z, versus between 0 and 400 snags per 100 acres 15-inch DBH and larger, as under Alternatives W, X, and Y. Under all alternatives, these are required to be retained at the project area scale. These plan components would ensure that snags retained would be sufficient to ensure that denning habitat would be available after vegetation projects in areas of lynx habitat where these activities occur. Snag guidelines under all alternatives would provide potential denning habitat.

This effect to lynx would only happen in about 17 percent of the lynx habitat within Management Area 3. While plan components for snags in Management Area 2 do not vary by alternative, emphasis for vegetation management in Management Area 2 stresses restoration of forest structure, composition, function, and connectivity and snags would probably be retained during restoration treatments but not required. Furthermore, treatments in Management Area 2 are expected to be conducted through wildland fire to restore habitats, which will naturally leave more snags.

Summary of Modeled Alternative Consequences

In the Canada Lynx Conservation and Assessment Strategy (Interagency Lynx Biology Team 2013), no conservation measures are identified for climate change due to the limited ability of federal land management agencies to alter the current trajectory. The conservation measures for vegetation include the following:

Conduct a landscape evaluation to identify needs or opportunities for adaptation to climate change. Consider potential changes in forest vegetation that could occur as a result of climate change e.g.,(Gärtner et al. 2008). Identify reference conditions relative to the landscape's ecological setting and the range of future climate scenarios. For example, the historical range of variability could be derived from landscape reconstructions e.g., (Hessburg and Smith 1999, Blackwell and Gray 2003, Gray and Daniels 2006).

Plan alternatives were analyzed using a landscape evaluation that considered reference conditions relative to the landscape's ecological settings and the range of future climate scenarios, considering the interaction of vegetation management, wildland fire, and possible effects on fragmentation of habitat.

The Ecosystem Research Group modeled the effects of the alternatives. The natural range of variation was modeled going back about 1,000 years and the effects of the alternatives were projected for the next 50 years, including anticipated changes in climate and the fire suppression logic of the model. Effects of vegetation management associated with each management area, combined with modeling of natural processes such as wildfires, insects and disease, and forest succession, were modeled in 2019. The Ecosystem Research Group modeled the effects of several future scenarios for comparison purposes, including a warmer and drier climate over the next five decades that would result in more acres burned due to expected climate change and continuing the current level of fire suppression into the future. Effects were modeled using SIMPPLLE and PRISM models. The SIMPPLLE and PRISM models provide a probabilistic assessment of the subset of federal actions that provide a programmatic framework for vegetation management activities across the Nez Perce-Clearwater over a 50-year future time period. However, since the exact location, extent, and timing of future fires, timber harvest, thinning, and planting are unknown, future site-specific actions would be subject to the requirements of Section 7 of the Endangered Species Act at a future time.

Ecosystem Research Group's modeling used the GIS layer of modeled and mapped lynx habitat for the Nez Perce-Clearwater. Two analyses for lynx were done to assess their habitat requirements: (1) a stand initiation habitat analysis and (2) a potential multistoried habitat analysis. Stand initiation hare habitat was modeled as any cover types within the footprint of lynx habitat updated in 2018. Stand initiation hare habitat was modeled as the 0- to 5-inch size class as seedling and sapling with a canopy cover class of 40 to 100 percent and 20 or more years since the previous stand-replacing disturbance, such as high-severity fire or regeneration harvest. Modeled multistoried habitat is limited to cover types that contain subalpine fir or Engelmann spruce, which may be mixed with other species, within subalpine fir-spruce habitat groups. Multistoried lynx habitat is provided by forests with a high proportion of trees in the diameter classes of 7 to 11 inches and 11 plus inches (Squires 2010, Squires et al. 2006) and a dense understory providing snowshoe hare habitat. Although snowshoe hare require a dense understory, the SIMPPLLE model is dependent on the Northern Region VMap classes and did not allow the incorporation of understory density. Updating of lynx habitat was conducted according to the Lynx Conservation Assessment and Strategy (2013) and is described in Lutes (2019).

The most important lynx habitats include Engelmann spruce, subalpine fir, spruce-fir, and lodgepole pine. Modeling results estimating the natural range of variability for lynx habitats suggests that they are departed from their natural range of variability. The departure is represented by an increase in Engelmann spruce and subalpine fir with a concurrent decrease in lodgepole pine and white bark pine. In other words, spruce-fir stands dominate more than they did under natural fire regimes while lodgepole and whitebark pine dominate less than they did in the past. Modeling results from PRISM suggest that, under all alternatives, the departure from the natural range of variability declines but the rate of that decline varies by alternative. That is because the alternatives vary the rate at which restoration of the natural range of variability is achieved, primarily by varying objectives for restoration. Objectives that restore or treat lynx habitat are mostly those that treat the cold and cool, moist potential vegetation types.

Given these objectives and various assumptions and constraints in the models, the modeling results suggest that, in all alternatives, subalpine fir, Engelmann spruce, and spruce-fir dominance types increases but the rate of that decline is faster in some alternatives than others. As these types increase, lodgepole pine and white bark pine dominance also increase. In Alternatives Z and the No Action Alternative, spruce-fir dominance types remain more constant and increase at a similar rate. Restoration back to the natural range of variation in these types take up to and beyond 70 years. In the Preferred Alternative, the amount of spruce-fir dominance change is from 592,330 acres to 796,493 by the end of the 5-decade time frame.

The amount of harvest or wildland fire required to achieve these results fluctuates between about 20,000 acres to a high of about 40,000 acres per decade time step, depending upon the timestep. This amount of treatment per decade was constrained by the PRISM model and is consistent with VEG S1 and S2 of the Northern Rockies Lynx Management Direction. Treatments projected to achieve this include both vegetation management and wildland fire.

Through time, under all alternatives, the proportion of large diameter size class would progress to the very large class while other size classes would remain relatively similar in abundance through time. The heterogeneity in size classes within a stand would increase because desired conditions will direct management to retain live trees within stands, which will grow into the very large size classes. Thus, even regenerating stands will still contain large and very large trees.

Under the 2012 Planning Rule, the assumption for wildlife is that species are well adapted to the dynamic nature of their forested habitats and may even require forests to function within the natural range of variation to persist and obtain optimal population performance. For most species, these assumptions are not explored rigorously in the scientific literature. Lynx habitat use has not been studied in relation to how forests function within their natural range of variation so effects to lynx from direction to restore the natural range of variation is not completely understood. However, a few clues from the published lynx and snowshoe hare literature can help make inferences about the effects.

Holbrook (2017) suggested that lynx used what they termed advanced regeneration increasingly as it increased on the landscape. Advanced regeneration generally holds the most snowshoe hares while lynx hunt more efficiently in mature forest. In this study, Canada lynx demonstrated use of mixed conifer forests and a mosaic of structural stages with canopies composed of spruce-fir and lodgepole. These findings underscore the importance of both types of stand conditions. Holbrook (2017) defined advanced regeneration as follows:

> Early–mid-seral stands of age ~25–40 yr with a mixed species composition, but spruce-fir tends to occur the most frequently (Appendix S1). Advanced regeneration exhibited a median basal area-weighted DBH of 8 inches or 20 cm (IQR = 5–10 inches or 14–27 cm); however, of the 51 plots examined 70% of them were classified at size classes between 5 and 15 inches (12.7–38 cm). Advanced regeneration exhibited median canopy cover of 45% (IQR = 30–70%), median tree height of 51 ft or 16 m (IQR = 34–64 ft or 10–20 m), and median basal area of 89 ft2/acre or 20 m2/ha (IQR = 39–124 ft2/acre or 9–28 m2/ha). Tree density for trees larger than 5 inches (12.7 cm) was 167 trees/acre or 416 trees/ha (IQR = 72–289 trees/acre or 178–714 trees/ha). Tree density for trees <5 inches (12.7 cm) was 900 trees/acre or 2223 trees/ha (IQR = 150–2549 trees/acre or 370–6298 trees/ha).

Holbrook (2017) defined mature forest as:

> Mid-seral stands of age ≥40 yr arranged in a multi-storied structure with a mixed species composition, but spruce-fir tends to occur twice as much as any other species (Appendix S1). Mature exhibited a median basal area-weighted DBH of 10 inches or 25 cm (IQR = 7–14 inches or 18–35 cm). However, of the 194 plots examined 45% were classified at size classes between 5 and 10 inches (12.7–25.4 cm), 25% at size classes between 10 and 15 inches (25.4–38 cm), and 21% of them were classified at size classes between 15 and 25 inches (38–64 cm). Mature exhibited median canopy cover of 56% (IQR = 40–70%), median tree height of 65 ft or 20 m (IQR = 53–88 ft or 16–27 m), and median basal area of 140 ft2/acre or 32 m2/ha (IQR = 91–209 ft2/acre or 21–48 m2/ha). Tree density for trees larger than 5 inches (12.7 cm) was 217 trees/acre or 535 trees/ha (IQR = 144–331 trees/acre or 357–818 trees/ha). Tree density for trees <5 inches (12.7 cm) was 1500 trees/acre or 3705 trees/ha (IQR = 300–4200 trees/acre or 741–10,374 trees/ha).

Kosterman et al. (2018) showed abundant mature forest and its connectivity contributed to lynx reproduction. They also showed that the amount of small diameter regenerating forest conditions improves lynx reproduction until it reaches about 20 percent at a landscape scale and declines slightly after that amount (Kosterman et al. 2018). The graph in the publication shows the probability of producing a litter approaches 1.0 at approximately 15 percent of the area being in small diameter forest and stays at close to 1.0 until approximately 20 percent then falls to between 0.75 and just under 1.0 as small diameter approaches 25 percent open. Kosterman et al. (2018) did not have data to show the relationship of probability of reproduction beyond 25 percent. However, the probability of reproduction does not fall as much at 25 percent small diameter as when the amount of small diameter forest makes up 10 percent or less. Thus, Kosterman et al. (2018) showed that the Northern Rockies Lynx Management Direction standard Veg S1's threshold of 30 percent within a lynx analysis unit is appropriate even though it is slightly higher than ideal and suggests that more lynx analysis units ought to be managed closer to between 15 to 25 percent small diameter than at lower levels. Thus, both mature connected forests and intermediate amounts of small diameter regenerating forests are likely important for lynx.

Kosterman et al. (2018) defined mature forest conditions as:

> A multistoried or uneven-aged stand with a median DBH of 26 cm (10 inches). This DBH is reflective of the multistoried nature of the structure class, but despite this DBH, there was a comparatively high proportion (i.e., 22%) of large trees (≥38 cm in DBH or 15 inches). Common attributes in this class were substantial understory (e.g., seedlings and saplings) and horizontal cover, continuous canopy, and no evidence of recent disturbance.

Kosterman et al. (2018) defined small diameter regenerating forest as:

> Regenerating forests generally due to forest management with smaller sized (~10–15 cm DBH or 4-6 inches) trees, intermediate canopy cover, and high horizontal cover.

SIMPPLLE modeling results for the revised natural range of variation runs suggest that, on average, the cool moist potential vegetation type averages between 17 and 22 percent in the 0- to 4.9-inch size class and between 19 to 21 percent in the 5- to 9.9-inch size class, suggesting the natural distribution of these size classes contribute to lynx habitat. Naturally, stands must go through the 0- to 4.9-inch size class in appropriate amounts to become stand initiation structure known to host the highest snowshoe hare counts.

In another publication, Holbrook et al. (2017) studied multi-scale relationships of forest metrics and snowshoe hare use. They found that snowshoe hares require horizontal cover, and that horizontal cover was associated with medium sized trees of 5 to 9 inches. While they found that spruce and fir forests produced high horizontal cover used by hares, they found a positive relationship with the amount of canopy cover of lodgepole pine within mixed conifer settings, both at the landscape scale and the plot scale. Work by Ellsworth et al. (2013) suggested that lodgepole pine was more nutritious to snowshoe hares than other conifer species.

Berg et al. (2012) found the lowest densities of snowshoe hares in young lodgepole at low density and late seral stands of mixed whitebark and spruce-fir stands and the highest densities of snowshoe hares were found in young lodgepole at high density and late seral multi-storied stands of mixed spruce-fir, mixed aspen spruce-fir, and mixed lodgepole spruce-fir.

Together, these studies suggest that landscapes with a variety of size classes, structural stages, and proportions of forest structures can affect lynx selection and reproduction and snowshoe hare abundance. Management proposed at landscape scales under the Land Management Plan would create conditions like those described above in some stands that would contribute to lynx selection and snowshoe hare abundance (Berg et al. 2012, Holbrook, Squires, Olson, Lawrence, and Savage 2017, Kosterman et al. 2018, Holbrook, Squires, Olson, DeCesare, and Lawrence 2017).

Under all alternatives, dominance would shift from more spruce-fir to more lodgepole. Lodgepole pine can contribute positively to snowshoe hares as a component of a mixed conifer stand and a 30 to 70-year-old stand of lodgepole. While treatments could make some stands unsuitable for lynx short-term, those stands would grow into conditions preferred by lynx through time. As time went on, a greater proportion of the lynx habitat would be in a size class, such as advanced regeneration, which promotes lynx use or reproduction. As long as these treatments follow plan guidance within the Northern Rockies Lynx Management Direction, they should contribute to lynx recovery.

To estimate the current condition, available data sets are not able to estimate horizontal cover associated with snowshoe hare and lynx habitat, but overall density can be estimated based upon Forest Inventory and Analysis field measurements of canopy cover. A large portion of the Nez Perce-Clearwater—about 65 percent of the area in the cool moist potential vegetation type—is currently in a moderate- to high-density class. Over the first three decades, modeling estimates that this proportion remains steady but then declines while the proportion of low-density forest increases. In the model, lower forest densities are largely driven by natural disturbances, such as fire, insects, and disease, which convert large areas to early successional forest in the latter modeled decades with temporarily less canopy cover. The increasing proportion of forest with low canopy cover may temporarily reduce the quality and connectivity of lynx habitat; however, this would improve over time with development of vegetation in the understory and mid-story. According to the modeling of the natural range of variation, fire cycles affecting the amount of multistoried and stand initiation habitat have occurred in the past and are likely to occur in the future in the mid- to high-elevation subalpine fir and spruce forests of the Nez Perce-Clearwater. This is a natural fluctuation over time associated with the characteristic fire regimes and disturbance processes.

The Ecosystem Research Group modeled a multistory forest that provides snowshoe hare and lynx habitat over the next five decades. Since the model is not able to discern whether a dense understory is present or not, this should be interpreted as areas with a potential to provide winter snowshoe hare and lynx habitat. The model depicted a trend in forest stands that are most likely to have a multistoried structure, high canopy closure, and presence of subalpine fir and spruce. For potential multistory habitat, the range between maximum and minimum natural range of variation is very large at a little more than 350,000 acres between natural range of variation high and low. Since the model reduces harvest based upon lynx standard VEG S6 and applies fire suppression logic as well as forest succession for all alternatives, levels of modeled multistoried lynx habitat remain within the natural range of variation in all decades. The change is primarily driven by modeled levels of fire or insects and disease allowing succession to increase modeled multistoried habitat. If insects and disease kill scattered patches of trees in the overstory of multistoried forests, that could increase the density of the understory, creating multistoried stands after a lag time of a few decades, provided the loss of canopy cover is not too great. In contrast, stand-replacing wildfires would create more stand initiation habitat which also increases in all alternatives at about the same pace because the trends are driven mostly by natural disturbances. Over the next five decades, the acres of modeled stand initiation habitat increase as well but remain within the natural range of variation. The Preferred Alternative, in combination with natural processes, shows that potential multistory hare and lynx habitat is expected to stay within the natural range of variation. The modeling results discussed above are believed to be a worst-case scenario with respect to changing climate, stand-replacing wildfire, and insects and disease.

In the updated modeling, the Nez Perce-Clearwater also tested the effects of an earlier increase in stand-replacing wildfire. This resulted in stand-replacing wildfire occurring on about 80,000 more acres. This would initially create more temporarily unsuitable habitat for Canada lynx for about the first two decades, followed by an increase in stand initiation hare habitat for subsequent decades.

Under all the alternatives, there would be no change to the plan components for lynx. The effects to lynx that were described in the Northern Rockies Lynx Management Direction 2007 Final Environmental Impact Statement (Volumes 1 and 2), biological assessment, biological opinion, and record of decision are incorporated by reference. Continued implementation of the Land Management Plan is anticipated to maintain or improve lynx habitat in the long-term, although some short-term adverse effects may occur, primarily due to the reduction of snowshoe hare habitat allowed under the exemptions to the vegetation standards. These actions would provide diversity and resiliency to lynx habitat. The Land Management Plan direction will promote conservation of the lynx population.

Threat: Wildfire, Fire Suppression, Fire Management, and Fuels

Stand-replacing wildfires are the most common type within lynx habitat on the Nez Perce-Clearwater. They remove understory vegetation and tree canopy cover in the short-term but can promote development of dense horizontal cover and recruitment of downed wood in the longer term. During the early post-fire period, a large stand-replacing fire may negatively affect the ability of a lynx to secure food resources within its home range. Lynx are known to use unburned patches in large, newly burned fire areas.

Fuels projects aim to reduce hazardous fuels through vegetation management, depending on the treatments. These changes can affect lynx habitat by reducing downed wood, simplifying forest structure, decreasing horizontal cover, removing understory vegetation, and reducing overstory and understory. These effects can vary depending upon the treatments used. The fuels treatments are usually localized around communities and infrastructure and evaluated on a site-specific basis but can be widespread in some cases. The Incidental Take Statement for the Northern Rockies Lynx Management Direction (NRLMD) recognized impacts from fuels treatments and granted limited exceptions from Land Management Plan standards for these activities within the Wildfire Community Protection Zones, which were discussed as the wildland urban interface in the NRLMD and Incidental Take Statement. The Clearwater National Forest was identified as occupied and consulted with the U.S. Fish and Wildlife Service on the amount of lynx habitat exempted from the NRLMD standards for fuels treatments. The amount of lynx habitat anticipated to be exempt from Land Management Plan standards within the NRLMD is about 44,607 acres on the Clearwater National Forest. The Nez Perce National Forest was considered unoccupied and was not required to consult on acres exempted from standards in the NRLMD for fuels treatments. This analysis assumes that the NRLMD will be implemented on the Nez Perce National Forest and will consult with the U.S. Fish and Wildlife Service on fuels exemptions for that Forest for fuels treatments within Community Protection Zones.

The revised Forest Plan is also proposing to adopt Community Wildfire Protect Plan (CWPP) wildland urban interface (WUI) boundaries, this changes where exemptions to VEG S1, VEG S2, VEG S5, and VEG S6 may be applied. The change to the CWPP WUI boundaries would provide flexibility when planning fuels reduction projects and align them with county designations. It would not increase the total exemptions acres above the six percent analyzed under the U.S. Fish and Wildlife Service Incidental Take Statement.

Since the development of the NRLMD Idaho, Clearwater and Latah counties have developed CWPPs to define WUI areas. Approximately 276,046 acres of lynx habitat on the national forest overlaps with portions of the CWPP WUI areas, this represents about 19 percent of the lynx habitat across the national forest, exceeding the 6 percent limit set forth in the NRLMD. Adoption of CWPP WUI boundaries would allow the national forest greater flexibility when locating and implementing hazardous fuels projects across the national forest. However, the cumulative total of acres of exempted fuels treatments within the wildland urban interface that do not meet the vegetation standards would remain capped at 89,272 acres or 6 percent of the lynx habitat across the national forest (Table 221). Given that the national forest has used none of the wildland urban interface exemption acres allotted to the national forest since 2007, instead developing and implementing projects so that they meet NRLMD, it is expected that this number will not be exceeded throughout the life of the revised Forest Plan.

Table 221. Total acres and proportions of exception and exemption acres proposed

Acre Category	Occupied Lynx Habitat	Unoccupied Lynx Habitat	Total
Total Acres of lynx Habitat	743,275	744,596	1,487,871
Acres of Lynx Habitat in CWPP WUI	78,112	197,934	276,046
Maximum acres of snowshoe hare habitat Treated Using Exemptions for Fuels Treatment Projects in CWPP WUI	44,596 (6%)	44,676 (6%)	89,272 (6%)
Maximum acres of snowshoe hare habitat Treated Using Exceptions for Activities for Other Resource Benefits	2,410 (0.3%)	2,530 (0.3%)	4,940 (0.3%)
Total Acres of Snowshoe Hare Habitat Treated Using Exemptions or Exceptions	47,006 (6.3%)	47,206 (6.3%)	94,212 (6.3%)

In its previous biological opinion on the Northern Rockies Lynx Management Direction (U.S. Department of the Interior 2007b), the U.S. Fish and Wildlife Service assumed that fuel treatments within the wildland urban interface would not be excessively concentrated in adjacent lynx analysis units because fuel treatment projects may not result in more than three adjacent lynx analysis units exceeding standard VEG S1 (that is, 30 percent or greater currently unsuitable). These limitations would continue to limit the concentration of impacts to Canada lynx in the future.

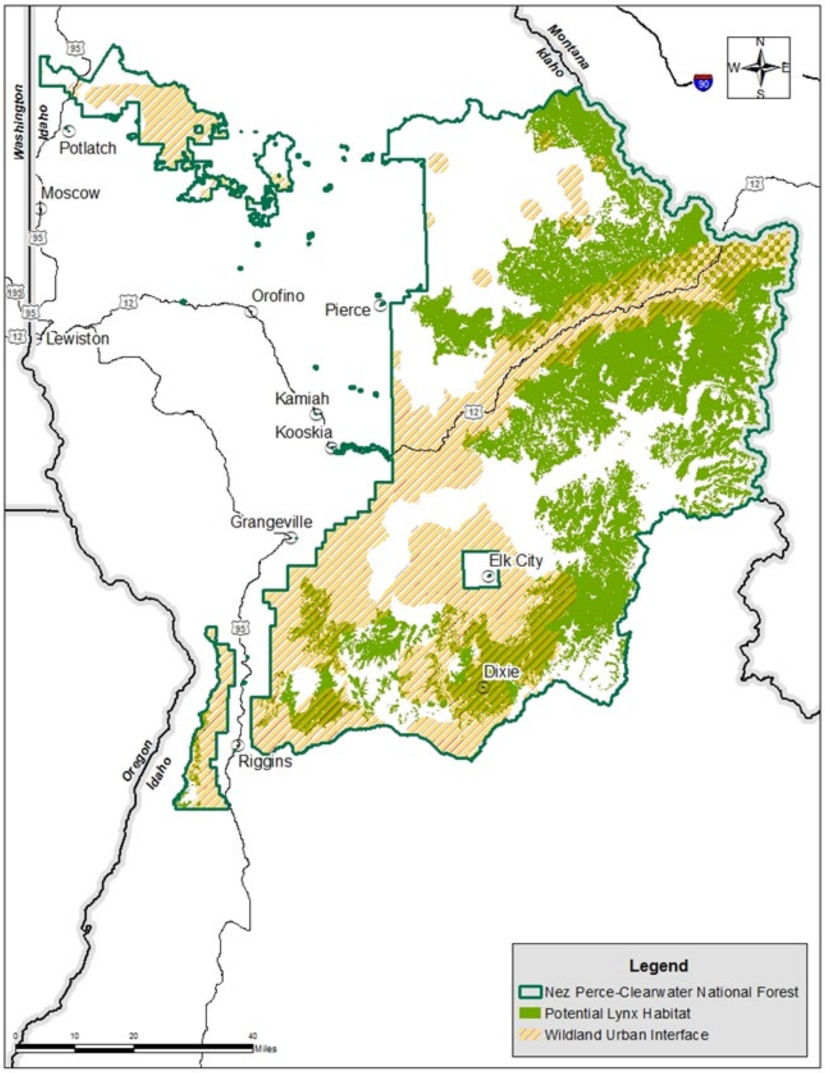


Figure 84. Wildland urban interface areas proposed for fuels exemptions

To date the total amount of fuels treatments occurring in lynx habitat on the Nez Perce-Clearwater amounts to 17,257 acres, which is about 1.2 percent of the lynx habitat in the plan area. However, since 2007, the Nez Perce-Clearwater has used none of the exempted acres analyzed in the Incidental Take Statement. Instead, all fire and fuels projects have abided the Northern Rockies Lynx Management Direction (NRLMD) standards and guidelines (that is, no thinning or reduction of the understory in multi-story habitat was conducted in lynx habitat) and individual projects went through consultation. Fuels treatments in the wildland urban interface are anticipated to have adverse effects on lynx and their snowshoe hare prey because the intent would be to maintain lower tree density in these areas, resulting in less area of dense horizontal cover.

Reductions in snowshoe hare habitat due to fuels treatments, including commercial harvest and precommercial thinning, could lead to lowered reproduction and survival of lynx. However, adverse effects are limited in their extent and distribution. In its previous biological opinion on the NRLMD (U.S. Department of the Interior 2017e), the U.S. Fish and Wildlife Service assumed that fuel treatments within the wildland urban interface would not be excessively concentrated in adjacent lynx analysis units because fuel treatment projects may not result in more than three adjacent lynx analysis units exceeding

Standard VEG S1. Except to create defensible space, the exceptions may not be used in lynx analysis units that have more than 30 percent in stand initiation structural stage that does not yet provide winter snowshoe hare habitat. These limitations would continue to limit the concentration of impacts to Canada lynx in the future. As previously stated, a sound rationale for the need and efficacy of fuels treatments is needed when claiming the exemptions to the Northern Rockies Lynx Management Direction (NRLMD) Vegetation Standards for fuels reduction projects implemented in the wildland urban interface.

The Standards, Objectives, and Guidelines laid out in the NRLMD only apply to occupied lynx habitat. Since the Nez Perce portion of the national forest is currently considered unoccupied NRLMD directs that projects need only consider applicable Standards, Objectives, and Guidelines. As with the Incidental Take Statement (ITS) for the NRLMD, the ITS for the Forest Plan Revision Lynx Biological Assessment will not include exemption or exception acres assigned to the unoccupied portion of the Nez Perce-Clearwater. Despite this the intent is to develop projects and analyze the effects of individual projects on this portion of the national forest as if it were occupied which is in line with regional forester direction. As a result, exemption acres will be applied to projects and tracked for reporting at such a time as the national forest is considered occupied.

Past fire regimes are described in the Assessment (U.S. Department of Agriculture 2014l, k), the Forestlands section, and Fire Management section. Fire regime differs by broad potential vegetation type, which for lynx is the cool, moist, and cold potential vegetation types. Fire regimes in these potential vegetation types are characterized by many frequent small fires and periodic large stand replacing fires. Within stand replacing fires, burn severity can vary because of temperature, humidity, time of day or night, and wind, leaving the habitat within a burned landscape variable. The majority of fire starts result in small acreages burned, adding heterogeneity to size classes, patch size, and forest structure. However, the greatest change agent in lynx habitat is stand replacing fire. The assumption is that most wildlife species are adapted to take advantage of the characteristics of this fire adapted ecosystem through time. Lynx use wide landscapes and some evidence suggests they reproduce better in those that have some mix of early seral and mature multistory (Kosterman et al. 2018).

Fire suppression over long periods of time can affect forest composition, dominance types, size class distribution, forest density, forest structure in single multi-story versus single story, habitat heterogeneity in distribution and size of habitat patches, and change in fire return intervals. Over shorter timeframes, fire suppression increases the amount of older age classes, decreases younger age classes, favors shade tolerant tree species over shade intolerant species, increases patch size resulting in less heterogeneity, increases forest density, and increases woody debris. Over longer time frames, fuel conditions build up and increase the chance of stand replacing wildfires. They are also more susceptible to insect outbreaks. Recovery from uncharacteristic fires takes longer and may not provide lynx habitat because of their size. The effects of changes in lynx habitat because of fire suppression is not well studied but some effects could be inferred from what is known about lynx and their prey.

Characterizing the impact of fire suppression as a threat to lynx is complex. Before European settlement, Native Americans were allowing wildfire to burn the landscape and managing the forest by active ignition in some cases, possibly since the Pleistocene. Shortly after European settlement, fires were suppressed across the Nez Perce-Clearwater, resulting in stand conditions today.

More recently, much of the plan area has been designated as wilderness where natural processes such as wildfires have been encouraged to take place. These areas are moving towards their natural range of variation through time. Yet, effects from suppression prior to wilderness designation still have some residual effects where some areas continue to be departed.

Given that about 43 percent of lynx habitat is in wilderness, which is trending towards its historic range of variability, and assuming that the rest of the lynx habitat on the Nez Perce-Clearwater has been under suppression for more than 100 years, the scope of effects of fire suppression is estimated to be somewhere between 30 to 70 percent. This puts the estimated scope in the large category using the NatureServe's rule-based methodology for determining threat magnitude. See Appendix C for additional details.

Severity of impacts from fire exclusion is difficult to assess using NatureServe methodology. Fire suppression probably enhanced lynx habitat over the intermediate term because Engelmann spruce and subalpine fir dominance types are estimated to have increased (U.S. Department of Agriculture 2014l). Similarly, fire suppression has probably increased the amount of multi-storied mature forests, which are known to be selected by lynx.

Long-term, fire suppression leaves many multi-storied stands susceptible to uncharacteristic wildfire. Fires have increasingly burned larger, longer, and hotter than they have both historically and prehistorically across the western United States (Dennison et al. 2014). Large wildfires burning uncharacteristically have the potential long-term to reduce much of the multi-storied forest stands to a stage that is unsuitable for lynx use. For more information about fire within the Nez Perce-Clearwater see the Fire Management section.

Evidence from the Nez Perce-Clearwater suggests that the most significant factor changing lynx habitat into a currently unsuitable condition over the last decade or longer has been wildfire. This is evident when considering that the predominant cause of lynx analysis unit's trending towards more than 30 percent in an unsuitable condition was caused by wildfire. Table 222 shows the total amount of habitat that falls within a fire perimeter that has burned since about 2000 when the Canada lynx was listed. Not all the habitat within these perimeters have burned nor have they burned at high severity.

Table 222. Acres of lynx habitat that fall within the perimeter of fires since lynx were listed

Fire Perimeters	Acres Lynx Habitat	Percent of Habitat
Unburned	1,050,035	72
Burned	407,444	28
Total	1,457,479	100

This analysis uses Burned Area Reflectance Classification (BARC) data to evaluate how fires have burned in lynx habitat. BARC data uses a satellite-derived data layer of post-fire vegetation condition. The BARC has four classes: high, moderate, low, and unburned. Burn severity data is only recorded on fires larger than 1,000 acres and has only been available since about 2000. Table 223 shows the burn severity of all fires in the plan area that had burn severity data collected and shows the acres and percent of burn severity by broad potential vegetation type. Thus, not all burned acres should be considered unsuitable for lynx, only those that burned at high or moderate burn severity. An estimated 28.97 and 26.03 percent of acres of lynx habitat in the cold and cool moist potential vegetation type groups burned at high severity within these burn perimeters. So, while 28 percent of lynx habitat fell within a fire polygon, only about 27.2 percent burned at high severity. High severity burns include acres of cool moist potential vegetation type plus acres of cold potential vegetation type combined divided by total acres of these potential vegetation types burned. Fires have been, by far, the largest agent of disturbance in lynx habitat in the plan area, followed by insects and disease.

Table 223. Percentage and acres of burn severity by broad potential vegetation types

Broad Potential Vegetation Type	Acres Cold	Acres Cool Moist	Acres Warm Dry	Acres Warm Moist	Percent Cold	Percent Cool Moist	Percent Warm Dry	Percent Warm Moist
High Severity	52,632	65,778	32,795	18,246	29%	26%	10%	10%
Low Severity	39,720	59,265	130,827	72,718	22%	23%	40%	39%
Moderate Severity	48,997	67,474	62,487	40,772	27%	27%	19%	22%
Unburned to Low Severity	40,337	60,151	97,128	53,149	22%	24%	30%	29%
Total	**181,686**	**252,669**	**323,237**	**184,885**	**100%**	**100%**	**100%**	**100%**

Data Source: BARC data within fire perimeters since burn severity was recorded in BARC

Under the assessment, modeling results from SIMPPLLE estimate that the amount of forest in early seral age classes has declined (U.S. Department of Agriculture 2014m). Early seral habitats and mature multi-story habitats are both known to support higher snowshoe hare numbers (Berg et al. 2012, Ruggiero et al. 1999). The amount of fire before fire suppression was much higher previously than today.

Holbrook et al. (2017) studied lynx selection in Montana. They found that lynx increasingly used advanced regeneration forest structures as they became more available at up to a maximum availability of 40 percent. Holbrook et al. (2017) suggested that land managers have an opportunity to promote lynx habitat in the form of advanced regeneration but are required to go through the stand initiation phase. Fire suppression reduces the amount of advanced regeneration because there is less in early stand initiation stage. Under all alternatives, the plan direction is to increase the amount of early seral conditions in the plan area, though the rate at which it is accomplished varies by alternative. These activities should reduce the size and extent of wildfires that could contribute to abundance of early seral forest in lynx habitat.

Fuels may interact with warmer or drier conditions. Large wildfires in lynx habitat are also believed to be strongly associated with changing climate factors. Westerling et al. (2006) compiled information on large wildfires in the western United States from 1970 to 2004 and found that large wildfire activity increased suddenly and markedly in the mid-1980s with a higher frequency of large wildfires, longer wildfire durations, and longer wildfire seasons. The greatest increases occurred in mesic, mid-, and high-elevation forest types in the northern Rocky Mountains. Westerling et al. (2006) stated that fire exclusion (suppression) has had little impact on the natural fire regimes of these higher-elevation forest types in this area; instead, climate appears to be the primary driver of forest wildfire in these stand replacing fire regimes. Alternatives in the plan that expedite returning the forest to natural range of variation conditions more quickly would reduce the risk of uncharacteristic wildfires. Alternative X achieves the return towards desired conditions more quickly than the others, followed by Alternative W then Alternative Y. Alternative Z is continuing at similar levels to current activity over the last few years under the No Action Alternative. The Preferred Alternative is like Alternative W.

On all lands, large wildfires in lynx habitat are believed to be strongly associated with changing climate factors. Wildland fires are likely to be actively suppressed to prevent loss of infrastructure and investments on all lands. Wildfires are likely to play a natural role in cumulative effects.

Fuels Reduction Treatments in the Wildland Urban Interface

As stated in the Northern Rockies Lynx Management Direction (NRLMD) (U.S. Department of Agriculture 2007f) and associated Incidental Take Statement (U.S. Department of the Interior 2012), the wildland urban interface is defined by the Healthy Forests Restoration Act. The U.S. Fish and Wildlife Service's biological opinion on the NRLMD (U.S. Department of the Interior 2017c) stated that fuels treatment projects in the wildland urban interface would be exempted from compliance with VEG S1, VEG S2, VEG S5, and VEG S6 under certain conditions designed to protect communities at risk in recognition of the escalating monetary and societal costs associated with fires in the wildland urban interface. For NRLMD analysis purposes, the wildland urban interface was modeled in 2007 as a 1-mile buffer surrounding communities with more than 28 people per square mile. Over the entire northern Rocky Mountains' geographic area analyzed by the U.S. Fish and Wildlife Service, about 6 percent of lynx habitat was found to be within one mile of communities. The 2007 Incidental Take Statement, updated in 2017, constrains wildland urban interface exemption treatments to no more than 6 percent cumulatively of lynx habitat on an individual national forest.

All action alternatives would carry forward the 6 percent exemption for vegetation treatments within the wildland urban interface, which is 44,607 acres for the Clearwater National Forest, for the life of the Land Management Plan. The Nez Perce National Forest was not required to consult on acres of fuels treatment exempt from the vegetation standards found in the NRLMD because it was found unoccupied by lynx.

Fuels treatments in the wildland urban interface are anticipated to have adverse effects on lynx and their snowshoe hare prey because the intent would be to maintain lower tree density in these areas, resulting in less area of dense horizontal cover. Reductions in snowshoe hare habitat due to fuels treatments and precommercial thinning could lead to lowered reproduction and survival of lynx. However, adverse effects are limited in their extent and distribution. In its previous biological opinion on the NRLMD (U.S. Department of the Interior 2017c), the U.S. Fish and Wildlife Service assumed that fuel treatments within the wildland urban interface would not be excessively concentrated in adjacent lynx analysis units because fuel treatment projects may not result in more than three adjacent lynx analysis units exceeding Standard VEG S1. Except to create defensible space, the exceptions may not be used in lynx analysis units that have more than 30 percent in stand initiation structural stage that does not yet provide winter snowshoe hare habitat. These limitations would continue to limit the concentration of impacts to Canada lynx in the future.

Wildland Fire Management

As stated in the NRLMD, VEG O3 encourages fire use activities that restore ecological processes and maintain or improve lynx habitat. Under guideline VEG G4, prescribed fire activities should not create permanent travel routes that facilitate snow compaction and permanent firebreaks should not be constructed on ridges or saddles. As displayed in the "Affected Environment" section, fire has historically played a substantial role in creating forested landscape patterns on the Nez Perce-Clearwater and fire continues to do so. The Nez Perce-Clearwater has experienced several large stand-replacing wildfires since 2000. In the next 15 to 25 years, a substantial portion of burned forest is expected to develop sufficient height and density to provide dense horizontal cover of branches at the snow surface to provide snowshoe hare habitat under all alternatives. The plan promotes greater use of wildfire within Management Areas 1 and 2, while wildfire in Management Area 3 would likely be suppressed due to proximity to values such as private property, infrastructure, and natural resources. See Section 2.1.6 of the Land Management Plan for fire management plan components. Natural ecosystem processes, such as wildfire, would contribute to denning habitat for Canada lynx, as would forestwide plan components for old growth, snags, and downed wood.

Fragmentation of Habitat

Human-caused alterations of natural landscape patterns can reduce the total area of habitat, increase the isolation of habitat patches, and affect movement between those patches of habitat (Interagency Lynx

Biology Team 2013). Habitat fragmentation may be permanent, such as when converting forest habitat for residential developments or agricultural use, or temporary, such as when creating a forest opening through timber harvest until trees and shrubs regrow. Fragmentation of lynx habitat in the plan area due to anthropogenic developments is very low because the Nez Perce-Clearwater is a large contiguous block of area with much of it managed as wilderness or Idaho Roadless Rule areas. The scope of permanent fragmentation is small, and the severity is slight.

Temporary fragmentation occurs because of departure of historic patterns of vegetation pattern. The amount of departure at a landscape scale is large, but the effect of this departure on fragmentation is probably slight. This could change if fires burn uncharacteristically in relation to their historic fire regime. Plan components in the Forestlands section of the Final Environmental Impact Statement address the distribution of disturbance suggestive of the natural range of variation.

Changing Climate

The Lynx Conservation Assessment and Strategy did not provide management recommendations specific to changing climate, although it did identify several information needs. Possible effects on lynx because of future changes in climate are:

- Potential upward shifts in elevation or latitudinal distribution of lynx and their prey.
- Changes in the periodicity of when snowshoe hares change color or loss of snowshoe hare cycles in the north.
- Reductions in the amount of lynx habitat and associated lynx population size due to changes in precipitation, particularly snow suitability and persistence, and changes in the frequency and pattern of disturbance events, such as fire and insect outbreaks.
- Changes in the demography of lynx, such as survival and reproduction rates.
- Changes in predator-prey relationships.

There is a high level of uncertainty about some of these hypothesized effects. These effects are not expected to be realized fully within the next 15 years. At most, within the 15-year timeframe of the plan, the severity would probably fall between slight with affects between 0 and 10 percent and moderate with affects between 11 and 30 percent for this threat under the NatureServe methodology for evaluating threats. Climate change is pervasive in extent in the plan area and may interact with wildfire and wildfire suppression to shift the distribution and amount of lynx habitat over time. Climate change is influencing 100 percent of all lynx habitat in the plan area; thus, the scope is pervasive. Using the moderate severity category estimates, the overall impact from climate change is estimated to be a medium threat by the combination of pervasive scope and moderate severity. Over longer timeframes, the effects could be much more severe.

Winter and Summer Recreation

Some kinds of recreational activities cause loss of habitat, behavioral responses to human disturbance, or snow compaction. Permanent habitat loss can occur within ski resorts from the clearing of trees for permanent infrastructure. Changes in winter habitat can result from vegetation removal and grooming of ski runs. The plan area does not contain ski resorts. Studies in Colorado of lynx and winter recreators showed that lynx do not avoid winter recreation until it gets more intensive (Olson et al. 2018) and suggests lynx are tolerant of human activities. A variety of behavioral responses may be expected from individual lynx and in different contexts (Interagency Lynx Biology Team 2013). Recreation can occur across all lynx habitat but accessibility limits both the distribution and intensity of recreation and may vary seasonally. Mechanized recreation is disallowed in designated wilderness so recreation must be accessed on foot or horseback. This leaves the scope of this threat overall as large but the severity slight for an overall threat impact of low using the NatureServe methodology for assessing threats. The alternatives vary in the amount of habitat that is open to motorized recreation(Table 224 and Table 225). Alternative W has the least amount of lynx habitat in a summer motorized recreation opportunity spectrum setting at 30 percent. All other alternatives have between 50 and 59 percent open within motorized settings. These amounts are driven primarily by the allocation of recommended wilderness. The Preferred Alternative has 743,105 acres of lynx habitat within a motorized winter recreation opportunity spectrum setting while 744,995 acres are non-motorized.

Squires et al. (2019) studied lynx habitat use concurrently with snowmobile recreation. They distributed GPS units to winter recreationists and documented 2,143 spatial movement tracks of recreationists engaged in motorized and nonmotorized winter sports for a total cumulative distance of 56,000 km from 2010 to 2013. They also deployed GPS radio collars on adult Canada lynx that were resident in the mountainous topography that attracted high levels of dispersed winter recreation. Squires et al. (2019) found that resource-selection models for Canada lynx were significantly improved when selection patterns of winter recreationists were included in best-performing models. Canada lynx and winter recreationists partitioned environmental gradients in ways that reduced the potential for recreation-related disturbance. Although the inclusion of recreation improved the resource-selection models model for Canada lynx, environmental covariates explained most variation in resource use. The environmental gradients that most separated areas selected by Canada lynx from those used by recreationists were forest canopy closure, road density, and slope. Canada lynx also exhibited a functional response of increased avoidance of areas selected by motorized winter recreationists for snowmobiling off-trail and hybrid snowmobiling compared with either no functional response with hybrid skiing or selection for backcountry skiing areas suitable for nonmotorized winter recreation. Under the No Action Alternative, about 47 percent of the lynx habitat on the Nez Perce-Clearwater is closed to over-snow motorized vehicle use, leaving 53 percent open to winter motorized recreation. Primitive and semi primitive non-motorized are the two categories of the recreation opportunity spectrum that do not allow motorized over-snow travel. Other recreation opportunity spectrum settings are open to motorized over-snow travel. The amount of lynx habitat in winter recreation opportunity spectrum settings changes under the alternatives because the alternatives motorize settings are adjusted to account for the change in the amount of recommended wilderness. The alternatives also vary by the amount of non-conforming uses that are allowed in the recommended wilderness areas. The semi-primitive motorized and non-motorized settings change the most by alternative. Alternative W allows the least over-snow motorized use and Alternatives X and Z have the highest percent of lynx habitat in a motorized setting (Table 225).

Table 224. Acres of lynx habitat within each summer recreation opportunity spectrum (ROS) setting by alternative

Acres	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Primitive	597,361	597,361	603,547	603,547	582,396
Rural	533	533	533	533	2,579
Roaded Natural	182,981	210,473	194,495	189,357	223,600
Semi-Primitive Motorized	247,500	427,696	214,004	192,648	365,334
Semi-Primitive Non-motorized	429,394	221,706	445,189	471,683	314,192

Table 225. Percent lynx habitat in motorized or non-motorized winter recreation opportunity spectrum

Percent lynx habitat	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Non-motorized winter setting (semi-primitive non-motorize and primitive)	70%	41%	50%	41%	50%
Winter motorized setting (roaded natural and semi primitive motorized)	30%	59%	50%	59%	50%

As discussed previously, Kolbe et al. (2007) found that compacted trails from over-snow motorized vehicles in their study area in western Montana did not promote a competitive interaction between coyotes and lynx. Squires et al. (2010) found no evidence that lynx selected areas away from National Forest System roads or groomed snowmobile trails during winter.

Although the Nez Perce-Clearwater is closed to lynx trapping, a potential indirect effect of motorized over-snow vehicle use is that it could facilitate access to lynx habitat and increase the vulnerability of lynx to incidental or accidental trapping or illegal shooting. Motorized over-snow vehicles provide access for trapping of other furbearers, which has the potential to increase the risk of incidental trapping of lynx; however, actual occurrences of incidental trapping of a lynx in Idaho is a rare event and usually results in live release. Wilderness areas and recommended wilderness on the Nez Perce-Clearwater are closed to motorized use and the majority of the lynx habitat is within either wilderness or recommended wilderness and is largely inaccessible during trapping seasons. Shifting areas suitable for motorized over-snow vehicle use within the Nez Perce-Clearwater would slightly increase the risk of accidental or incidental trapping in some alternatives.

In our plan area, snowmobiling recreation is not intense in most areas because the forested vegetation inhibits this activity in many locations. Thus, over-snow travel is often limited to designated routes and known areas of use.

To estimate where over-snow motorized uses are preferred, a combination of known use areas, as identified by user groups, and known groomed routes were used, combined with modeling of landscape factors that promote snowmobile use like methods published in Olson et al. (2018). Olson et al. (2018) used snowmobile use data collected from GPS units carried by winter recreation users. Those criteria were applied to the landscape to model the probability of snowmobile use based on topography, vegetation, climate, and access to predict where snowmobiling has a higher probability of occurrence. Many areas that do have a high probability of use correspond well to where recreation is known to occur. The primary exception is in areas where groomed trails have been established and use is primarily on those routes based upon modeling results. The model outcomes of the snowmobile model are shown in Figure 89 in the wolverine section, which also shows the areas that are non-motorized under the Preferred Alternative. While snowmobiling is possible in any portion of the Nez Perce-Clearwater, the terrain and vegetation render many areas as not preferred for winter motorized snowmobile recreation.

The Land Management Plan does not make site-specific determinations on snowmobile route grooming or snowmobile recreation areas. Rather, it controls where the activity would be suitable and the settings under which those activities may be conducted after a site-specific analysis. Alternatives X and Z would have higher amounts of area suitable for over-snow travel. The Preferred Alternative allows approximately 50 percent of lynx habitat to be suitable for motorized uses while approximately 50 percent would not be suitable. The No Action Alternative did not have winter recreation opportunity spectrum settings as suitability plan components, and so these are new constraints imposed by the plan. Instead, winter motorized recreation was open everywhere unless closed by travel decisions like the clearwater travel plan or site-specific closures. Additional snow compaction would occur on some but not all this acreage because there are portions where tree cover is too dense for snowmobiles to navigate.

Guideline HU G11 of the Northern Rockies Lynx Management Direction states that designated motorized over-snow vehicle routes or designated play areas should not expand outside baseline areas of consistent snow compaction unless designation serves to consolidate use and improve lynx habitat within a lynx analysis unit or a combination of immediately adjacent lynx analysis units. Based on scientific findings on snow compaction, competing predators, and risk of accidental trapping mortality relevant to the Northern Rockies, there would be minimal risk to lynx from over-snow vehicle use.

Increased competition from other predators due to snow compaction is a minor concern. As discussed previously, Kolbe et al. (2007) found that compacted trails from motorized over-snow vehicles in their study area of western Montana had only minimal impacts on coyote movements and foraging success and that snowshoe hares were an insignificant portion of the winter diet of coyotes, indicating that snow compaction did not promote a competitive interaction between coyotes and lynx. Furthermore, evidence from Colorado suggests lynx naturally choose to use areas not typically used by winter motorized recreational users because lynx tend to use forested habitats where winter recreational users often prefer non-forested areas (Squires et al. 2019). In summary, the level and distribution of winter recreation is not likely to negatively impact the overall lynx population, although there is some risk of injury or mortality to individual lynx.

In vicinities that are already heavily used by motorized over-snow vehicles, there is a potential for the additional suitable areas to result in an increase in consistent snow compaction, as defined by the Northern Rockies Lynx Management Direction. The effects of this increase on Canada lynx are anticipated to be minor based upon scientific findings (Kolbe et al. 2007, Squires et al. 2013, Squires 2010). In addition, not all the acreage in the added suitable areas would be expected to have an increase in consistent snow compaction because terrain and vegetation influence where motorized over-snow vehicles can physically go. Vegetation conditions are dynamic over time and change in response to disturbance and succession. Wildfire may initially open up dense forests for motorized over-snow vehicle use but areas previously open to motorized over-snow vehicle use become unavailable because the machines cannot physically maneuver between or over the trees as high densities of dead trees fall or as succession occurs.

Winter Recreation—Developed Ski Areas

Downhill ski resorts typically are located at high elevations in areas with coniferous forests and deep snow, which coincides with lynx habitat. There are no ski resorts on Nez Perce-Clearwater lands, and none are proposed.

Mining and Energy Development

The Nez Perce-Clearwater has a long history of mineral exploration and development activity. Most of the mining has been oriented around rivers or in hard rock but a few of them are open pit mines. Most mine activities on the Clearwater National Forest have been outside of lynx habitat. Mines on the Nez Perce National Forest do extend up into lynx habitat around Elk City and southward along Crooked River. They likely have little effect on lynx habitat and would not affect a transient lynx.

No oil and gas sites have been developed and no foreseeable oil and gas exploration is expected. The geology under the Nez Perce-Clearwater has low potential for oil and gas production. As stated in Land Management Plan Appendix 8, HU O5 says to manage human activities, including minerals and oil and gas exploration and development, to reduce impacts to lynx and lynx habitat. Guideline HU G4 encourages remote monitoring of mineral and energy development sites and facilities to reduce snow compaction. Guideline HU G5 addresses development of a reclamation plan to restore lynx habitat when mineral and energy development sites and facilities are closed. HU G12 limits winter access for non-recreation special uses and mineral and energy exploration and development to designated routes or designated over-the-snow routes. The application of these measures is expected to minimize adverse effects on lynx.

Many acres of National Forest System lands on the Nez Perce-Clearwater are withdrawn from mineral entry. Designated wilderness, Idaho Roadless Rule areas, wild and scenic rivers, and research natural areas have withdrawn or restricted mineral exploration.

Withdrawal of large areas of the Nez Perce-Clearwater from mineral development reduces the risk of Canada lynx habitat loss, disturbance, displacement, and mortality. All withdrawals are subject to valid existing rights. The Forest Service does not have the discretion to deny the right to exercise an outstanding mineral right. However, the developer does not have unrestricted rights because the developer's rights are limited to using only as much of the surface as is reasonably necessary to explore, develop, and transport materials. The developer must provide an operating plan to the Nez Perce-Clearwater. The Nez Perce-Clearwater has some ability to manage surface resources. Forest Service Manual 2832 provides direction for administration of outstanding mineral rights.

National Forest System and Backcountry Roads

On the Nez Perce-Clearwater, the majority of roads occur within the lands managed as general management in Management Area 3 and outside of lynx habitat, as most of the lynx habitat is within Idaho Roadless Rule areas and wilderness where new road construction is prohibited. About 17 percent of lynx habitat occurs within Management Area 3 so most of the effects of backcountry roads are limited to this area, though some existing roads do separate or are cherry stemmed into Management Areas 1 and 2. Within Roadless Rule areas, roads travel between roadless areas but are already established. The Land Management Plan will not make any specific decisions on roads but establishes the setting governing future proposed roads.

As stated in the Northern Rockies Lynx Management Direction, four plan guidelines concern National Forest System roads:

- HU G6 says to use methods that avoid or reduce effects on lynx when upgrading unpaved roads to Maintenance Levels 4 or 5.
- HU G7 discourages building new permanent roads on ridgetops, saddles, or forested stringers or in areas identified as important for lynx habitat connectivity.

- HU G8 says that brush cutting along low-speed, low-traffic-volume roads should be done to the minimum level necessary to provide for public safety.
- HU G9 says that public motorized use should be restricted on new roads built for projects.

These plan components would continue to limit the potential local impacts of roads on lynx and lynx habitat.

Road construction results in a small reduction of lynx habitat by removing forest cover. On the other hand, if a road is closed, regrowth of dense vegetation may provide good snowshoe hare habitat, and lynx may use the roadbed for travel and foraging (Koehler and Brittell 1990). Extensive backtracking studies in Montana found that lynx did not avoid gravel forest roads (Squires 2010). Trails are typically narrow routes with a native surface; there is no information to suggest that trails have negative impacts on lynx (Interagency Lynx Biology Team 2013). Road densities within lynx habitat on the Nez Perce-Clearwater are low because most lynx habitat occurs within roadless and wilderness. Thus, the overall impact is low because of its small scope in lynx habitat and low severity in effects.

Livestock Grazing

Livestock grazing occurs on less than 15 percent of the Nez Perce-Clearwater. Twelve livestock grazing allotments, all located on the Nez Perce half of the plan area, include lynx habitat. No lynx habitat is located within livestock grazing allotments on the Clearwater. The Northern Rockies Lynx Management Direction (Land Management Plan Appendix 5) contains one objective and four guidelines pertaining to livestock grazing management in lynx habitat in occupied habitat. Objective GRAZ O1 provides direction to manage livestock grazing to be compatible with improving or maintaining lynx habitat. Guideline GRAZ G1 states livestock grazing should be managed in fire- and harvest-created openings so impacts do not prevent shrubs and trees from regenerating. Under guideline GRAZ G2, livestock grazing in aspen stands should be managed to contribute to the long-term health and sustainability of aspen. Under guideline GRAZ G3, livestock grazing in riparian areas and willow carrs should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes. Under guideline GRAZ G4, livestock grazing in shrub-steppe habitats that are in the elevation ranges of forested lynx habitat in lynx analysis units should be managed to contribute to maintaining or achieving a preponderance of mid- or late-seral stages, similar to conditions that would have occurred under historic disturbance regimes. With these components in place, the effects of livestock grazing on lynx and lynx habitat were judged to be minimal across the analysis area in the northern Rockies

The management direction only applies to occupied lynx habitat. Since the Nez Perce currently has unoccupied lynx habitat, the direction should be “considered” but would not have to be followed until such time as lynx occupy the unit. Any authorization or re-authorization of grazing allotments should consider the management direction.

The livestock grazing allotments are the same under all alternatives. Table 226 shows the amount of lynx habitat located within allotments. Two allotments that include 60,668 acres of lynx habitat are vacant and not currently grazed. Approximately 72,627 acres are located in active allotments.

No existing research indicates that grazing or browsing by domestic livestock on federal lands would reduce the snowshoe hare prey base or have a substantial effect on lynx (Interagency Lynx Biology Team 2013). However, it is possible that livestock browsing or grazing could reduce the forage and dense horizontal cover needed by snowshoe hares in some environments.

About five percent of the total lynx habitat overlaps with active livestock allotments. Not all areas of allotments are grazed, and most multistory forest is not grazed because it does not produce enough forage for livestock. Proposed desired conditions under the action alternatives promote a diverse mix of native plant communities and guidelines limit upland forage utilization (FW-GDL-GRZ-03) and maintenance of stubble heights of at least 10 to 15 centimeters along the greenline (FW-GDL-ARGRZ-01). The overall impact from this threat is assessed as low with a small scope and slight severity. Effects to lynx habitat would be negligible in the plan area.

Table 226. Acres lynx habitat by allotment

Allotment Name	Status	Acres of Lynx Habitat	Percent of Allotment
Allison-Berg	Active	6,308	17%
Butte Gospel	Active	22,261	57%
Cannon Ball	Active	4,983	19%
Cow Creek	Active	2,589	9%
Fiddle Creek	Active	1,253	15%
Florence	Vacant	27,681	52%
Hanover Mountain	Active	6,387	41%
Hungry Ridge	Active	6,218	20%
Mallard Creek	Vacant	32,987	89%
Papoose	Active	2,416	18%
Peter Ready	Active	13,246	28%
White Bird Creek	Active	6,967	21%
Total	Vacant	60,668	n/a%
Total	Active	72,627	n/a%

Mortality Due to Highways and High-Speed Forest Roads

Mortalities of lynx due to vehicle collisions have been documented in Colorado (reintroduced animals on paved highways), in Minnesota (on paved highways), in Maine (on high-speed gravel roads), and in Montana (on highways). Collisions are unlikely to occur on National Forest System roads, which are traveled at slower speeds and have lighter traffic volumes than highways. Comparatively, few paved roadways traverse through the Nez Perce-Clearwater. The longest paved roadways include U.S. Highway 12 along the Lochsa River, the Salmon River Road, portions of the Selway River Road, and Highway 14 along the Southfork Clearwater River. Other paved roadways include Highway 8 and Highway 3 through limited portions of the Palouse district and a few other portions of paved roads that end shortly after entering National Forest System lands. Highway 12 and Highway 14 allow traffic speeds between 45 to 50 miles per hour so it may be possible on rare occasions for a lynx to be struck by a moving vehicle on these roads. However, these roads have comparatively low traffic volumes and most of these road miles do not travel through lynx habitat because of their lower elevation. There are no major roadways that travel north to south in the plan area. Few, if any, lynx have been reported as killed on the paved roads in the plan area. The overall impact from these roads is low because roads on the Nez Perce-Clearwater only travel through a limited portion of the plan area (small scope) and the severity is slight (not expected to impact more than 10 percent of the lynx population) because most paved roads do not travel through lynx habitat and few lynx are expected to be struck on these roads. Perhaps the most significant impact is to lynx habitat connectivity. These roads currently represent only very minor impacts to connectivity.

Mortality Due to Incidental Trapping or Illegal Shooting of Canada Lynx

The Forest Service usually does not regulate trapping activities on National Forest lands and defers to the state on regulations regarding hunting, fishing, and trapping activities by the public. Trapping, snaring, and shooting of lynx is currently prohibited in the contiguous United States. In Idaho, there is no open season for trapping lynx, and it has been prohibited since 1996 though the Center for Biological Diversity versus Otter (No. 1: 14-CV-258-BLW) case expressed concerns about incidental trapping of lynx when targeting other fur bearers. If a trapper traps a “non-target” animal such as a lynx, it must be “released immediately” if alive and taken “into possession” if dead (Title 36 Fish and Game, Chapter 11 Protection of Animals and Birds). Idaho has not adopted any laws that limit the types of traps that may be used in lynx habitat. However, incidents of inadvertent trapping of lynx in Idaho have been low. As an example, between January 2012 and February 2014, there were four reported incidental trappings of lynx in Idaho. The Center for Biological Diversity versus Otter (No. 1: 14-CV-258-BLW) case reviewed data stating three of these lynx were released alive while only one was mistaken for another species and killed by a hunter rather than the trap itself. None of the four incidents where lynx were incidentally trapped occurred in the Clearwater Region. Similarly, in Montana, a total of three lynx were captured during the eight license years between 2008 to 2015 and all were released uninjured; overall, lynx “take” during 2000 to 2007 averaged 1.6 per year (U.S. Department of the Interior et al. 2016). Most trapping of other furbearer species occurs in winter.

The distribution of legal trapping is influenced by the distribution of roads. Save for a few areas, the distribution of roads influences winter travel because forested vegetation makes over-snow travel difficult. About 51 percent of lynx habitat is in either recommended wilderness or designated wilderness under the Preferred Alternative, which makes accessibility to trappers more difficult. Wilderness and recommended wilderness are unsuitable for motorized or mechanized travel, including over-snow vehicles under the preferred alternative. Similarly, Idaho Roadless Rule areas also make accessibility more challenging to trappers because of a lack of roads. So, while the scope of trapping is technically available in all lynx habitats, in reality, because of accessibility, the scope is probably largely limited to less than an estimated 50 percent of lynx habitat, leaving the scope using the NatureServe methodology as large. Because lynx trappings are exceedingly rare in Idaho, let alone in the plan area, and lynx mortalities from trapping are also uncommon when lynx are trapped, the severity, or the extent to which lynx populations would be reduced, is estimated as slight. The overall magnitude of this threat is low with a large scope and slight severity. Regulation of trapping is under the authority of the State of Idaho, and the Forest Service only regulates this activity under specific circumstances. The alternatives vary in the amount of recommended wilderness and in whether over-snow travel would be suitable in recommended wilderness. The amount of recommended wilderness and whether over-snow travel is suitable could affect incidental trapping and access during winter. See the discussion below on recommended wilderness. In the Preferred Alternative, no motorized over the snow travel would be allowed in recommended wilderness.

Consequences from Changes in Management Area Direction

Consequences of plan components, other forestwide plan components, and management area direction are the same for all action alternatives, save for variations on snag retention, rate of attainment of desired vegetation conditions, the amount of over-snow motorized travel, differences in the types of non-conforming uses allowed within recommended wilderness areas, summer motorized recreation opportunity spectrum settings, restocking rates, live trees retained per acre, amount of timber production, and whether communication sites are allowed on Pilot Knob. The primary difference in alternatives from a management area perspective is in the mix of recommended wilderness and the amount of land identified as suitable wild and scenic rivers. Thus, the effects were analyzed separately for each alternative and each variation in plan component because any piece of the alternatives that varies could have been selected to make a unique combination. These alternatives were considered individually and make a unique combination in the Preferred Alternative.

Management area allocations provide the on-the-ground framework that guides which allowable uses may occur in areas of the Nez Perce-Clearwater. This section characterizes the management areas in Canada lynx habitat and discusses the effects of the resulting management direction on the species.

Under the alternatives, the amount of designated wilderness and Idaho Roadless Rule areas will not change. The Idaho Roadless Rule themes could change if selected as recommended wilderness; otherwise, Roadless Rule themes do not vary by alternative. The Idaho Roadless Rule includes several themes which vary the management activities allowed and the purpose for which those activities may be conducted. All areas under consideration for recommended wilderness under the alternatives fall within Idaho Roadless Rule areas. After the alternatives are selected, and if needed, the Nez Perce-Clearwater will make a recommendation to the Chief of the Forest Service recommending a change in Roadless Rule theme to the wildland recreation theme for any areas identified as recommended wilderness. An Idaho Roadless Rule area theme of wildland recreation is the most restrictive Roadless Rule theme. As Roadless Rule area direction already restricts many activities in all themes, a change to recommended wilderness would result in only slightly more restrictive management and slightly more protections for lynx.

Recommended Wilderness and Nonconforming Uses

The recommended wilderness plan components in alternatives varied individually to make a unique combination of the amount of recommended wilderness and uses allowed in each alternative. Thus, for each alternative and for each variation in plan component, the effects are analyzed separately.

The amount of recommended wilderness varies by alternative. Recommended wilderness under Alternative W contains the most lynx habitat with up to 29 percent of all lynx habitat in the plan area while recommended wilderness under Alternative Z contains no lynx habitat. The Preferred Alternative includes a total of 258, 210 acres of lynx habitat in recommended wilderness which is approximately 12 percent of lynx habitat.

Table 227 shows the amount of lynx habitat that falls within each alternative. The No Action Alternative currently has 9 percent of the total lynx habitat within recommended wilderness. Alternative X would not recommend any wilderness, including areas currently recommended. The Preferred Alternative is most like Alternative Y, except that there were boundary adjustments for each of the recommended wilderness areas. The boundary changes occurred in the Hoodoo and Mallard-Larkin recommended wilderness and in the Preferred Alternative, the boundary was adjusted to accommodate recreation while protecting resources like mountain goats. The differences in boundary changes between alternatives are of little consequence because the suite of lands considered for recommended wilderness were all Idaho Roadless Rule areas managed for roadless character which helps protect lynx habitat. The one area where it matters is for winter motorized recreation where motorized recreation would be unsuitable in recommended wilderness but would be suitable in Idaho Roadless Rule Areas as evaluated above.

Table 227. Amount of lynx habitat occurring within the proposed recommended wilderness areas by alternative (Alt)

Recommended Wilderness Name	No Action Alternative Acres	NA %	Alt W Acres	W %	Alt Y Acres	Y %	Alt Z Acres	Z %	Alt X Acres	X %	Preferred Alternative Acres	P%
Bighorn - Weitas	0	0	131,312	9	0	0	0	0	0	0	0	0
East Meadow Creek	0	0	67,448	5	67,448	5	67,530	5	0	0	0	0

Recommended Wilderness Name	No Action Alternative Acres	NA %	Alt W Acres	W %	Alt Y Acres	Y %	Alt Z Acres	Z %	Alt X Acres	X %	Preferred Alternative Acres	P%
Hoodoo	80,633	6	101,999	7	66,637	5	99,794	7	0	0	108,276	5
Mallard-Larkins	1,621	0	2,151	0	2,153	0	2,028	0	0	0	77,139	4
Meadow Creek Upper North Fork	0	0	38,614	3	0	0	37,707	3	0	0	0	0
Meadow Creek	0	0	0	0	0	0	0	0	0	0	72,795	3
North Fork Spruce - White Sand	8,181	1	28,633	2	0		12,974	1	0	0	0	0
North Lochsa Slope	0	0	33,819	2	0	0	0	0	0	0	0	0
Rawhide	0	0	0	0	0	0	5,548	0	0	0	0	0
Sneakfoot Meadows	8,042	1	21,774	1	0	0	18,301	1	0	0	0	0
Total Lynx Habitat and percent	**98,478**	**7**	**425,749**	**29**	**136,238**	**9**	**243,882**	**17**	**0**	**0**	**258,210**	**12**

Alternatives in recommended wilderness could influence lynx habitat connectivity. Several recommended wilderness areas are identified as linkage areas for lynx (U.S. Department of Agriculture 2007f). In particular, the Hoodoo area, East Meadow Creek, and Sneakfoot areas are identified as linkage areas for lynx. Changes to the Hoodoo recommended wilderness areas in Alternative Y would reduce the amount of linkage area compared to the No Action Alternative. This change would allow snowmobile use in these linkage areas while currently it is not allowed. The effects to transient lynx from intensive over-snow travel is unclear. The types of nonconforming uses allowed in recommended wilderness varies by alternative. The Preferred Alternative does not allow most nonconforming uses within recommended wilderness, except for aircraft landings and mechanized or motorized tools being allowed for administrative use.

MA2-STD-RWILD-02 varies by alternative. Under the No Action Alternative and Alternatives W, X, and Y, winter motorized recreation would be unsuitable in recommended wilderness while winter motorized recreation would be suitable as a non-conforming use under Alternative Z. Therefore, Alternative Z would allow over-snow travel and its effects within recommended wilderness. Winter motorized recreation would not be suitable in recommended wilderness under the Preferred Alternative. The analysis of the effects of over-snow motorized use identified habitat loss from disturbance and increased competition from other carnivores through snow compaction. The conclusions are that winter recreation would have minor impacts to lynx overall because of their tolerance of the winter recreation and evidence suggesting that other predators do not generally make enough use of compacted trails to greatly affect lynx.

The Lynx Conservation and Assessment Strategy (2013) concluded that:

Most backcountry ski hut sites are primitive in nature. Some facilities may have utilities, summer road access, and on-site storage for grooming equipment and fuel. Use by snowmobile clubs and the general public is often focused or concentrated around these sites. Many have developed trail systems that loop around the site or provide access to other remote areas. These facilities are generally located along designated cross-country ski and snowmobile routes. Users compact the snow along the route to and from the huts and in the immediate vicinity. Off-trail travel has the potential to create larger areas of compacted snow. However, as indicated above, this local snow compaction is short-term and not likely to change the competitive interactions between lynx and coyotes.

These buildings are currently existing and would not represent new developments. Their use would have minor impacts on lynx distribution and disturbance. The allowance of this activity would have only minor differences in impacts to lynx.

Designated and Eligible Wild and Scenic Rivers (Management Area 1)

The amount of suitable wild and scenic rivers varies by alternative. Under the alternatives, most of the wild and scenic rivers either fall outside of lynx habitat because they are lower in elevation, or they fall within Idaho Roadless Rule areas, recommended wilderness, or designated wilderness. The Nez Perce-Clearwater has four designated rivers—the Selway, the Lochsa, the Middle Fork Clearwater, and the Salmon River. During Land Management Plan, rivers eligible for wild and scenic designation were identified base upon their outstandingly remarkable values. Wild and scenic river segments are classified as wild, scenic, or recreational segments. Timber harvest is not allowable in river segments classified as wild. River segments classified as scenic or recreational are not suitable for timber production, but timber harvest may be allowed to meet desired social, economic, or ecological conditions. Wild and scenic river direction for designated rivers is managed as Management Area 1 while those found suitable are managed under Management Area 2 direction. Management direction for both designated and suitable wild and scenic rivers help to maintain wide forested corridors along major waterways that may facilitate lynx movement through the landscape, providing connectivity. Most rivers being considered suitable as wild and scenic rivers under the alternatives, and which also occur within lynx habitat, are located within Idaho Roadless Rule areas or designated wilderness areas. Thus, most of them have substantial restrictions already. Suitable wild and scenic river direction would apply to these areas in addition to guidance for Idaho Roadless Rule areas and designated wilderness area direction. Lynx are not river dependent, so they were not considered a criterion for determining wild and scenic river eligibility. One of the few rivers not within wilderness or roadless areas but within lynx habitat considered under the alternatives is Crooked Fork Creek. It flows through the checkerboard area of the Nez Perce-Clearwater and that area is identified as a linkage area. If this river were identified as suitable, it would enhance connectivity for lynx through this area, at least on National Forest System lands. The Preferred Alternative identified the second lowest acreage for wild and scenic rivers of the alternatives, save for Alternative X which had none. The Preferred Alternative identified Cayuse Creek, Fish Creek, Hungery Creek, Kelly Creek, North Fork Kelly Creek, South Fork Kelly Creek, Middle Fork Kelly Creek, Colt Killed Creek, and Meadow Creek. It also identified two eligible rivers, the Little North Fork and Salmon River. These rivers, and the quarter mile area surrounding them, would contribute to the conservation of lynx habitat.

National Historic Landmark

Most of the Lolo Trail National Historic Landmark lies within lynx habitat. This management area is to be managed consistent with the guidance for which it was designated. This management area is not suitable for timber production, nor is it suitable for commercial use of non-timber forest products. Vegetation management may be allowed to maintain desired ecological conditions and values. Effects to lynx are largely beneficial.

Research Natural Areas

Less than one percent of potential lynx habitat is located within research natural areas under all the alternatives. Research natural areas are generally natural appearing, and human influence on their ecological processes is limited and is guided by the Rocky Mountain Research Station. This management area is not suitable for timber production. Vegetation management may be allowed for study and research purposes or to protect the values for which the research natural area was designated, if needed. Although very limited in number and size, research natural areas help provide a continuum of security habitat and connectivity for lynx.

Management Area 3

Approximately 17 percent of lynx habitat is located within Management Area 3. The amount of area in Management Area 3 varies slightly by alternative. These alternatives are mostly driven by rivers found suitable for wild and scenic river designation under the alternatives. Otherwise, Management Area 3 does not vary by alternative. Management Area 3 is anticipated to have the highest intensity of timber harvest because it is suitable for timber production. Thirteen percent of the lynx habitat forestwide is suitable for timber production while four percent of the lynx habitat forestwide falls within Management Area 3 but is not suitable. Management Area 3 is managed for multiple uses. Road building, recreational development, and both winter and summer motorized travel are generally allowed. The primary disturbance to vegetation is through timber management and fuels reductions. Fires have been suppressed to protect the timber resource and this would continue in this management area under the revised plan. In this management area, active management activities, including prescribed fire, timber harvest, fuels reduction, precommercial thinning, commercial thinning, and planting are most likely to continue to create a mosaic of forest conditions. Much of Management Area 3 is in the wildland urban interface where fuels management is anticipated to be higher. Management Area 3 is where exemptions to the vegetation standards for lynx are most likely to result in short-term adverse effects but long-term benefits to hare habitat by creating a mosaic of successional stages. Recreation is managed to provide a variety of settings, most of which emphasize developed and motorized settings. Recreation is also most intense in this management area. However, plan components in the Northern Rockies Lynx Management Direction would reduce the effects of these activities in Management Area 3. All of these factors could impact lynx to some extent.

Fragmentation of Habitat

Many actions that fragment habitat, such as highway expansions and residential developments, are not under the authority of the Forest Service. However, Land Management Plan components under all alternatives are beneficial to Canada lynx by maintaining or improving habitat connectivity on National Forest System lands and would help to reduce or minimize adverse effects. Standard ALL S1 specifies that are new or expanded permanent developments and vegetation management projects must maintain habitat connectivity in a lynx analysis unit or linkage area. In linkage areas, potential highway crossings will be identified (LINK S1) and National Forest System lands should be retained in public ownership (LINK G1). Guideline ALL G1 says that methods that avoid or reduce effects on lynx should be used when constructing or reconstructing highways or highways across federal land. Guideline HU G6 says that methods to avoid or reduce the effects on lynx in lynx habitat should be used when upgrading unpaved roads to Maintenance Levels 4 or 5 if the result would be increased traffic speeds and volumes or a foreseeable contribution to increases in human activity or development in lynx habitat. Guideline HU G7 states that new permanent roads should not be built on ridgetops or saddles or in areas identified as important for lynx habitat connectivity. New permanent roads and trails should be situated away from forested stringers. LINK O1 encourages working with landowners to pursue conservation easements, habitat conservation plans, land exchanges, or other solutions in mixed ownership areas to reduce the potential of adverse impacts on lynx and lynx habitat. These plan components help to reduce fragmentation of lynx habitat and provide for habitat connectivity. Most lynx linkage areas are composed of at least some designated wilderness or Idaho Roadless Rule areas, and these contribute to connectivity for lynx. The primary exception is one linkage area around Lolo Pass that travels through checkerboard ownership. Forest lands within this checkerboard area are composed of lands managed for multiple uses. Forest lands to the northwest of the checkerboard areas are currently recommended wilderness.

Designated wilderness, recommended wilderness, and Idaho Roadless Rules areas prevent or inhibit most of the threats that disrupt connectivity for lynx.

Alternatives W, Y, and Z identify the East Meadow Creek area as recommended wilderness. Were this area to become recommended wilderness, it would slightly increase protections for lynx connectivity over its current status under the Idaho Roadless Rule wildland recreation theme, as recommended wilderness is slightly more restrictive than wildland recreation direction. The East Meadow Creek area would connect the Frank-Church Wilderness with the Selway-Bitterroot designated wilderness areas which would slightly benefit lynx connectivity. The Preferred Alternative identifies the East Meadow Creek area as recommended wilderness with boundary adjustments.

The amount of recommended wilderness varies by alternative and may affect linkage areas for lynx. Lynx linkage areas would be enhanced by all alternatives except Alternative X. Alternative Y would reduce protections slightly by shrinking some existing recommended wilderness areas. However, the change would be minor, and perhaps even negligible, because these lands would continue to be Idaho Roadless Rule areas, which have substantial protections from anthropogenic influences that could affect connectivity.

Plan components vary by alternative in what is allowed in recommended wilderness areas. Alternative Z allows over-snow travel. While allowed, over the snow travel is constrained by the Northern Rockies Lynx Management Direction guidelines to disallow new snow compaction areas from baseline amounts. These variations would have limited effects on lynx connectivity because they would not prohibit or disrupt traveling lynx.

In addition to plan components that are common to all alternatives, additional plan components address habitat connectivity and travel corridors. Forestwide plan components for riparian management zones and wildlife support connectivity of lynx habitat by providing for cover conditions that support lynx travel and access to foraging habitats and provide for distribution of cover across the Nez Perce-Clearwater. Plan components that would apply to summer corridors identified by Squires et al. (2013) would also facilitate long-distance movements and potential range shifts.

FW-DC-WL-03 would guide management towards a pattern that would facilitate connectivity for wildlife, such as lynx, and replicate the natural range of variation.

Connectivity of mature forest, percent composition of young regenerating forest, low perimeter-area ratio of young regenerating forest patches, and adjacency of mature to young regenerating forest types are important for lynx reproduction and survival at the scale of a lynx home range (Kosterman 2014). The perimeter-area ratio of young regenerating forest patches is anticipated to be highly variable across the Nez Perce-Clearwater, depending upon whether patches are created by wildland fire or by vegetation management activities, such as timber harvest. Plan components for old growth and riparian management zones, integrated with plan components for vegetation management, help to provide for adjacent mature and regenerating forests at the scale of a lynx home range; lynx are likely to travel through such habitat while accessing patches of boreal forest within their home range.

While many actions that fragment habitat, such as highway expansions and residential developments, are not under the authority of the Forest Service, these features are limited in the plan area and no new developments are anticipated within the life of the plan. Plan components in the Land Management Plan are beneficial in maintaining or improving habitat connectivity on National Forest System lands and would help to reduce or minimize adverse effects. Management direction allows for activities to occur to meet social, economic, and multiple-use objectives of the Nez Perce-Clearwater while promoting the recovery of the Canada lynx population.

Future Changes in Climate

The preliminary Northern Region Adaptation Partnership risk assessment for the Canada lynx (McKelvey and Buotte 2018) states that lynx have little or no adaptive capacity to live in areas lacking snow and limited ability to shift their diet away from snowshoe hares. There is a potential that climate change will reduce the extent of deep snow habitats preferred by lynx. McKelvey et al. (2018) estimated that contiguous areas of spring snow cover would become smaller and more isolated throughout the Columbia River Basin with greatest losses at the southern periphery but possible increases in snow at higher elevations in the lynx core, including the Nez Perce-Clearwater. Regardless of snow depth, the timing of snowmelt has been occurring about two weeks earlier in recent decades. Mills and Johnson (Mills and Johnson 2013) used an ensemble of locally downscaled climate projections and forecasted that the annual average duration of snowpack will decrease by 29 to 35 days by midcentury. Unless snowshoe hares show enough plasticity to adapt to earlier snowmelt, the reduced snow duration will increase the number of days that white snowshoe hares will be mismatched on a snowless background. This lack of camouflage coloration may make lynx more successful in detecting their primary prey, but in the long-term, it may also reduce snowshoe hare numbers, especially at relatively lower elevations where snow reductions in the Northern Rockies are anticipated to be greatest. McKelvey and Buotte (2018) estimate that the likelihood of future climate change effects is high, with a moderate magnitude of effects by 2030 and a high magnitude of effects by 2050.

As discussed above, stand-replacing wildfires within fire regimes IV on the Nez Perce-Clearwater have been the dominant force for creating early stand initiation habitat since lynx were listed. Increases in wildfire may initially create more habitat that is temporarily unsuitable for snowshoe hares and lynx foraging but may greatly increase suitable habitat within a few decades (Vanbianchi et al. 2017). Plan components for fire would allow the Nez Perce-Clearwater to adapt its future management to changing conditions.

Effects of Plan Direction

Terrestrial Ecosystems Across the Landscape

Plan direction within the terrestrial ecosystems section of the Land Management Plan would have no effect or beneficial effects on Canada lynx. Desired conditions FW-DC-TE-01, FW-DC-TE-05, and FW-DC-TE-06 would contribute to ecosystem integrity and provide a diversity of habitat conditions for Canada lynx.

Biophysical Features

Plan direction within the biophysical features section of the Land Management Plan would have no effect on Canada lynx.

Forestlands

Plan direction for the forestlands section proposes changes to dominance types, size classes, and forest density; addresses landscape pattern; and alters some habitats used by Canada lynx. Plan components in this section are informed by modeling the natural range of variation and should contribute to ecosystem integrity. The effects would provide for the diversity and abundance of wildlife that could contribute to Canada lynx prey. However, these plan components would direct management to alter some habitats that would be used by Canada lynx and their prey. Alteration of these habitats would be through timber harvest, wildland fire, planting, mechanical vegetation management, and other forestry or restoration methods after site specific analysis. Since Canada lynx tend to use high elevation forested habitats, habitats used most by Canada lynx would be within the cold and cool moist broad potential vegetation types. Specifically, plan components in this section would direct management of cool moist broad potential vegetation types. The desired dominance types identified in this section identify less Engelmann spruce and subalpine fir dominance types than currently occurs and less than was identified though modeling of the natural range of variation, though there is some overlap in the ranges. The natural result of these desired conditions would be to direct management to reduce Engelmann spruce and subalpine fir dominated forests into other desired dominance types identified in that section. Because Engelmann spruce and subalpine fir forests are preferred by Canada lynx, these desired conditions could have adverse consequences for Canada lynx. This section also has desired conditions for size classes. These desired size class distributions would direct management to shift size classes in the cool moist broad potential vegetation type. Currently, the Nez Perce-Clearwater is over the desired range in the 0-to-4.9-inch class and the 5-to-9.9-inch size class so management would seek to shift other size classes into these size classes. This may affect the amount of mature multistory habitat in this broad potential vegetation type.

A similar desired condition range is seen in the cold potential vegetation type with desired conditions that would direct management to reduce Engelmann spruce and subalpine fir dominance types, while expanding whitebark pine dominance types. This would have consequences to lynx habitats, from changes in dominance types and changes in size classes. However, the plan must follow the Northern Rockies Lynx Management Direction when implementing these activities. The Northern Rockies Lynx Management Direction would constrain many of these activities to maintain lynx habitats.

Meadow, Grassland, and Shrubland

Plan direction within the meadows, grasslands, and shrublands section of the Land Management Plan would have no effect or beneficial effects on Canada lynx. Desired conditions within this section would contribute to ecosystem integrity and provide a diversity of habitat conditions.

Carbon Storage and Sequestration

Plan direction within the carbon storage and sequestration section of the Land Management Plan would have no or beneficial consequences on Canada lynx.

Fire Management

Fire management plan components would allow and encourage fire to play its natural role, across the planning area. Fire is likely to play a dominant role in shaping Canada lynx habitat over the life of the plan. FW-OBJ-FIRE-01 in the fire management section would seek to treat by vegetation treatments, managed wildfire, or actively burning between 530,000 and 645,000 acres, some of which would be Canada lynx habitat. FW-OBJ-FIRE-02 sets the objectives for fuels treatments at 227,242 acres per decade under the Preferred Alternative. Some of these acres could occur in lynx habitat but would be conducted within the wildland urban interface and would be constrained by the Northern Rockies Lynx Management Direction. FW-OBJ-FIRE-03 would encourage fire to play a natural role to reduce uncharacteristic and undesirable wildfire through management of natural unplanned ignitions on 360,258 acres per decade under the Preferred Alternative. These would also occur within some lynx habitats, particularly in the Idaho Roadless Rule areas, recommended wilderness, and designated wilderness. Fire has been the dominant agent of change in lynx habitat since lynx were federally listed and will continue to be under the Land Management Plan.

Invasive Species

Plan direction for the invasive species section would have negligible effects on Canada lynx. Canada lynx habitats do not currently have many invasive species, and treatments within Canada lynx habitat would not likely have any direct consequences on Canada lynx.

Soil Resources

Plan direction in the soil resources section of the plan would have negligible effects or beneficial effects on Canada lynx habitats. They would serve to protect and restore soil resources from management activities. Soil objectives propose restoration activities, but those would have lower probabilities occurring within Canada lynx habitat and would have short-term impacts locally on Canada lynx prey. They would not occur at an extent that would have negative consequences on lynx.

Water and Aquatic Ecosystems

Plan direction in the water and aquatic ecosystems section would have negligible effects or beneficial effects on Canada lynx because they would restore, enhance, and protect aquatic ecosystems.

Riparian Management Zones

Plan direction in the riparian management zones section would have negligible effects or beneficial effects on Canada lynx because they would restore, enhance, and protect riparian areas.

Conservation Watershed Network

Plan direction in the conservation watershed networks section would have negligible effects or beneficial effects on Canada lynx because they would restore, enhance, and protect aquatic habitats. Some of these treatments would occur within lynx habitats after a site-specific analysis. Due to their limited scope and the limited amount of lynx habitat they would affect, Canada lynx would not likely be sensitive to these restoration activities. Lynx would benefit from proper functioning aquatic habitats.

Infrastructure (Aquatic and Riparian)

Plan direction in the aquatic and riparian infrastructure section would have negligible effects or beneficial effects on Canada lynx because they would restore, enhance, and protect aquatic habitats. Canada lynx would not be sensitive to restoration activities and would benefit from proper functioning aquatic habitats.

Energy and Minerals (Aquatic and Riparian)

Plan direction in the aquatic and riparian energy and minerals section would have negligible effects or beneficial effects on Canada lynx because they would protect aquatic habitats.

Livestock Grazing (Aquatic and Riparian)

Plan direction in the aquatic and riparian livestock grazing section would have negligible effects or beneficial effects on Canada lynx because they would protect aquatic habitats.

Wildlife

Plan direction in the wildlife section would have negligible effects or beneficial effects on Canada lynx. FW-DC-WL-01 would provide conditions for federally listed species. FW-DC-WL-03, FW-DC-WL-06, and FW-GDL-WL-01 would promote connectivity for Canada lynx. FW-STD-WL-01 requires that the Nez Perce-Clearwater follow the Northern Rockies Lynx Management Direction (NRLMD). Guidance in the NRLMD would contribute beneficial consequences to Canada lynx habitats. However, some direction within the NRLMD would also have a chilling effect on needed treatments within Canada lynx habitat.

Multiple Uses Wildlife

Plan direction in the Multiple Uses Wildlife section directs the Nez Perce-Clearwater to provide ecological conditions for species commonly used by the public for hunting, trapping, fishing, gathering, or watching. This type of management could potentially occur within Canada Lynx habitat. Many wildlife species have needs that differ from those of Canada lynx and such management may impact lynx habitats.

Multiple Uses Elk

Plan direction in the Multiple Uses Wildlife section would direct the Nez Perce-Clearwater to restore or enhance habitat for elk through active management. They seek to increase or enhance elk nutrition, which would mean increasing early seral conditions. The objectives for elk nutrition are nested within the vegetation plan components, except that they direct a proportion of treatments to areas that would produce higher nutritional responses. Sites with higher nutrition potential are those that are more mesic and have better quality soils. Some of these treatments could occur within lynx habitats and would reduce lynx use for approximately 30 to 40 years. These treatments would be required to abide by the Northern Rockies Lynx Management Direction, which restricts the amount of lynx habitat that could be treated within a lynx analysis unit to ensure they protect lynx habitat.

Air Quality

Plan direction in the air quality section would have no effect on Canada lynx.

Tribal Trust

Plan direction in the tribal trust responsibilities section would have negligible or beneficial effects on Canada lynx.

Cultural Resources

Plan direction for the cultural resources section would have few environmental consequences for Canada lynx. Objectives for cultural resources would seek to improve huckleberry stands. Some of these stands might occur within lynx habitats and would represent short-term impacts in localized areas.

Municipal Watersheds

Plan direction for the municipal watersheds section would have no environmental consequences for Canada lynx.

Sustainable Recreation

Lynx are generally tolerant of human recreational activities. However, some recreation plan direction could have some consequences for lynx. Plan direction in the sustainable recreation section may lead to management that would increase disturbance to Canada lynx. Specifically, FW-DC-REC-11 could facilitate additional future winter recreation into Canada lynx habitat. FW-DC-REC-10 would potentially facilitate additional motorized, mechanized, and pedestrian trails in lynx habitat. Recreational facilities result in the loss of lynx habitat from their footprint. These impacts would be minor.

Many activities are either suitable or unsuitable in different recreation opportunities spectrum classes. If lynx habitat occurs within the various recreation opportunity spectrum classes, future actions found suitable through recreation opportunity spectrum classes could occur after a site-specific analysis. Similarly, activities found not suitable would be prohibited and serve to protect lynx habitat. Timber production, permanent road construction, temporary road construction, building permanent structures, over-snow vehicle use, and motorized travel are prohibited within primitive and semi-primitive non-motorized recreation opportunity spectrum classes, all of which would help protect lynx habitat. Timber production, timber harvest, permanent road construction, temporary road construction, construction of new buildings or structures, over-snow vehicle use, and mechanized and motorized travel would be suitable in semi-primitive motorized, roaded natural, and rural recreation opportunity spectrum classes. Prescribed fire, livestock grazing, locatable minerals, and leasable minerals would be suitable in all recreation opportunity spectrum classes. Recreation infrastructure, such as motorized trails or hiking trails, may increase access for trapping, which could result in limited incidental take; however, incidental take of Canada lynx in Idaho is rare. Trapping is allowed on National Forest System lands but is regulated by the Idaho Department of Fish and Game. However, trapping of lynx is prohibited under Idaho law.

Scenery
Plan direction in the scenery section would have negligible or no effect on Canada lynx.

Public Information, Interpretation, and Education
Plan direction in the public information, interpretation, and education section would have negligible or no effect on Canada lynx.

Infrastructure
Plan direction in the infrastructure section may lead to management that would increase disturbance to Canada lynx. Specifically, this direction could encourage increased road access into Canada lynx habitat, which could alter Canada lynx habitat. There is no direction in the plan that constrains road building or motorized trails, other than within some recreation opportunity spectrum settings designated wilderness, or recommended wilderness. Recreation infrastructure, such as roads, may increase access for trapping activities, which could result in limited incidental take; however, incidental take of Canada lynx is rare. Trapping is allowed on National Forest System lands but is regulated by the Idaho Department of Fish and Game. However, trapping of lynx is prohibited under Idaho law.

Land Ownership and Land Uses
Plan direction in the land ownership and land uses section would have both negative and beneficial consequences on Canada lynx. FW-DC-LND-01 specifically would direct land acquisitions to prioritize habitat for at-risk species, which would have beneficial consequences for Canada lynx connectivity and habitat conservation. On the other hand, FS-DC-LND-06 could facilitate some impacts to Canada lynx habitat from energy developments. However, a large portion of the Canada lynx habitat is in designated wilderness where these facilities would not be allowed. Potential for oil or gas extraction is low to very low on the Nez Perce-Clearwater, so there would be little chance to have oil and gas extraction projects. Wind energy potential is also low, so there is less likely to be wind energy developments. More likely would be rights-of-way for electrical grid, or oil and pipelines could occur. These types of infrastructure usually have temporary impacts during construction but then would have low impacts after completion. The footprint would be limited to only a very small percent of Canada lynx habitat in the plan area.

Ecosystem Services
Plan direction in the ecosystem services section would have consequences to Canada lynx. Specifically, FW-GDL-ES-01 would constrain the closing of existing routes. In the event a route was closed, it would direct the Nez Perce-Clearwater to consider opening a new road when closing other roads, essentially redistributing the road system. In many areas of the Nez Perce-Clearwater, road densities are high or very high and may need to be reduced due to resource concerns. If this happens, new roads or motorized trails could potentially need to be created to maintain access. This guideline would create a situation where watersheds or areas with low road densities in Canada lynx habitat would possibly see an increase in access because of road closures in high road density areas for resource benefits. This would not happen in lynx habitat within recommended or designated wilderness but could happen with roads in Management Area 3 or with motorized trails in areas suitable for summer motorized uses in Management Area 2 that are suitable for motorized uses under the preferred alternative. Roads in Idaho Roadless Rule Areas are not allowed, unless granted an exception from the Idaho Roadless Rule. So new roads in Idaho Roadless Rule Areas are unlikely. The plan component requires decision makers to consider opening new motorized routes but doesn't require new motorized routes to be opened. A potential outcome is that efforts to reduce motorized uses for resource reasons would be more challenging. It might not result in additional motorized routes because in each case, a route would also be closed. This plan component would also require that any closure of over-snow areas would require other areas to be opened to maintain the net amount.

Timber

Plan direction in the timber section would direct the manner in which timber production and harvest are conducted. These plan components establish direction that would achieve desired conditions for vegetation found in the Forestlands section of the plan. Timber production could potentially alter some Canada lynx habitats, mostly in Management Area 3. However, all timber harvest would need to follow the Northern Rockies Lynx Management Direction per standard FW-STD-WL-01 which imposes constraints in lynx habitat on vegetation treatments. Most lynx habitat is unsuitable for timber harvest and timber production, and therefore this direction has limited capability to alter lynx habitat. The direction in the timber harvest section specifies the size of openings allowed, which would typically be 40 acres but is allowed up to 207 acres under specific conditions. The larger patch size would be more consistent with the patch size of lynx habitat under natural disturbances wherein these habitats burn with stand replacing fires. Timber production has the potential to reduce lynx habitat use for up to 30 to 40 years.

Energy and Minerals

Plan components in the energy and minerals section may have some environmental consequences to Canada lynx habitats if mining or energy extraction activities take place in Canada lynx habitat under the plan. In the event they do, it would result in temporary or permanent loss of Canada lynx habitat. However, the extent of mining or mineral activities would likely be over only a small proportion of Canada lynx habitat so the effects would be minor.

Livestock Grazing

Plan direction in the livestock grazing section would potentially have minor environmental consequences for Canada lynx because it could alter vegetation that provides habitat for snowshoe hares. However, livestock grazing only overlaps with a portion of lynx habitat and would have only indirect consequences to lynx prey.

Special Forest and Botanical Products

Plan direction in the special forest and botanical products section would have negligible environmental consequences for Canada lynx.

Designated Wilderness

Plan direction in the designated wilderness section would have beneficial consequences for Canada lynx.

Wild and Scenic Rivers

Plan direction in the wild and scenic rivers section would have negligible or beneficial consequences for Canada lynx.

Recommended Wilderness

Plan direction in the recommended wilderness section would have negligible or beneficial consequences for Canada lynx.

Idaho Roadless Rule Areas

Plan direction in the Idaho Roadless Rule areas section would have negligible effects or beneficial effects on Canada lynx.

Research Natural Areas

Plan direction in the research natural areas section would have negligible effects or beneficial effects on Canada lynx.

Gospel-Hump

Plan direction in the Gospel-Hump geographic area section would have negligible consequences or beneficial effects on Canada lynx.

Lower Salmon

Plan direction in the Lower Salmon geographic area section would have negligible consequences on Canada lynx.

Pilot Knob

Plan direction in the Pilot Knob geographic area section would have negligible or no consequences for Canada lynx.

Lolo Trail National Landmark

Plan direction in the Lolo Trail National Landmark geographic area section would have negligible or no consequences for Canada lynx.

Cumulative Effects on Canada Lynx

As described previously, the Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013) identified four anthropogenic influences as being of greatest concern to the conservation of lynx: climate change, vegetation management, wildland fire management, and fragmentation of habitat. The lower tier of anthropogenic influences includes recreation, minerals and energy management, forest and backcountry roads and trails, grazing by domestic livestock, and mortality due to incidental trapping or illegal shooting. Although these lower-tier activities could affect individual lynx, they are not expected to have a substantial effect on the overall lynx population and are unlikely to cause cumulative adverse effects. Therefore, they are not discussed in detail. The analysis of cumulative effects considers the previous analysis and decision under the Northern Rockies Lynx Management Direction Final Environmental Impact Statement (U.S. Department of Agriculture 2007f).

The cumulative effects analysis area is predominantly National Forest System lands, state managed lands, tribal lands, and private lands. The cumulative effects area for lynx is managed through implementation of a consistent set of Land Management Plan objectives, standards, and guidelines (U.S. Department of Agriculture 2007f). Habitat management on these units, in concert with the Nez Perce-Clearwater, promotes the conservation of lynx.

In response to reducing uncharacteristic wildfire, fuels reduction programs have increased in recent decades and are expected to continue on managed portions of Forest Service, state, tribal, and private lands within the boundaries of the Nez Perce-Clearwater geographic areas, particularly in the wildland urban interface. Only about 1.18 percent of the lynx habitat in the plan area has been treated with fuels treatments since lynx were listed.

On national forests in the cumulative effects' analysis area, the wildland urban interface has vegetation treatments using the exceptions or exemptions to the Northern Rockies Lynx Management Direction (NRLMD) vegetation standards, which may adversely affect stand initiation or multi-story hare and lynx habitat. However, the amount of these areas represents 6 percent of lynx habitat on forest lands and the amount is consulted on with the U. S. Fish and Wildlife Service. They determined that this was not enough impact to jeopardize lynx. On the Clearwater National Forest, the maximum acres of lynx habitat that could be affected by the wildland urban interface exemption is 55,800 acres. Exceptions for precommercial thinning projects for resource benefits are limited to 1,930 acres. Combined, the exemptions and exceptions could affect about 3.9 percent of the lynx habitat on the Nez Perce-Clearwater. However, the Nez Perce National Forest did not consult on incidental take because they were considered unoccupied. The wildland-urban interface boundary where exemptions apply is determined by community wildfire protection plans and so could change slightly over time, but these changes would not cause an appreciable difference in the percent of lynx habitat where exemptions could occur. Thus, the Nez Perce National Forest was not issued exemptions or exceptions for these activities. To date, the level of effects to lynx is substantially lower than that anticipated in the record of decision for the NRLMD because the actual amount of treatments on the Clearwater National Forest total only about 15,399 acres under the wildland urban interface exemption (Hanvey 2017).

National forests in the cumulative effects analysis area manage lynx habitat to provide forest landscapes supporting a mosaic of differing successional forest stages and containing the presence of snowshoe hares and their preferred habitat conditions. These national forests follow management direction in the NRLMD. During the last decade, timber harvest practices have been more favorable for lynx as a result of forest plan amendments, with fewer acres impacted by temporary loss of multistory stands that provide snowshoe hare and lynx habitat. In fact, less than one percent of the lynx habitat has been manipulated by timber management in the plan area. The U.S. Fish and Wildlife Service determined that the NRLMD would not jeopardize the Canada lynx.

The Idaho Department of Lands manages thousands of acres of forested habitats to the west of the Nez Perce-Clearwater, most of which is not lynx habitat because it is too low in elevation. The Idaho Department of Lands does not generally adjust their management for lynx. The Idaho Department of Lands manages their lands for sustainable timber production and in accordance with state law.

Most private lands within the cumulative effects area are at elevations too low to be lynx habitat, but lynx do travel through some of these areas. Large portions of forested lands in Idaho, west and north of the plan area, are managed by Potlatch Deltic Corporation for timber production. Their management may affect lynx habitat and could be characterized as prioritizing timber production. Similar to Idaho Department of Lands, most of the forested areas they manage are too low in elevation to be lynx habitat. Their primary management efforts are to maximize profits from private forestry.

A much smaller amount of the cumulative effects area is managed by individuals who own forested lands. Many of these habitats are also lower in elevation and mostly are not lynx habitat. However, private lands in the checkerboard ownership near Lolo Pass occur in lynx habitat. Some of these landowners are clearing vegetation to reduce the risk of wildfire, which may reduce the potential for lynx foraging, although whether lynx would forage in close proximity to human dwellings and dogs is unknown. Fuels treatments in lower montane forests that burned naturally with mixed severity may help to prevent uncharacteristically severe fires from occurring or spreading to lynx habitat at higher elevations.

Although lynx are known to cross openings, Squires et al. (2013) found that lynx generally use habitat within about 300 feet of cover. Because cover is altered by wildfire, insects, disease, and actions on other land ownerships, it is difficult to predict when or where these effects to cover would occur.

A number of highways occur in lynx habitat in the cumulative effects areas. Various studies have documented lynx crossings of highways. Highways pose a risk of direct mortality to lynx. Two-lane or four-lane highways with high traffic volumes or impediments, such as fences on both sides of a highway, may impede lynx movement. According to Alexander et al. (Interagency Lynx Biology Team 2013), traffic volumes between 3,000 and 5,000 vehicles per day may be the threshold above which successful crossings by carnivores are impeded. None of the roads in the plan area have this much traffic. U.S. Highway 12 west of the Nez Perce-Clearwater is a two-lane highway and has much higher traffic volumes than those on the Nez Perce-Clearwater and may impede lynx crossings between Kooskia and Lewiston. There are no four-lane highways in the cumulative effects analysis area and few roads have enough traffic to affect lynx travel. It is not anticipated that traffic volumes are expected to increase dramatically within the life of the plan. The plan does not make travel management decisions, it only identifies where such uses are suitable.

Connectivity to source populations of lynx in Canada is considered critical to the persistence of populations in most parts of the range in the United States (Squires et al. 2013) (68 FR 40076). While connectivity from Canada has not been evaluated for lynx, other studies have evaluated connectivity hypothetically for 105 species using resistance kernel modeling (Cushman et al. 2012). Cushman et al. (2012) showed that the Nez Perce-Clearwater is well connected to Canada. While connectivity was high, they found species associated with high elevations and species associated with lower elevations were predicted to have limited extent of connected habitat. Species associated with high elevations were predicted to have the vast majority of their connected habitat protected by federal Forest Service and National Park Service lands. Connectivity from the Nez Perce-Clearwater to Canada is relatively well connected through forested habitats that would facilitate lynx travel.

Lynx are known to be strong dispersers. Populations in Canada reduce population density through dispersal, in addition to mortality and low recruitment, during snowshoe hare population lows (Mowat et al. 1999). Mowat et al. (1999) documented 15 straight-line dispersal distances of 310 to 683 miles. The straight-line distance from the United States-Canadian border to the northern boundary of the Nez Perce-Clearwater, as measured using GIS mapping, was between approximately 130 and 150 miles which is well within the dispersal capabilities of lynx. Most of the land from the Nez Perce-Clearwater boundary to the Canadian border through northern Idaho or western Montana includes National Forest administered lands that make up the Idaho Panhandle, Kootenai, and Lolo National Forests.

These lands would present little resistance to a strong disperser like Canada lynx. As an example, lynx introduced into southern Colorado were fitted with satellite telemetry collars and dispersed far from Colorado after release. Some individuals moved from southern Colorado northward through Colorado, Wyoming, and Montana and as far away as North Idaho, with observations on the Nez Perce-Clearwater and north of the plan area. Other individuals made it to Iowa, southern Utah, Kansas, Nebraska, northern Arizona, and southern New Mexico (Devineau et al. 2010). The places where lynx moved from that study would be far more inhospitable to lynx dispersal than the lands between Canada and the Nez Perce-Clearwater. Lynx dispersing from Canada moving south would most likely arrive somewhere along the northern boundary of the Nez Perce-Clearwater. The northern boundary of the Nez Perce-Clearwater is made up of recommended wilderness areas or Idaho Roadless Rule areas that would provide for good conditions for lynx arrival.

The distance to known and well-studied lynx breeding populations near Seeley Lake, Montana was measured at about 60 miles from the nearest Nez Perce-Clearwater boundary near Lolo Pass. Though the track around Missoula and the surrounding communities would be more difficult for lynx than from Canada, these distances are well within the dispersal capability of lynx. Potentially, the best path would include lynx travelling north of Missoula, Montana, into the Lolo National Forest and continue on the Nez Perce-Clearwater near the Hoodoo recommended wilderness area or near Lolo Pass. The Hoodoo area is included in most alternatives as recommended wilderness, including the Preferred Alternative. Other areas where lynx could potentially arrive from the Seeley Lake, Montana, population area along the eastern boundary of the Nez Perce-Clearwater, which is mostly composed of roadless rule areas or designated wilderness, save for the checkerboard ownership near Lolo Pass. Most areas along the eastern Nez Perce-Clearwater boundary would provide for lynx arriving from the east. Once here, the Nez Perce-Clearwater is a large block of contiguous public land composed of mostly wilderness and roadless areas surrounded on the north, east, and south by other Forest Service administered lands. Save for a couple of relatively low traffic roads, it is very well connected and represents very low barriers to connectivity for lynx.

Recreational Activities

Scientific evidence to date indicates that most recreational activities pose a low risk of having negative effects on lynx (Interagency Lynx Biology Team 2013). Within the cumulative effects analysis area outside the Nez Perce-Clearwater, there are two ski areas on private lands near the national forest. These ski resorts are Snow Haven, south of Grangeville, Idaho, and Bald Mountain, northwest of Orofino, Idaho. Both are small ski areas with very little development at the base. These ski areas are not within lynx habitat so any effects to lynx are minor. There is one ski area on the Kootenai National Forest called Turner Mountain. This is a very small ski area with only one lift and very little development at the base. The ski area affects about 263 acres of lynx habitat, with 164 acres of cleared ski runs and 98 acres of gladed skiing, so any effects to lynx are minor. Additionally, there are approximately five miles of groomed cross-country ski trails in lynx habitat within lynx analysis units and another five miles that are designated for cross-country ski use on the Kootenai National Forest.

Trapping and snaring of lynx is currently prohibited across the contiguous United States. Incidental trapping or snaring of lynx is possible in areas where regulated trapping for other species overlaps with lynx habitat (Squires and Laurion 1999). State wildlife management agencies regulate the trapping of furbearers. On all lands, areas open to motorized over-snow vehicle use occur in lynx habitat, and these areas may have increased risk of incidental trapping of lynx because trapping seasons for other species occur in the winter. However, many areas of lynx habitat have limited accessibility for off-route motorized over-snow vehicle use due to high tree densities and rugged topography. On the Kootenai National Forest, there are approximately 120 miles of groomed motorized over-snow vehicle routes and approximately another 46 miles of designated motorized over-snow vehicle routes in lynx habitat within lynx analysis units. One lynx was reported trapped on the Kootenai National Forest in December 2012 and was released unharmed. Incidental trapping of lynx is a rare event in Idaho and lynx have usually been released alive when it occurs.

On the Kootenai National Forest, no leasable minerals, such as oil, gas, coal, and geothermal resources, are being produced. All leases are currently suspended in accordance with the 1985 court decision of Conner v. Burford (848 F. 2d 1441 (9th Cir. 1988)). The Troy copper and silver mine was in operation for over 20 years on the Kootenai National Forest and affects approximately 50 acres on National Forest System lands and an additional 400 acres of private lands. There are no plans of operation or notices of intent to explore or operate any commercial mines in lynx habitat on the Lolo National Forest. The Cotter Basin Mine on the Helena National Forest produced copper and silver in the past. In its biological opinion on the Northern Rockies Lynx Management Direction, the U.S. Fish and Wildlife Service (U.S. Department of the Interior 2017c) concluded that the application of the amendment guidelines would result in no or only minor adverse effects to lynx due to minerals and energy development. No adverse cumulative effects are anticipated.

Much of the lynx habitat on the Kootenai, Lolo, and Helena-Lewis and Clark National Forests overlaps with grizzly bear habitat, where road construction and motorized use is constrained. Additionally, the objectives and guidelines related to lynx in the amended forest plans reduce or minimize any potential adverse effects (U.S. Department of the Interior 2017c), and no adverse cumulative effects are anticipated. Roads can facilitate access for trappers and trapping that may incidentally catch some lynx, but inadvertent trapping of lynx is rare in Idaho and usually results in live release as evaluated above.

The effects of livestock grazing were anticipated to be minimal under the Northern Rockies Lynx Management Direction (U.S. Department of the Interior 2017c) and there is no new information to suggest that this has changed. No adverse cumulative effects are anticipated.

Wolverine

When the Nez Perce-Clearwater's Assessment was published (U.S. Department of Agriculture 2014d), the U.S. Fish and Wildlife Service had recently published a proposed rule to list the North American wolverine as a threatened distinct population segment in the contiguous United States (U.S. Department of the Interior 2013a). However, on August 13, 2014, the U.S. Fish and Wildlife Service withdrew its previous proposal. On April 14, 2016, the U.S. District Court for the District of Montana Missoula Division remanded the matter to the U.S. Fish and Wildlife Service for further consideration consistent with order CV 14-246-M-DLC (consolidated with case nos.14-247-M-DLC and 14-250-M-DLC) (U.S. Department of the Interior 2014c). The U.S. Fish and Wildlife Service withdrew the proposed rule to list the North American wolverine in the contiguous United States as a threatened species under Endangered Species Act in October 2020 (U.S. Department of the Interior 2014c). This was based on their conclusion that the loss of habitat due to climate change is not as significant as believed at the time of the proposed rule. They also found that wolverines in the contiguous United States do not qualify as a distinct population segment. Additional litigation followed, and the U.S. Fish and Wildlife Service requested a voluntary remand of their decision in the spring of 2022. On May 26, 2020, the District Court for the District of Montana vacated the 2020 withdrawal of the proposed rule and wolverine was once more considered "proposed" under the Endangered Species Act which is its current status.

The Nez Perce-Clearwater completed a thorough review of scientific information to inform the planning process, develop plan components, and assess consequences of alternatives. Recent studies included the evaluation of the effects of winter recreation on wolverines and the results of multi-state efforts to survey for wolverines with camera traps. Data and information gaps exist, but the breadth and depth of the available scientific information are sufficient to assess potential effects of alternatives.

Wolverines live at low densities and occupy remote areas with persistent snowpack, which they use for denning. Their global distribution is circumpolar, as they occupy the boreal regions on several continents. They rely on small mammals and ungulates as food sources, both scavenging and hunting their prey. Winter food resources influence habitat selection (Krebs et al. 2007) and survival (Krebs et al. 2004).

The U. S. Fish and Wildlife Service (2018b) Species Status Assessment for the North American wolverine concluded that the wolverine's physical and ecological needs include:

- large territories in relatively inaccessible landscapes; at high elevation (1,800 to 3,500 meters (5,906 to 11,483 feet))
- access to a variety of food resources, that varies with seasons; and
- physical/structural features (for example, talus slopes, rugged terrain) linked to reproductive behavioral patterns.

The analysis will consider these ecological needs in the context of how land allocations and plan components would affect the North American wolverine and address threats and stressors (U.S. Department of the Interior 2017b).

The U. S. Fish and Wildlife Service issued an addendum to their 2018 Status Assessment with new information on the population trend, distribution, and habitat factors (U.S. Fish and Wildlife Service 2023). The core conclusion was that:

- wolverine populations in the contiguous United States are small, fragmented, and relatively isolated from larger populations in Canada and are at risk from genetic factors because female wolverines appear to have virtually no recent population connectivity based on genetic analyses.
- Core wolverine habitats are projected to become smaller and more fragmented in the future as the result of climate change and human disturbance because climate change is projected to shrink wolverine habitat, increased backcountry winter recreation is likely in shrinking core habitats and human developments could reduce connectivity.

Analysis of the effects of the alternatives on wolverines and their habitat is based upon wolverine habitat models that are designed and updated by researchers. Current wolverine models include persistent spring snow as a factor in modeling habitat suitability, but different models assess and use this factor in different ways. The U.S. Fish and Wildlife Service initially modeled wolverine habitat across the United States in 2013 (U.S. Department of the Interior 2013a), incorporating the work of two groups of scientists (Copeland et al. 2010, Inman et al. 2011). Since that time, Inman (2011) produced a more refined model that delineated areas of the western United States predicted to be maternal wolverine habitat suitable for use by reproductive females, primary wolverine habitat suitable for survival and use by resident adults, female dispersal habitat suitable for relatively brief female dispersal movements, and male dispersal habitat suitable for relatively brief male dispersal movements. This model is based on a resource selection function developed with wolverine telemetry locations from 2001 to 2010 in the Greater Yellowstone Ecosystem of Montana, Idaho, and Wyoming (Inman et al. 2012). The model by Copeland et al. (2010) used satellite data to classify areas of persistent spring snow based upon coarse-scale satellite data collected over a seven-year time period from 2000 to 2006 in which snow cover varied from year to year. This model displayed the number of years out of seven that a GIS pixel was classified as snow. Copeland et al. (2010) studied all known wolverine dens in Norway and Sweden, finding that areas with persistent spring snow at least five years out of seven were preferred. Since that time, Inman (2013) produced a more refined model that delineated areas of the western United States predicted to be maternal wolverine habitat suitable for use by reproductive females, primary wolverine habitat suitable for survival and use by resident adults, female dispersal habitat suitable for relatively brief female dispersal movements, and male dispersal habitat suitable for relatively brief male dispersal movements. The models are based on a resource selection function developed with wolverine telemetry locations from 2001 to 2010 in the Greater Yellowstone Ecosystem of Montana, Idaho, and Wyoming (Inman et al. 2012b). Inman (2013) models are used in this analysis.

The area modeled by Inman et al., (2013) as providing primary habitat encompasses much of the higher elevation areas of the Nez Perce-Clearwater, whereas the area modeled as providing for maternal habitat is more limited and restricted to only the highest elevations. An estimated 144,371 km^2 (49,258 mi^2) of wolverine habitat occurs in the occupied area in Montana, Idaho, Oregon (Wallowa Range), and Wyoming (U.S. Department of the Interior 2013a). Modeled wolverine habitat from Inman (2013) for the Northern Region of the Forest Service is shown in Figure 85. While modeled primary wolverine habitat from the model predicts wolverine habitat across the landscape, wolverine maternal habitat is thought to be more limited. Protecting maternal habitat may be important to the conservation of the wolverine. Wolverine habitat models may be refined in the future as more scientific information becomes available.

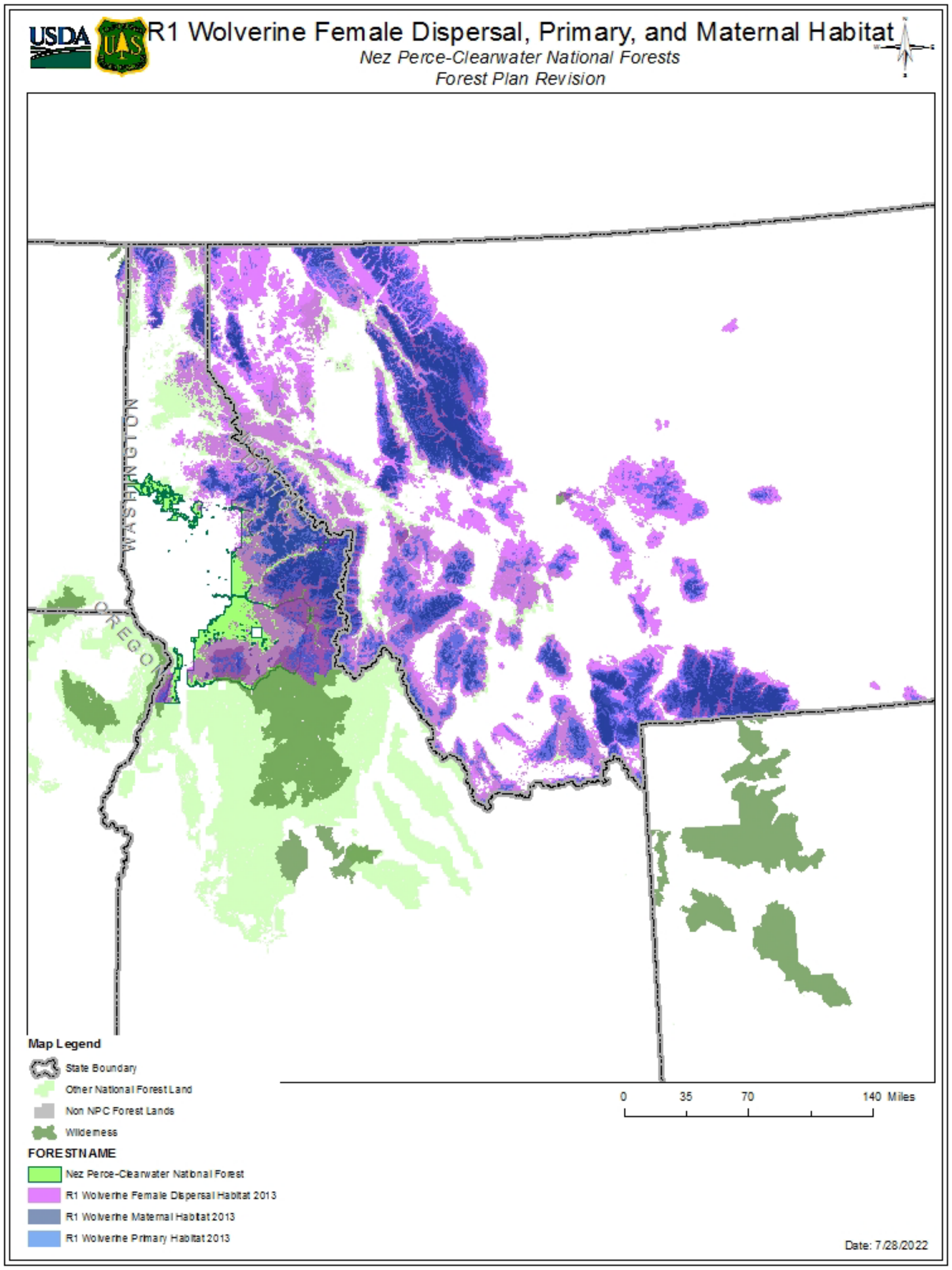


Figure 85. Modeled maternal, primary, and female dispersal primarily Northern Region of the Forest Service

Wolverine habitat is distributed at higher elevations across the Nez Perce-Clearwater National Forest, with substantial amounts of habitat concentrated eastward towards the Idaho-Montana border. Wolverine habitat as modeled by Inman (2013) includes primary habitat, maternal habitat, and female dispersal habitat. The Nez Perce-Clearwater has approximately 753,576 acres of maternal habitat, 1,334,238 acres of primary habitat, and 3,024,135 acres of female dispersal habitat (GIS layer of modeled habitat based on Inman (2013)). The Nez Perce-Clearwater has a total of 1,334,238 acres of primary wolverine habitat which makes up about 12.6 percent of the 10,554,788 acres of wolverine primary habitat within the

Northern Region of the Forest Service. The majority of wolverine habitat in the planning area occurs within designated wilderness, recommended wilderness, or Idaho Roadless Rule Areas. For example, only 93,487 acres of modeled primary wolverine habitat or about seven percent of the Nez Perce-Clearwater National Forest total is within general forest areas (managed to emphasize multiple uses). Similarly, only 35,024 acres or about 4.6 percent of modeled maternal wolverine habitat is within general forest areas. The total amount of modeled wolverine habitat is shown in Table 228.

Table 228. The acres of modeled wolverine habitat found within the Nez Perce-Clearwater National Forest, the total within the Northern Region, and the percent of the Northern Region total represented by the wolverine habitat within the Nez Perce-Clearwater National Forest

Type of Wolverine Habitat (based on Inman et al. 2013)[1]	Total Acres within the Nez Perce-Clearwater	Total Acres within the U.S. Forest Service Northern Region	Percent of Northern Region Wolverine Habitat Within the Nez Perce-Clearwater
Maternal	753,576	4,822,636	15.3
Primary	1,334,238	10,554,788	12.6
Female Dispersal	3,024,135	24,884,989	12.2

(Inman 2013)

Maternal and primary habitat is primarily situated at higher elevations and has relatively low road densities when compared to dispersal habitat, which occupies lower elevation areas with higher levels of human access. Primary and maternal habitats support a wide range of potential wolverine prey, including small and medium-sized mammals particularly marmots, deer, elk, moose, bighorn sheep, and mountain goat. Modeled maternal wolverine habitat is the most limited compared to primary and female dispersal habitat. Modeled maternal wolverine habitat is also the most important regarding the effects analysis because it indicates the effects to wolverine reproduction. Figure 86 below shows female dispersal habitat, Figure 87 shows modeled primary wolverine habitat, and Figure 88 shows modeled maternal wolverine habitat.

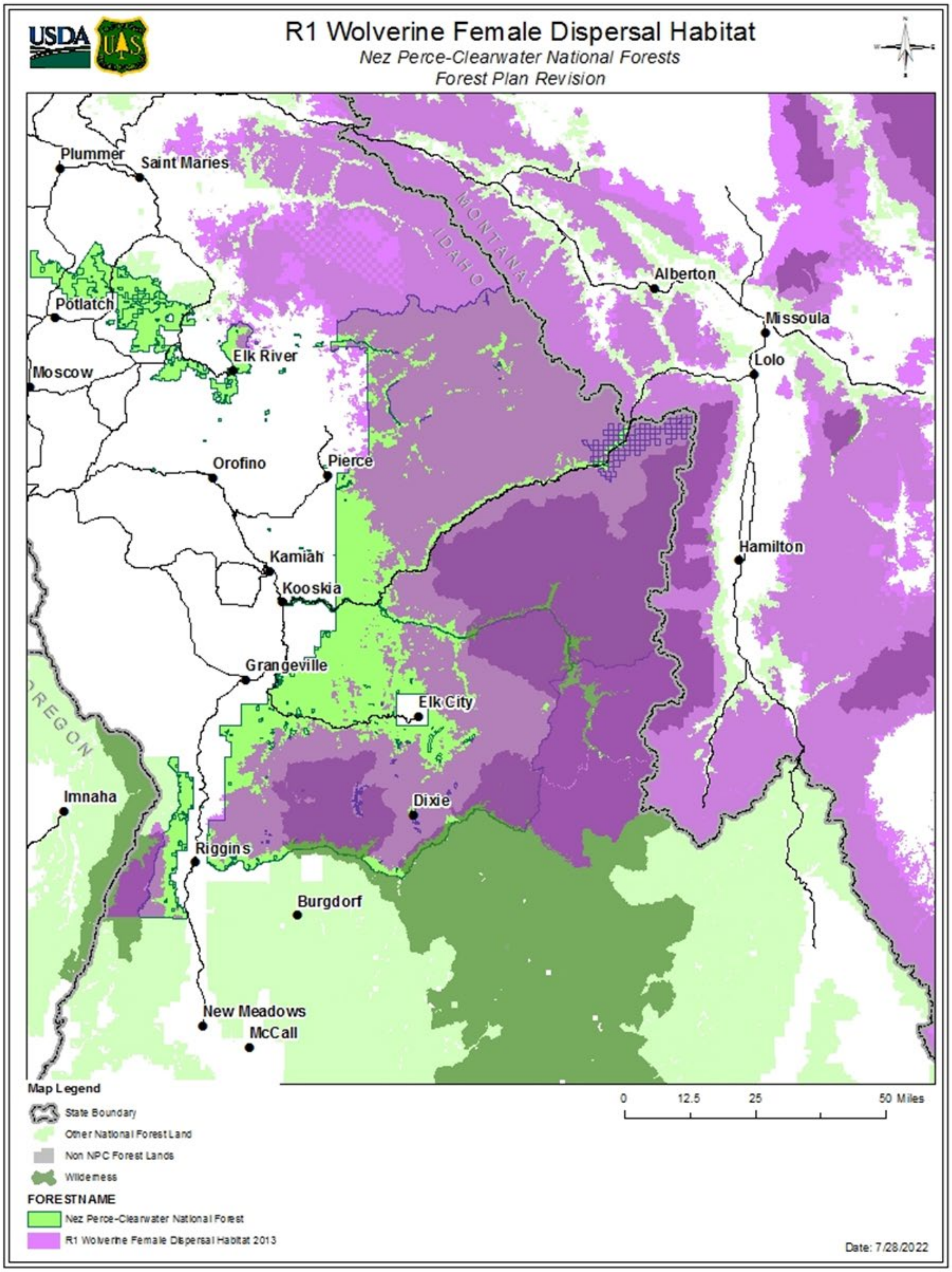


Figure 86. The distribution of female wolverine dispersal habitat within the Nez Perce-Clearwater National Forest

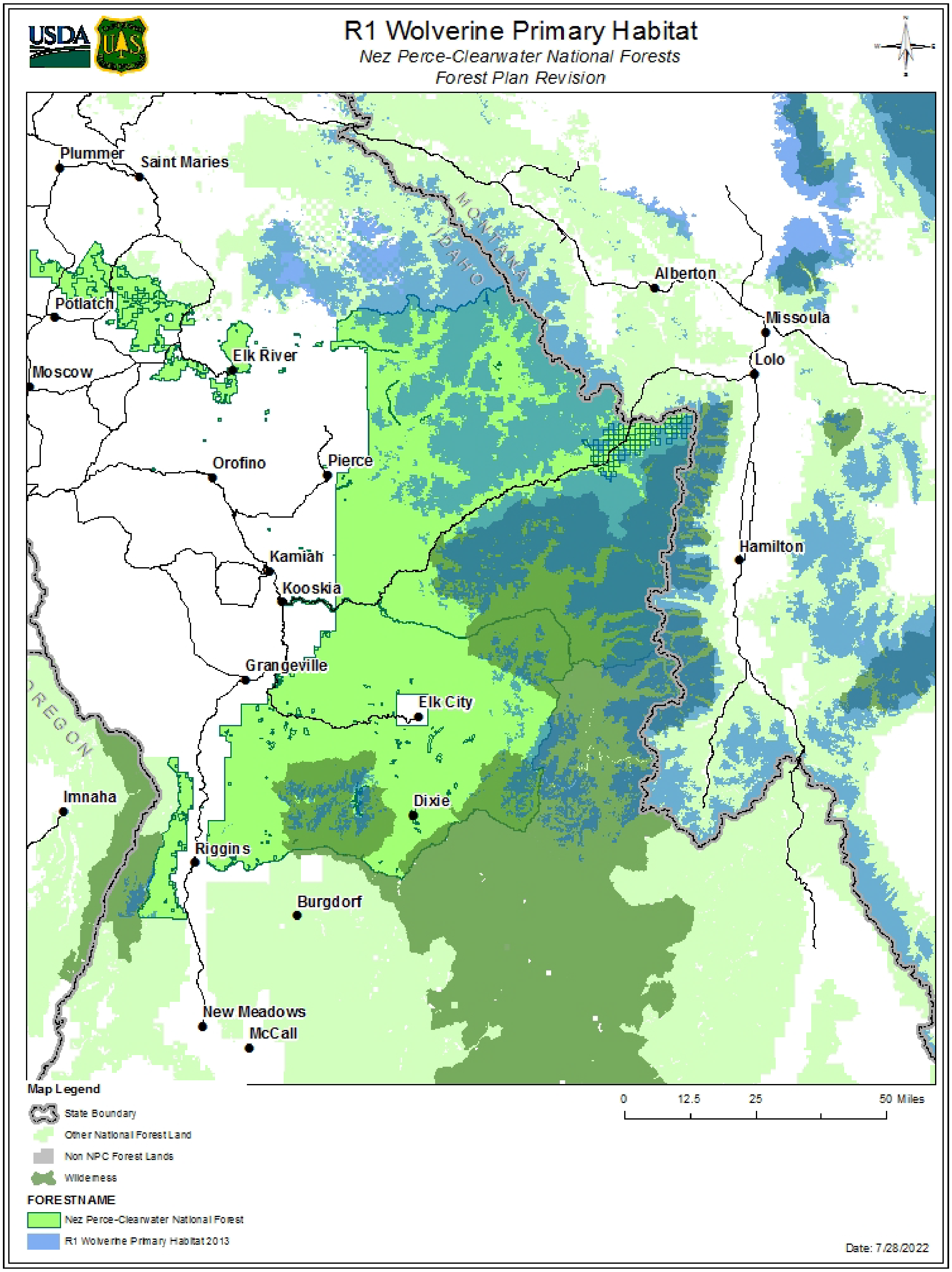


Figure 87. The distribution of modeled primary wolverine habitat on the Nez Perce-Clearwater National Forest

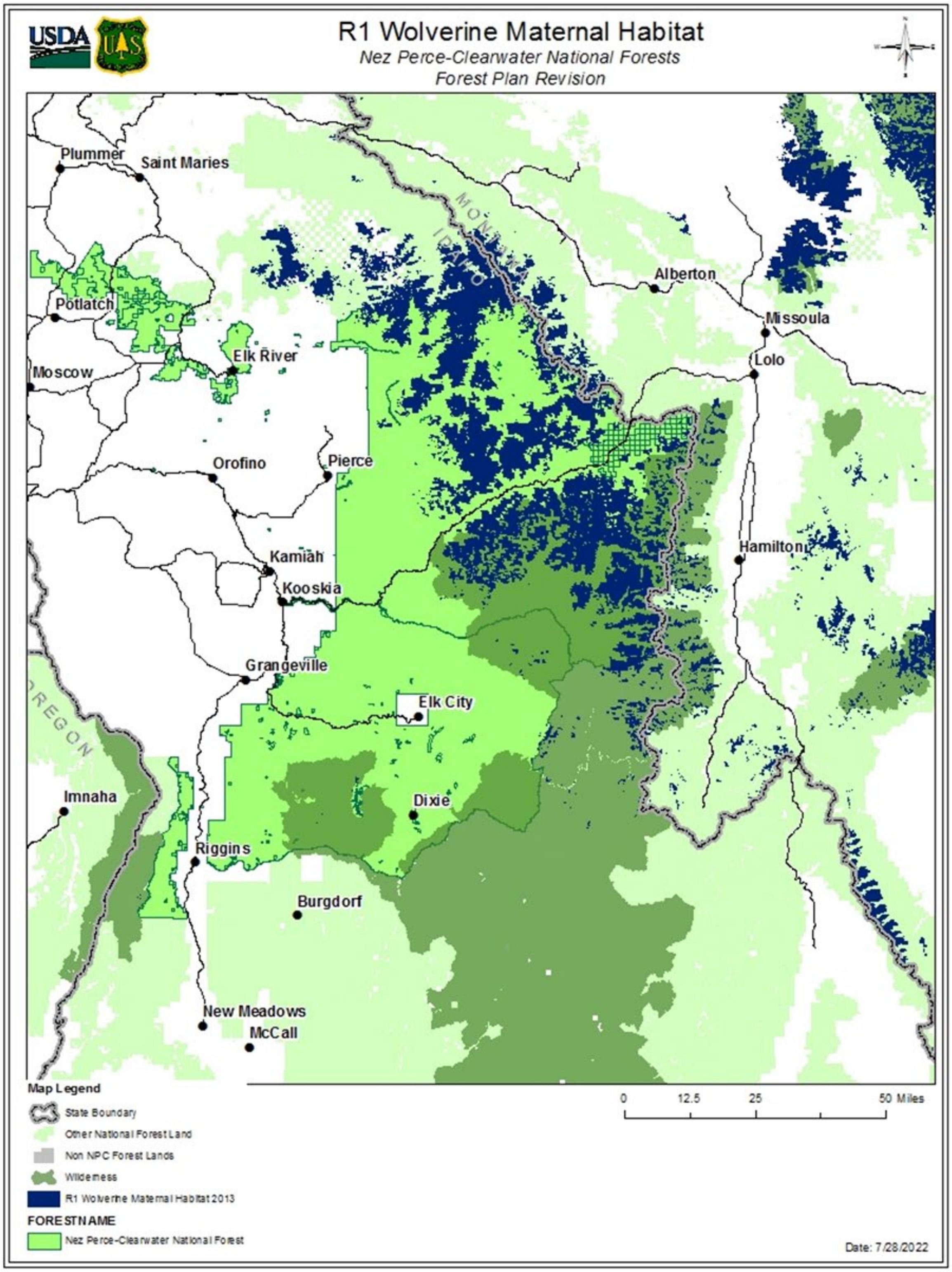


Figure 88. The distribution of modeled maternal wolverine habitat on the Nez Perce-Clearwater National Forest

As Magoun et al. (2017) pointed out, "to manage wolverines and their habitat and incorporate persistent spring snow in models of future wolverine habitat, we must understand the relationship of wolverines to snow and measure persistent spring snow at an appropriate resolution and scale that is biologically meaningful for the species." As summarized by Magoun et al. (2017), the spatial and temporal coarseness of the model and analysis by Copeland et al. (Copeland et al. 2010) introduced uncertainty regarding the obligatory nature of the relationship between persistent spring snow through May 15 and wolverine habitat. Magoun et al. (2017) stated the "use of snow-covered den sites may not be obligatory through 15 May, or may not be obligatory at the scale in Copeland et al. (2010); nevertheless, wolverines may continue to use snow-covered sites as long as they are available." Magoun et al. (2017) discuss that scattered patches of snow that are not detectable by remote sensing techniques at the den-site scale may persist long enough in spring to provide cover for wolverines, even when considering future climates. These authors encouraged more research on the relationship of wolverines to smaller patches of spring snow at the den-site scale to determine if snow is necessary for successful reproduction; if it must be present for the entire denning season; if other structures, such as boulders or down trees, afford protection for wolverine kits near the end of the denning season; if wolverine distribution is tied to factors that have not yet been measured and defined; or if other possible uses of snow are an important component of wolverine habitat.

Snow in wolverine habitat may be affected by changes in climate. For this Final Environmental Impact Statement, the Nez Perce-Clearwater used a compilation of climate change effects published for the Northern Region Adaptation Partnership (Halofsky, Peterson, et al. 2018a, b) that summarizes climate change projections by subregions. Downscaled climate models were used to predict the effects of a changing climate. Future climate uncertainty and anticipated variability is associated with scale. Potential effects of future changes in snow cover and persistence are uncertain or variable due to geographic location, atmospheric circulation patterns, such as the Pacific Decadal Oscillation, and elevation. A study by Webb et al. (Webb et al. 2016) found that wolverines in the boreal forest region of northern Alberta were not as closely associated with persistent spring snow as wolverines in the Rocky Mountains and suggested that these two very different habitats should be separated for analysis purposes and for the study of climate change effects.

Aronsson and Persson (2017) and Jokinen et al (2019) demonstrated wolverine denning in areas without persistent snow, questioning the absolute necessity of persistent springtime snow for wolverine denning success. Aronsson and Persson (2016) showed that the wolverine population in Sweden has expanded considerably into the boreal forest landscape, and colonized areas without persistent spring snow cover. Similarly, Jokinen et al (2019) documented female wolverines appear to be using locally-available denning structures in the lowland boreal forest, despite a lack of deep snow, persistent spring snow cover, or large boulders documented in other studies. A study by Webb et al. (2016) found that wolverines in the boreal forest region of northern Alberta were not as closely associated with persistent spring snow as wolverines in the Rocky Mountains and suggested that these two very different habitats should be separated for analysis purposes and for the study of climate change effects.

Kortello (2019) tested hypotheses that explored a number of factors that explain the distribution of wolverines at different scales in Southern British Columbia just north of the Idaho-Canadian border. They tested four factors: climate, food, human disturbance, and trapping harvest. Top models included food and human disturbance. Of the four food items examined (caribou, mountain goat, moose, and hoary marmot) wolverine occurrence was most closely related to hoary marmot habitat. With regards to human disturbance, they documented a negative association with forestry road density and a positive association with protected areas. Their research suggested that that marmot habitat is important to wolverine in winter and suggest that management actions for conservation prioritize factors related to female occurrence, as these were more clearly defined than male habitat and that human disturbance is a major driver of wolverine distribution (Kortello et al. 2019). The importance of climate was low compared to the food and disturbance hypotheses. However, Kortello (2019) noted that if the forest road density variable is removed from the analysis, persistent spring appears in both the female top models. Hence, they state that their results do not reject the hypothesis that wolverine occurrence is constrained by an obligate association with persistent spring snow but do suggest the alternative explanation that the relationship between spring snow and wolverine distribution could be functionally related to the distribution of food, disturbance, or mortality risk. Kortello (2019) suggested that the negative relationship with forest road density is indicative of anthropogenic disturbance because of the high level of snow machine operation in their study area. They also suggested that avoidance of forestry road density was due to disturbance rather than trapping because trapping kills were not negatively related to distribution. Protected areas were strongly and positively related to wolverine presence in the top-ranked models and the primary difference between protected areas and the surrounding landscapes in winter is lower human use (Kortello et al. 2019).

Predicting the future of mountain snowpack is complex with multiple drivers and with a strong elevation dependence, however topographical aspect can be an important factor for predicting mountain snowpack (Barsugli et al. 2020). Barsugli (2020) modeled snowpack in two areas: one in Northwestern Montana and another in Colorado. Their results suggest that springtime snowpack is projected to persist in the upper half of the current denning zone for many future scenarios to the mid-21st century and find a strong dependence of snow loss on topographical aspect such that northerly slopes could provide refugia for snow adapted species.

Methodology and Analysis Process

The analysis area for indirect effects of the Land Management Plan is the areas of modeled habitat encompassed by the administrative boundary of the Nez Perce-Clearwater. Because wolverines are wide-ranging, the analysis of cumulative effects is discussed in the context of the northern Rocky Mountains area.

Affected Environment

Population, Life History, and Distribution

In North America, wolverines are year-round residents across Alaska and Canada. The southern portion of the species' range extends into high-elevation alpine portions of Washington, Idaho, Montana, Wyoming, California, and Colorado. Wolverines occur at low densities, range widely, inhabit remote and rugged landscapes away from human populations, and are difficult to detect, so conducting research on wolverines is challenging (Idaho Department of Fish and Game 2014b). Wolverine populations in Idaho were heavily trapped in the early 1900s and were near extinction. Wolverine population growth and expansion has been documented in the North Cascades and northern Rocky Mountains (U.S. Department of the Interior 2014b). In Idaho, wolverines have been reported in 34 of 44 counties (77 percent) and presently occur in most, if not all, historically occupied habitat in Idaho (Idaho Department of Fish and Game 2014b).

Lukacs et al. (2020) conducted a multi-state occupancy study that sought to define the limits to the current distribution, identify potential gaps in distribution, and provide a baseline dataset for future monitoring and analysis of factors contributing to changes in the distribution of wolverines. They used remotely triggered cameras and hair snare DNA samples to develop spatial occupancy models within 183 of 633 potential wolverine sites that comprised suspected wolverine ranges in these four states. Wolverines were detected in 59 of 183 cells (32.2 percent). Based on occupancy calculations, it was estimated that 268 of the 633 cells (42 percent) were used by wolverines. Wolverines were detected via camera or DNA at another 31 supplemental stations for 93 cells with positive detections. Several cells were sampled within or near the Nez Perce-Clearwater, where both males and females were detected. Their results suggest wolverine habitat is weakly correlated with modeled wolverine habitat but that no other covariates examined were correlated with wolverine occupancy. Occupancy rates were highest in the Northern Continental Divide Ecosystem, intermediate in the Cascades and central mountains of Idaho, and lower in the Greater Yellowstone Ecosystem. However, reasons for the different occupancy rates are unknown. Wolverine was detected from 240 DNA samples obtained during the survey period, which included 202 samples from 51 official survey stations and 38 samples from 18 supplemental stations. Of these wolverine-positive samples, 145 (60 percent) were of sufficient quality to determine sex and to identify the individual. Both males and females were broadly distributed, and samples identified 26 unique females and 24 unique males. Results demonstrated that all of the large areas of predicted wolverine habitat within the four states contained wolverines.

A few other studies have been conducted on the Nez Perce-Clearwater that indicate wolverine use. In January through March 2018, a multi-species mesocarnivore survey was conducted throughout the Nez Perce-Clearwater, excluding wilderness and roadless areas. During this survey time, one wolverine was detected at one out of four camera stations located in modeled wolverine habitat near Lolo Pass. Two other samples of wolverine DNA were collected in 2015 from hair snare samples near the Adam Ranger Station. These samples were not high enough quality to determine sex or individual identities.

The Idaho Species Diversity Database records (accessed January 2019) show observations of wolverines and other wildlife in Idaho. In that database, a total of 66 observations of wolverines have been documented throughout the plan area from 1962 to 2015. From 1962 to 2015, observation frequency was relatively steady with an average of 1.2 observations per year with 0 to 11 observations recorded annually. Observations were the result of both incidental observations and targeted surveys and were composed of visual observations, tracks identified as wolverine, individuals in hand, and photographs.

According to the U.S. Fish and Wildlife Service (U.S. Department of the Interior 2014a), "within the area known to currently have wolverine populations, relatively few wolverines can coexist due to their naturally low population densities, even if all areas were occupied at or near carrying capacity. Given the natural limitations on wolverine population density, it is likely that historic wolverine population numbers were also low."

Wolverine populations fluctuate in response to prey availability, juvenile dispersal, and mortality of adult females. The U.S. Fish and Wildlife Service stated that the northern Rocky Mountains portion of the North American wolverine is thought to be the largest subpopulation and the most genetically resilient of the current subpopulations within the United States (U.S. Department of the Interior 2014b). Inman et al. (2013) estimated the current population, as well as the population capacity for regions of the western United States. The Nez Perce-Clearwater is in the Salmon-Selway region. They estimated that the current population in the Salmon-Selway region is near its capacity and estimated to be about 101 individuals out of a capacity of about 105 individuals. However, no recent research that would estimate population levels has been conducted for wolverine on the Nez Perce-Clearwater.

The Idaho Department of Fish and Game established wolverine priority conservation areas as a framework for managing wolverines in the state of Idaho. The areas across the state with wolverine habitat were categorized as Tier I, Tier II, or Tier III as a means to prioritize conservation work for wolverines. Nearly all the lands of the Nez Perce-Clearwater were identified as either Tier II moderate or Tier III low.

Wolverines are constantly on the move and are known to make long-distance movements that are not impeded by topography or deep snow (Copeland and Yates 2006, Squires et al. 2007) nor large rivers like the Salmon River (Idaho Department of Fish and Game 2019a). Copeland and Yates (2006) estimated that adult female wolverines have home ranges averaging 55 square miles. Adult males ranged over an even larger area, with home ranges that averaged 193 square miles (Copeland and Yates 2006). Home range boundaries are dynamic, as are population demographics.

Habitat

For wolverine habitat across the western United States, Inman et al. (2013) reported that, in general, wolverines are distributed in areas of higher elevation where there is steeper terrain, more snow, fewer roads, and less human activity and in areas closer to high-elevation talus, tree cover, and snow cover persisting to April 1. Year-round habitat includes rocky alpine habitats, glacial cirque basins, and avalanche chutes that provide food sources, such as marmots, voles, and carrion (Hornocker and Hash 1981, Magoun and Copeland 1998, Inman et al. 2007, Copeland et al. 2007). Wolverines appear to rely on the cold and snow to cache carrion (Inman et al. 2012). Wolverines also travel through the area where snow persists, and they minimize travel through low-elevation habitat (McKelvey et al. 2011). Persistent spring snow cover is also correlated with gene flow because this is where the wolverine's within-home-range movements and dispersal occur year-round (Schwartz et al. 2009).

Magoun and Copeland (Magoun and Copeland 1998) described two types of reproductive dens: natal dens where young are born and maternal dens where the mother may move the kits if conditions are no longer suitable at the natal den. Sites used for maternal dens are often close to the natal den and have a similar structure. Prior to the Glacier National Park study, not much was known about the den sites of reproductive female wolverines in Montana because den sites are often in remote terrain that is very difficult to study. During the first three years of the study, data was collected for 19 wolverines and information about reproductive dens was obtained for two adult females that raised four offspring (kits). Copeland et al. (2010) found that dens were excavated in the snow and were on upper slopes in sparse timber beneath downed woody debris or rocks. Dens are typically used through late April or early May. Females used two to three different dens prior to the weaning of kits at six to seven months of age. Kits gather at rendezvous sites that are primarily in boulder, talus, and cliff areas (Copeland et al. 2010). Survival of young was low, even in the National Park Service setting where trapping was not allowed and motorized disturbance did not occur in winter or spring. Wolverine den sites may not occur in the same exact spot year after year, and specific maternal or natal den sites on the Nez Perce-Clearwater are unknown.

Primary wolverine habitat is also characterized by low levels of human development (Hornocker and Hash 1981, Copeland 1996, Krebs et al. 2007). This negative association with frequent human presence is sometimes interpreted as active avoidance of human disturbance but it may reflect the wolverine's preference for cold, snowy, and high-elevation habitat that humans do not often develop. The U.S. Fish and Wildlife Service assessed the effects of a variety of human activities that can affect wolverines and their use of habitat.

The U.S. Fish and Wildlife Service (2013d) stated that it is unlikely that wolverines avoid the type of low-use forest roads that generally are found in wolverine habitat. Based on the best available science, the U.S. Fish and Wildlife Service concluded that wolverines do not avoid human development of the types that occur within suitable wolverine habitat and that there is no evidence that wolverine dispersal is affected by infrastructure development.

Krebs et al. (2007) modeled male versus female wolverine habitat selection in British Columbia, hypothesizing that food, predation risk, and human disturbance affected habitat selection. Krebs et al.

(2007) based their model on 39 adult wolverines—23 females and 16 males—that were located a total of 2,125 times within two study areas. These authors modeled selection in two time periods: winter and non-winter. The winter season was defined as the period when there was persistent snow cover at the treeline. Human use variables incorporated into the models included those associated with winter recreation activity, roads, and timber harvesting. Winter recreation data included estimates of snowmobile primary use sites, locations of runs for two helicopter skiing companies in the Columbia Mountains study area, and backcountry ski use centered on the Trans-Canada Highway corridor within and adjacent to Mount Revelstoke and Glacier National Park. These authors stated that extensive timber harvesting had occurred within a large portion of the study area. Krebs et al. (2007) concluded that male wolverines were most closely associated with food availability in both summer and winter. Moose winter ranges, valley bottom forests, and avalanche terrain were positively associated with winter male wolverine use.

Krebs et al. (2007) stated:

"Habitat associations of females were more complex; combinations of variables supporting food, predation risk, or human disturbance hypotheses were included in most supported models from both summer and winter in both study areas. Females were associated with alpine and avalanche environments where hoary marmot and Columbia ground squirrel prey are found in summer. Roaded and recently logged areas were negatively associated with female wolverines in summer. In the Columbia Mountains, where winter recreation was widespread, females were negatively associated with helicopter and backcountry skiing. Moose winter ranges within rugged landscapes were positively associated with females during winter. Our analysis suggests wolverines were negatively responding to human disturbance within occupied habitat. The population consequences of these functional habitat relationships will require additional focused research. Our spatially explicit models can be used to support conservation planning for resource extraction and tourism industries operating in landscapes occupied by wolverines."

Recreational Use in Wolverine Habitat

The threshold for the amount of human activity that can occur before it affects male and female wolverine habitat selection is unknown. Some scientists have expressed concern about the effects of human activities on female wolverines with young kits during the mid-February to mid-May time period because food resources are scarce for foraging females. As the kits mature, the mother will leave them for longer periods of time to find food, but the kits cannot travel with their mother until they are at least 10 weeks old. If a female wants to move kits to a new location or to another den, she must carry them in her mouth. If the female needs to move the kits very far, the probability of kits dying increases. Reproductive females and kits are at risk of predation (Magoun and Copeland 1998) and females are most vulnerable to energetic pressures due to the high cost of lactation during this period (Krebs et al. 2007). The predominant activity in some portions of wolverine habitat during this time period is backcountry recreation.

Winter backcountry recreation opportunities in the northern Rocky Mountains include snowshoeing, snowboarding, skiing, heli-skiing, snowcat- or trackster-assisted skiing and snowboarding, snow bikes, and snowmobiling. Studies of winter recreation have produced mixed conclusions. Wolverines have been documented to persist and reproduce in habitats with high levels of human use and disturbance, including developed alpine ski areas and areas with motorized snowmobile use (Heinemeyer 2012, Heinemeyer and Squires 2013). Heinemeyer and Squires (2014) stated "wolverines appear to tolerate winter recreation in their home ranges, including denning females. Based on our preliminary findings, potential wolverine habitats that have even high levels of winter recreation may support resident wolverines despite the potential human disturbance." This suggests that wolverines can survive and reproduce in areas that experience human use and disturbance; however, there is uncertainty with respect to the amount, type, and timing of human recreational use and its effects on female wolverines. Additional, more recent publications from this study are discussed below.

Heinemeyer et al. (2017) studied effects of winter recreation on wolverines in the Greater Yellowstone Area. They found that wolverines responded to backcountry winter use in different ways but, given the extent of overlap between winter recreation and wolverine distribution, suggested that wolverines tolerate winter recreation to some degree. In this study, wolverines reacted negatively to higher levels of recreation use in winter, with stronger responses to dispersed use than to use on designated routes, indicating that wolverines may have a higher tolerance for more predictable patterns of winter recreation use. Wolverines reacted to both motorized and nonmotorized winter recreation. However, since motorized equipment allows humans to travel further and faster than nonmotorized means of transport, motorized winter recreation could affect larger proportions of wolverine habitat.

Heinemeyer et al. (2019) suggested stronger negative responses to winter recreation than previous publications suggested. They fit GPS collars on wolverines to monitor responses to winter recreation and other resources in mid- and late-winter (January–March) and concurrently sampled the spatial patterns of winter recreationists with three methods: GPS tracking of volunteer recreationists, infra-red trail use counters, and aerial surveys. Datasets were obtained from Idaho, Wyoming, and Montana, spanning more than 1.1 million acres; however, the Nez Perce-Clearwater Land Management Plan area was not included. From the data, they developed resource selection functions for wolverines with a use: availability design to estimate the relative probability of selection, assess the effect of winter recreation on wolverine habitat selection, and evaluate indirect habitat loss from winter recreation. They also tested whether wolverines showed functional responses to winter recreation based on the relative intensity of winter recreation to which they were exposed. Winter recreation activities varied in the number of recreationists and types of recreation, and each study area had a unique combination of backcountry recreation, including snowmobiling; skiing, including snowboards; snowmobile-accessed skiing and boarding (hybrid); cat-skiing; heli-skiing; and yurt-supported skiing. They obtained collar data from 24 wolverines that were tracked between one and four years and obtained 53,301 locations used in the spatial modeling and 6,603 locations for model validation. They concurrently obtained 5,899 GPS tracks from a variety of winter recreation uses and obtained trail use estimates from 25 trail use counters to obtain recreation intensity.

Motorized recreation occurred at higher intensity across a larger footprint than non-motorized recreation in most wolverine home ranges. Wolverines avoided areas of both motorized and non-motorized winter recreation with off-road recreation, eliciting a stronger response than road-based recreation. Female wolverines exhibited a stronger avoidance of off-road motorized recreation and experienced higher indirect habitat loss than male wolverines. Wolverines showed negative functional responses to the level of recreation exposure within the home range, with female wolverines showing the strongest functional response to motorized winter recreation. Wolverines maintained multi-year home ranges within landscapes that support winter recreation and some resident animals had greater than 40 percent of their home range within the footprint of winter recreation. This suggests that wolverines tolerate winter recreation at some scale. However, within home ranges, wolverines avoided all forms of winter recreation and showed increasing avoidance of areas as the amount of off-road winter recreation increased, resulting in indirect habitat loss or degradation of moderate- or high-quality habitats. This study suggests indirect habitat loss, particularly to females, could be of concern in areas with higher recreation levels. Potential for backcountry winter recreation to affect wolverines may increase under climate change if the reduced snowpack concentrates winter recreationists and wolverines in the remaining areas of persistent snow cover.

Actual use by winter recreation or winter motorized users is likely less than where it is allowed because of vegetation characteristics, slope, terrain, and access from passable roads in the winter. The analysis and plan draw from several sources of information to evaluate the effects of winter recreation on wolverines. Actual winter use was estimated by a combination of information provided by winter motorized user groups, the distribution of groomed routes, and geospatial modeling that estimated the probability of winter recreation use based upon the preferences of winter recreators studied in Colorado (Olson et al. 2017). In Olson's study, the variables that predicted snowmobile use included topography, access, vegetation, and climate.

In order to better understand the probability of winter recreation use, the Rocky Mountain Research Station modeled the probability of use on the Nez Perce-Clearwater, using similar methods used by Olson et al. (2017). The values of the environmental covariates on the Nez Perce-Clearwater were sometimes far outside of the mean and range of the values that went into the Colorado model. That means that applying the model here was beyond the range of what it was trained on, and this can create unreliable predictions. In order to account for this, several models were produced and then validated. Two versions of the snowmobile models were created and two were created for backcountry skiing, one in which the covariates were standardized similar to Colorado and one in which they were standardized relative to the range of conditions on the Nez Perce-Clearwater. Standardizing is basically just a common modeling step which includes subtracting the mean and dividing by the standard deviation so that all the covariates are put into a similar scale.

Olson et al. (2017) created the following models for the plan area: a backcountry skiing model standardized to Colorado conditions, a backcountry skiing model standardized to Idaho conditions, an on-roads snowmobile model standardized to Colorado conditions, an on-roads snowmobile model standardized to Idaho conditions, an off-road snowmobile model standardized to Colorado conditions, and an off-road model standardized to Idaho conditions. All covariates were standardized by subtracting the mean and dividing by the standard deviation. In order to determine which model was the best fit for recreation on the Nez Perce-Clearwater, a team of Forest Service recreation specialists from each zone with on-the-ground knowledge of snowmobile and back country skiing use was assembled to evaluate the models. As part of that exercise, spatial data was used to further evaluate the models. The data used included groomed routes, maps of the plan area, and data provided by recreation groups on where they go. The model identified as the best fit in the North and Central Zones was the Idaho Standard off-road model. This model was also the best fit to the user data provided by snowmobile user groups. However, specialists felt the model over projected snowmobile areas in the South Zone. The specialists felt the Idaho Standard backcountry skiing model was the best fit for backcountry skiing in the plan area but that some known groomed routes were not showing in the model.

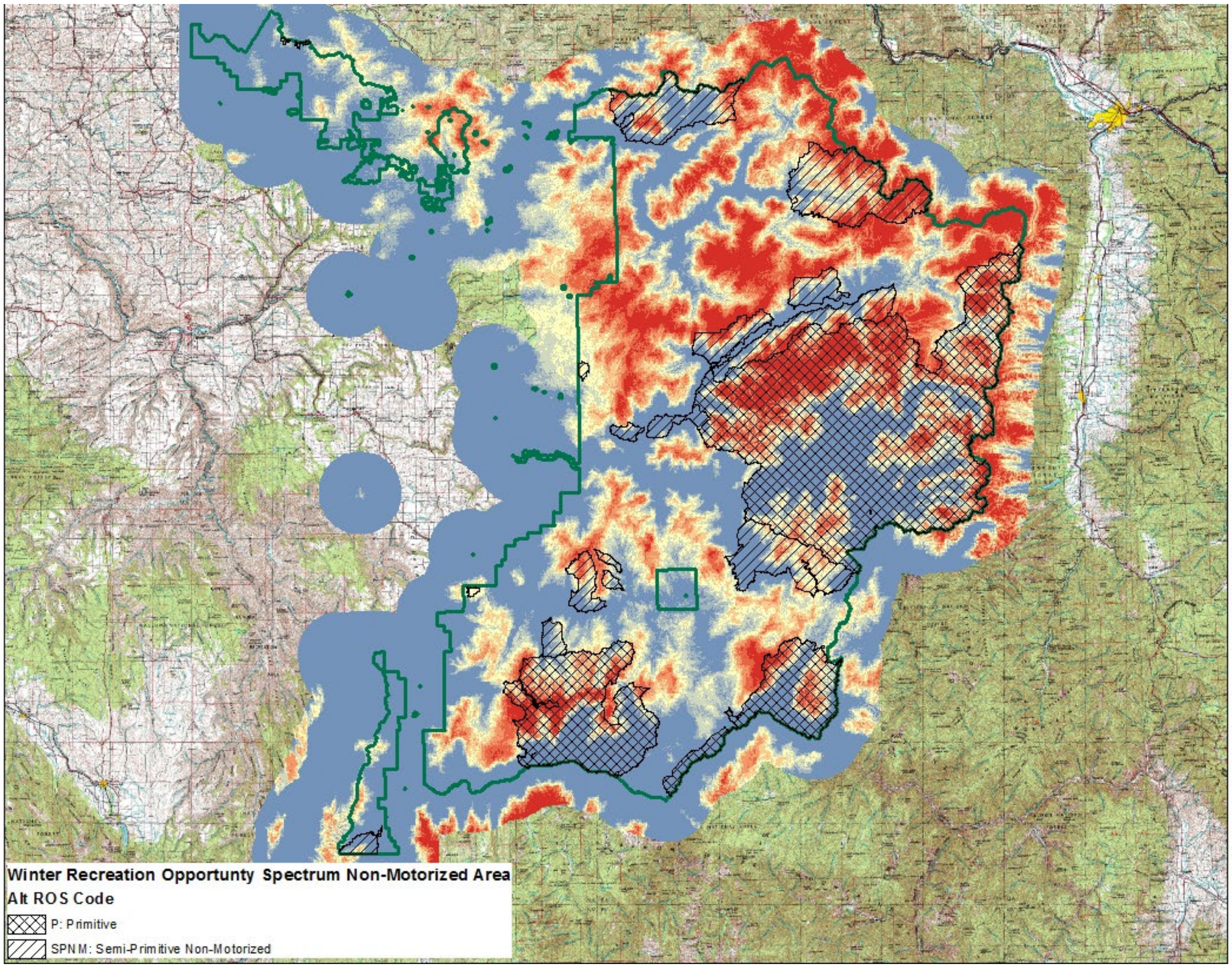


Figure 89. The Idaho Standard off road Snowmobile model developed by Lucretia Olson to estimate snowmobile user selection on the Nez Perce-Clearwater National Forest. Warmer colors represent areas where snowmobilers are predicted to select to use, where cooler colors represent areas snowmobilers might not select based on user preferences from Colorado. Crosshatched and line shaded areas would be non-motorized for winter recreation under the Preferred Alternative.

These models suggest variability in the probability of snowmobile and backcountry skiing use at any given location. These are probabilistic models that represent only the relative probability of use. The models only account for the area that has the terrain and access features that would promote use and does not represent administrative decisions about where that use is allowed. For example, some areas in the Selway-Bitterroot Wilderness were identified, but motorized over-snow use is not allowed. The models represent a smaller footprint of where snowmobile use has a high probability of occurrence than where snowmobile use is allowed under the No Action Alternative. Under the No Action Alternative, most roadless rule and general forest areas are open to winter recreation. In reality, lower elevation areas and steep slopes are shown in the model as having a low probability of use even though they are technically open to that use. Similarly, areas with heavy tree cover show a low probability of use. There could be some variability in the model predictions for various users. Highly skilled users might be able to use areas of lower model values, whereas average users might be more constrained.

Some precautions are in order about the application and interpretation of these models to the Nez Perce-Clearwater. First, Olson et al. (2017) developed these winter recreation models in Colorado where conditions and use patterns may differ from those in on the Nez Perce-Clearwater. In developing the models, Olson et al. (2017) used the mean and standard deviation from Colorado to make the conditions similar to what the model expected or the mean and standard deviation from Idaho to allow for the differences in environmental conditions there. These models were developed for snowmobiles and backcountry skiing but do not predict winter motorized use on machines like snow bikes. It should be noted that, in Colorado, the model was validated statistically with GPS snow tracks of actual use. The validation of Nez Perce-Clearwater models used expert opinion and polygons provided by the user groups that were delineated onto maps and then transferred to an electronic format. These validation methods are not likely as robust as those generated from statistical methods. Since this is a “relative” probability that means that inference cannot be applied from the actual predicted number, meaning a value of 0.5 does NOT mean a 50 percent probability. Because of this, the predictions were binned into 10 equal area intervals, which means that 10 percent of the area is in each bin. That way, a location in bin 1 is known to be in the lowest 10th percentile of probabilities (“bad” rec habitat), while a location in bin 10 is in the highest 10th percentile of probabilities (“good” rec habitat). Depending on where the breakpoints are, the model can over project or under project actual use. Models would have to be created and evaluated with actual use data to identify a threshold probability at which use is not preferred. The best way to interpret the model is that the areas with the highest percentiles likely are the easiest or most enjoyable to use, or the most accessible, while those in lower bins might be interpreted as more difficult or unpleasant to use, or where there is little access. The model does not predict use intensity or actual use in the plan area. It only predicts where people might want to go based on the model parameters. The model could be useful for a variety of purposes, including understanding the effects on users when areas are found unsuitable for winter recreational uses, understanding areas where there might be user conflicts, identifying new areas that could provide winter recreation, identifying areas that could be improved by management for winter recreation, or, as in this case, understanding the potential effects of recreation on resources, such as wildlife habitat.

The models were used as a guide or a piece of information to consider, but they were not used alone in evaluating the potential effects of the plan and alternatives. Other sources of information included snowmobile user data; wildlife habitat models; administrative boundaries, such as those from recommended wilderness; the presence of known groomed routes or use areas; the presence of roads and trails; and other information. It is likely that areas predicted to be higher probability winter recreation use areas could be constrained by topographic barriers that preclude use, even when predicted to have high relative probabilities by the model.

Interestingly, the areas modeled as wolverine habitat visually coincide with areas the model predicts as having a higher winter recreation relative probability, though this was not quantified. This is likely because the model identifies higher probabilities, in part by snow depth and elevation, where wolverines are known to prefer to reside. A map of the winter habitat models is shown in the figures below.

In areas open to motorized over-snow vehicle use, the amount of use has likely increased over the last few decades due to technical advances in motorized over-snow vehicles and human population growth though this has not been quantified nor have the effects to wolverine. Backcountry skiing has also increased in popularity.

Connectivity and Wolverine Habitat

Cegelski et al. (2006) found wolverines in Idaho to have the lowest genetic diversity levels among eight populations evaluated across the Rocky Mountains and high levels of genetic structure. They concluded, despite some evidence of immigration of wolverines from Canada to the United States, Idaho populations were genetically isolated, even from populations in Montana. However, the sample size used for evaluating the Idaho population was small (sample size is 15) and limited to central Idaho (USFWS

2018). Overall, wolverines in the Northern Rockies exist as small and semi-isolated subpopulations within a larger metapopulation that requires regular dispersal of individuals between habitat patches for maintenance (Aubry et al. 2007, Inman et al. 2013). Mitochondrial analysis provides support that all contiguous United States historical and contemporary wolverine populations are likely descendants of immigrants from Canada (U.S. Department of the Interior 2018b). The U.S. Fish and Wildlife Service considers wolverines that occupy the contiguous United States to be genetically continuous with wolverines in adjacent Canadian provinces and that wolverines are not genetically isolated from wolverines in Canada (U.S. Department of the Interior 2020c).

Inman et al. (2013) reported that the United States' Northern Rockies include most of the major core areas, the majority of the current population, and connections to larger populations in Canada. They identified six regions that can likely function as major population cores where primary habitats exist as large blocks of relatively contiguous, publicly owned lands that include significant portions of designated wilderness or National Parks, and are capable of supporting 50 or more wolverines. These are the Northern Cascade, Northern Continental Divide, Salmon-Selway, Greater Yellowstone, Southern Rockies, and Sierra-Nevada regions. Maps in Inman et al. (2013) suggest the plan area retains high levels of connectivity both within the plan area and to other wolverine regions.

Inman et al. (2013) stated "the greatest potential for wolverine dispersal was concentrated in western Montana and along Montana's borders with Idaho and Wyoming proximate to this area." This modeling suggests the Nez Perce-Clearwater provides, and will continue to provide, for connectivity because it is a large contiguous block of publicly owned land that contains high amounts of wilderness and roadless areas. Schwartz et al. (2009) mapped wolverine connectivity with least cost path methods. Predicted connectivity was highest in the plan area along the Idaho-Montana border. Schwartz et al. (2009) identified the Bitterroot Mountains between Montana and Idaho as a critical artery of gene flow. This area genetically links wolverines of central Idaho to those in the Bob Marshall Wilderness and Glacier National Park in Montana and through them on to Canada.

Key Stressors

Land Management

Few land management activities are thought to affect wolverines. Those thought to have some effects include recreation activities, in particular winter recreation. Wolverines are adaptable and generally tolerant of human recreation activities but there is scientific uncertainty about the types of winter recreation activities and the amount of disturbance that may affect female wolverines with kits.

Trapping

Trapping wolverines has been prohibited in Idaho since about 1965. Fourteen incidentally trapped wolverines have been reported during Idaho furbearer seasons since 1965. Eight of the incidental catches were released alive and six resulted in mortality. From 1965 to 2014, non-target catches accounted for an average of 0.29 wolverines annually with 0.12 wolverine catches resulting in mortality (McKelvey et al. 2014). This count included four wolverines incidentally trapped during the 2013 to 2014 furbearer season. These statewide numbers suggest that incidental trapping of wolverine is rare in Idaho. The effects from incidental trapping are largely outside of Forest Service control, except in regard to how access decisions inadvertently facilitate or impede trapping activities.

Highways

The Idaho Transportation Department has authority to manage highways on the Nez Perce-Clearwater. Wolverine mortality from collisions with vehicles has occurred in the state but at low levels. Wolverines do not usually come into contact with high-traffic-volume roads, except in those areas where highways cross over mountain ranges, such as major passes. Wolverines killed on roads in valleys between mountain ranges are likely the result of dispersal attempts by wolverines, but these appear to be rare occurrences (U.S. Department of the Interior 2013c). The Nez Perce-Clearwater contains Lolo Pass and Hoodoo Pass, which may have a higher chance of a wolverine strike. Most of Highway 12 and Highway 14 occur at lower elevation not considered primary habitat, but a wolverine crossing through the plan area might have to cross these highways. The U.S. Fish and Wildlife Service (2018b) evaluated roadkill and concluded "Roads present a low stressor to wolverines at the individual and population level in most of its current contiguous United States range." Their basis for that conclusion was that there was a low proportion of major highways in both modeled primary habitat and a low mean density of roads at high elevations where wolverines have been observed. They suggest that the effects of roads continue to be at low levels in the future and that there is no information that indicates that mortality from roads or disease would increase within the range of wolverine in the contiguous United States in the future.

Changing Climate

Climate change and inadequate regulatory mechanisms related to climate change is the only primary threat to the wolverine distinct population segment (DPS) identified by the U.S. Fish and Wildlife Service. Other threats were classified as secondary as they may work in concert with climate change to affect the conservation status of the species (U.S. Department of the Interior et al. 2013).

The Species Status Assessment identifies abiotic and biotic factors when assessing the impact of climate change on wolverines. On abiotic factors it concludes:

> Observed trends and future climate model projections indicate warming temperatures for much of the western United States, including areas within the Current Potential Extent of the wolverine. The degree of future warming varies by region and is dependent upon the future emission scenario used during the modeling process. Future precipitation trends are less certain for many regions, in part, due to naturally high inter-annual variability; some regions are projected to experience greater winter precipitation. Wolverines have been found to have a wide range in critical temperature depending on season and undergo seasonal changes in fur insulation to adapt to warmer temperatures in summer. Wolverines also exhibit changes in behavior, such as moving to higher elevations in summer months. Wolverines continue to occupy areas that have exhibited increases in temperature (e.g., California, parts of Montana and Washington); however, no empirical studies have evaluated these physiological and behavioral adaptations, including sub-lethal effects, relative to warming temperatures.

The 2013 proposed rule for the North American wolverine identified threats to the long-term persistence of the species. The primary threat, at that time, was determined to be potential changes in climate (U.S. Department of the Interior 2016), including effects on connectivity of meta-populations. The U.S. Fish and Wildlife Service is currently evaluating potential changes in climate within wolverine habitat based upon more refined models. The effects of climate change are outside Forest Service control, though the Forest Service has the authority to manage other activities that could affect changing wolverine habitats through time.

Although the goods and services provided by National Forest System programs and activities have been and will undoubtedly continue to be affected by climate change, the activities described in the Preferred Alternative and action alternatives are not the cause of climate change. Some activities and direction in the plan can mitigate the effects of climate change or act as a sink for greenhouse gases that contribute to climate change. While the agency has no authority over climate change, climate change can interact with Forest Service activities to exasperate effects of climate change on wolverines. For example, climate change could interact with winter recreation potentially concentrating winter recreation activities into a smaller intensified areas that would be increasingly important to wolverines in the future. Similarly, climate change can interact with wildfire behavior and conditions that result in higher severity acres burned. The desired vegetation conditions can drive management to increase vegetation resiliency to the effects of climate change.

Activities in the plan that could interact with the effects of climate change are the suitability of winter motorized uses within wolverine habitat, plan components for recreation, the coarse filter ecosystem plan components for terrestrial ecosystem, and plan components related to fire management.

Key Indicators

Coarse filter plan components provide for habitat diversity that benefits wolverines. Key stressors on all lands are discussed in the section on cumulative effects to the wolverine. There are no species-specific plan components proposed in the plan for wolverine. Most of the wolverine habitat already falls within either designated wilderness or Idaho Roadless Rule areas. Alternatives affect the amount of recommended wilderness and the uses allowed within recommended wilderness, which can affect the amount of wolverine habitat that would be affected by a number of activities common on Forest Service lands. The alternatives affect the amount of areas identified as motorized or non-motorized under the recreation opportunity spectrum. Thus, a key indicator is the amount of wolverine habitat contained within the various management areas, recommended wilderness areas, roadless rule areas, and areas within the various recreation opportunity spectrum settings that govern the scope of potential disturbance. The scope is determined by the extent to which the amount of wolverine habitat falls within the management areas, recreation opportunity spectrum settings, recommended wilderness proposed by alternative, and the risk of human disturbance to wolverines from suitability of uses allowed under the alternatives in recommended wilderness, Idaho Roadless Rule areas, and general forest. The severity of the effects is influenced by the extent to which these disturbances reduce the population or the extent to which it would reduce wolverine habitat.

Environmental Consequences

Effects Common to All Alternatives

All alternatives include plan components designed to maintain or restore diverse, resilient vegetation conditions that would provide for wolverine prey species. As described in the “Affected Environment” section above, research results suggest that wolverines are generally tolerant of human disturbance associated with recreation developments and activities (Heinemeyer and Squires 2014). The thresholds for the amount of development or human recreational use that individual wolverines will tolerate in their home ranges is unknown. With all alternatives, plan components would support key ecosystem characteristics for wolverines because a substantial amount of modeled wolverine habitat is in designated wilderness (Table 229). In wilderness, the risk of human disturbance is low because motorized uses and mechanized transport, such as snowmobiling, helicopter-assisted skiing or snowboarding, and snow bikes, are not allowed.

Table 229. The acres of modeled primary and maternal wolverine habitat within designated wilderness within the Nez Perce-Clearwater National Forest

Wilderness Name	Primary Wolverine Habitat Acres	Maternal Wolverine Habitat Acres
Frank Church-River of No Return Wilderness	23,894	8
Gospel-Hump Wilderness	48,539	358
Selway-Bitterroot Wilderness	524,630	303,616

Wilderness Name	Primary Wolverine Habitat Acres	Maternal Wolverine Habitat Acres
Total	597,063	303,982

The forest planning area under the action alternatives is broadly divided into three management areas with similar management. Management Area 1 is composed of lands designated by congress with high levels of protection. Land under this broader management area includes designated wilderness direction, designated wild and scenic river direction, and direction for the National Historic Landmark. Management Area 2 includes management of Idaho Roadless Rule and areas that are proposed for designation such as Recommended Wilderness, Research Natural Areas, and eligible and suitable wild and scenic rivers. Management Area 2 has a range of protective measures but can generally be characterized as moderate amounts of protections. Management Areas 1 and 2 are discussed in more detail below. Table 230 shows the amount of modeled wolverine habitat within the three management areas.

Perhaps, of the most relative importance, in terms of potential impacts, is the distribution of wolverine habitat within Management Area 3. Management Area 3 are lands managed for multiple uses and thus is the management area most likely to experience a wide array of human activities and uses. A wide variety of activities like timber production, motorized uses, snowmobile use, recreation, and more will occur within Management Area 3. These will affect relatively little of the wolverine habitat within the plan area. The table below shows the amounts and percentage of primary wolverine habitat that is distributed within the three broad management areas. Since only approximately 7 percent of wolverine habitat is within Management Area 3, only that amount will experience the most intense effects of human disturbance, dispersed recreational activities, infrastructure development, road development, and has the most access related to trapping. The other land allocations are protected to various degrees and are not expected to experience as many or as much of these types of activities as explained further below. Of more importance, most maternal habitat also is contained within protective land allocations and management which is also shown in Table 230.

Table 230. The distribution of modeled wolverine primary habitat under the compared to the existing condition

Management Area (MA)	Acres of Modeled Primary wolverine habitat within management areas	Percent of Modeled Primary wolverine habitat within management areas
MA1	623,830	46.76%
MA2	616,921	46.24%
MA3	93,487	7.01%

Land allocations would support key ecosystem characteristics for wolverines because about 44.7 percent of modeled primary wolverine habitat, along with 40.3 percent of modeled maternal wolverine habitat, is in designated wilderness. Plan direction for wilderness management emphasizes managing for wilderness character. In wilderness, the risk of human disturbance is low because motorized uses and mechanized transport, such as snowmobiling, helicopter-assisted skiing or snowboarding, and snow bikes, are not allowed. Plan direction for the recommended wilderness would have beneficial effects for wolverine.

The majority of the modeled wolverine habitat occurs in designated wilderness areas or in Idaho Roadless Rule areas (Table 231). On the Nez Perce-Clearwater, about 597,017 acres of modeled primary wolverine habitat and 303,982 acres of maternal habitat is in designated wilderness where motorized uses, including snowmobiling, helicopter-assisted skiing or snowboarding, and track steer-assisted skiing or snowboarding, are not suitable uses and thus would not be allowed. Nonmotorized uses, such as backcountry skiing, are not restricted in wilderness or recommended wilderness. However, it is also difficult to access for non-motorized winter recreation because much of the wilderness area on the Nez Perce-Clearwater is large and remote and access points are limited. Wilderness areas provide habitat where the risk of human disturbance to wolverines is very low during the time period when females have dependent young. The management direction within wilderness prevents or reduces threats from human disturbance, dispersed recreational activities, infrastructure, transportation corridors, land management (except prescribed burning), and reduces access to trapping. They also provide connectivity to conserve effects of small populations and genetic diversity.

Table 231. The acres of modeled maternal wolverine habitat within various land allocations

Land Allocation Type	Acres of Modeled Maternal Wolverine Habitat	Percentage of the Total amount of Maternal Habitat
Management Area 2- Idaho Roadless Rule	409,205	54.3
Management Area 2- Research Natural Area	3,202	Less than 1%
Management Area 1-Designated Wild and Scenic Rivers	2	Less than 1%
Management Area 2- Suitable Wild and Scenic Rivers	7,538	1
Management Area 1- Designated Wilderness	303,982	40.3
Management Area 2- Recommended Wilderness	83401	11
Management Area 3-General Forest Managed for Multiple Uses	35,036	4.6

Note: Total wolverine maternal habitat equals 753,576 acres. The amounts add up to more than the total because several land management allocations overlap. For example, Recommended wilderness overlaps with Idaho Roadless Rule Area. Also, Research Natural Areas, and some Suitable Wild and Scenic Rivers overlap wilderness areas, recommended wilderness or Idaho Roadless Rule Areas.

The amount of modeled wolverine habitat by Idaho Roadless Rule area theme is displayed in Table 232. Idaho Roadless Rule areas restrict some management activities, such as road building, vegetation management, and some mineral activities. These land allocations would protect wolverine habitat from experiencing these types of activities. The different Idaho Roadless Rule themes vary in the activities they constrain. The plan will not change Idaho Roadless Rule distribution, and all action alternatives implement the Idaho Roadless Rule as core direction. As a result, management activities disallowed under the Idaho Roadless Rule will continue to be prohibited. The Idaho Roadless Rule area themes are not going to change under the Preferred Alternative either. Idaho Roadless Rule areas direction reduces or prevents infrastructure as it addresses some type of mining, transportation corridors (prohibits road building), and land management (constrains timber harvest). Because road construction is constrained, access is constrained which reduces some human disturbances, and access to trapping. Thus, a little more than half of the wolverine habitat has some protections against some of these activities. These restrictions are enforced by suitability plan components (see forest plan suitability tables in Land Management Plan for the specific restrictions and allowances for Idaho Roadless Rule Areas). Approximately 47.5 percent (634,380 acres) of modeled primary wolverine habitat falls within Idaho Roadless Rule areas. Approximately 54.3 percent of modeled maternal habitat is within Idaho Roadless Rule areas. The alternatives vary how much of the Idaho Roadless Rule lands would also be within recommended wilderness, which would add extra protections. The recommended wilderness areas discussed below are also Idaho Roadless Rule areas as they overlap. Thus, in some Idaho Roadless Rule areas are additionally protected by the constraints present in recommended wilderness as discussed below. Under the Preferred Alternative, 20.3 percent (or 83,401 acres) would also be recommended wilderness.

Winter motorized recreation would be a suitable use within Idaho Roadless Rule Areas unless they are also within recommended wilderness or are identified as non-motorized in the winter Recreation Opportunity Spectrum settings. Non-motorized winter recreation is also suitable within Idaho Roadless Rule Areas. The effects of winter recreation include displacement, avoidance behavior and disturbance effects, but does not typically result in direct mortality. Thus, about half of the wolverine habitat within the plan area would be subject to the effects of winter recreation. However, many areas where wolverine habitat is suitable for motorized winter recreation are steep or has forested vegetation which reduces or eliminates the probability of motorized recreation, which provides refuge areas from this activity. Plan direction for Idaho Roadless Rule Areas would contribute to the conservation of wolverine and their habitats and provide the ecological conditions for wolverines.

Table 232. Acres of modeled primary and maternal wolverine habitat within Idaho Roadless Rule areas by roadless rule area theme

Idaho Roadless Rule Area Theme	Acres of Modeled Primary Wolverine Habitat	Acres of Modeled Maternal Wolverine Habitat
Backcountry Restoration	299,809	205,795
Land Management Plan Special Area	2,347	1,648
Primitive	130,711	77,097
Special Area of Historic or Tribal Significance	18,006	10,090
Wild Land Recreation	183,507	114,535
Grand Total	**634,380**	**409,205**

Summary Alternative Consequences

The amount of modeled maternal wolverine habitat within recommended wilderness is shown in Table 233 while the amount of primary wolverine habitat is shown in Table 234. Under the No Action Alternative, approximately 162,310 acres of wolverine habitat occur within recommended wilderness, which are all currently also wildland recreation theme Idaho Roadless Rule areas and represent about 12.2 percent of wolverine habitat in the plan area. Over-snow motorized vehicles are currently not allowed within recommended wilderness. Alternative W would have the most modeled primary and maternal wolverine habitat included as recommended wilderness and would be the best for wolverines. The lowest alternative is Alternative X which has no recommended wilderness and so has no modeled wolverine habitat. The Preferred Alternative has the second least amount of modeled maternal wolverine habitat in recommended wilderness. Alternative Y would have 148,861 acres of wolverine habitat, which is 11.2 percent forestwide, and Alternative Z would have 297,293 acres, or about 22.3 percent, of wolverine habitat. The Preferred Alternative is similar to Alternative Y, except the boundaries of the Hoodoo are slightly different compared to Alternative Y. The boundaries of the Preferred Alternative are also slightly different than those in the No Action Alternative. The Preferred Alternative would have 140,761 acres of modeled primary wolverine habitat, which would make up 10.5 percent of the total primary wolverine habitat forestwide. There is little difference in management for recommended wilderness and management under the Idaho Roadless Rule backcountry recreation theme, other than whether over-snow motorized recreation and mechanized travel is allowed. These numbers would be additional to the 39.6 percent of wolverine habitat in designated wilderness. Thus, between 39.6 and 68 percent of the wolverine habitat in the plan area would have a low risk of human disturbance in areas of modeled wolverine habitat, depending upon which alternatives are selected.

The Preferred Alternative's boundary change in included some additions and some subtractions in the Hoodoo. The change resulted in approximately 13,747 acres less primary wolverine habitat and 12,131 fewer acres of maternal habitat within the Hoodoo recommended wilderness area compared to the No Action Alternative. The reduction amounts to about 1 percent of the total primary wolverine habitat and about 1.6 percent of the total maternal wolverine habitat within the plan area. While they will no longer be recommended wilderness, they will be managed as Idaho Roadless Rule Wildland Recreation theme, the most restrictive theme of the Idaho Roadless Rule.

Table 233 and Table 234 show the acres of primary and maternal wolverine habitat in recommended wilderness under the 1987 plans compared to the action alternatives. The action alternatives differ from one another in how much habitat is within recommended wilderness. The Preferred Alternative includes about 10.5 percent of primary habitat and about 11.1 percent of maternal wolverine habitat as recommended wilderness. Even though the amount of recommended wilderness increases under the Preferred Alternative, the amount of wolverine habitat within recommended wilderness decreases on account of a boundary change in the Hoodoo and Mallard Larkin recommended wilderness areas and because North Fork Spruces-White Sand and Sneakfoot Meadows would no longer be considered recommended wilderness. The addition of the Meadow Creek recommended wilderness does not add much modeled primary and maternal wolverine habitat because of its lower elevations. The Hoodoo recommended wilderness area contributes the most acres of maternal wolverine habitat of the recommended wilderness areas. The overall change represents about 21,549 acres less of primary habitat and 24,842 acres of maternal habitat that will not be recommended wilderness compared to the No Action Alternative. However, modeled wolverine dispersal habitat within recommended wilderness will increase because most of the Meadow Creek Recommended Wilderness Area is female wolverine dispersal habitat. More modeled female maternal habitat in recommended wilderness would better conserve the wolverine because these areas would receive greater protection against development and human disturbances, such as winter recreation.

Table 233. The acres of modeled maternal wolverine habitat within recommended wilderness under the 1987 Forest Plans and the alternatives

Recommended Wilderness	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z	Alternative X
Bighorn - Weitas	0	0	115,249	0	0	0
East Meadow Creek	0	0	1,286	1,286	1,242	0
Hoodoo	58,565	46,434	69,129	40,815	68,338	0
Mallard-Larkins	35,841	36,951	38,627	38,631	38,173	0
Meadow Creek	0	17	0	0	0	0
Meadow Creek - Upper North Fork	0	0	27,285	0	26,787	0
Moose Mountain	0	0	10,539	0	0	0
North Fork Spruce - White Sand	5,975	0	16,253	0	8,405	0
North Lochsa Slope	0	0	15,260	0	0	0
Pot Mountain	0	0	0	0	18,209	0
Rawhide	0	0	0	0	1,437	0
Sneakfoot Meadows	7,862	0	19,173	0	16,372	0
Grand Total	**108,243**	**83,401**	**312,801**	**80,732**	**178,964**	**0**

Table 234. The acres of modeled primary wolverine habitat within recommended wilderness in the existing condition compared to the Preferred Alternative

Recommended Wilderness Area	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z	Alternative X
Bighorn - Weitas	0	0	164,053	0	0	0
East Meadow Creek	0	0	18,695	18,695	18,417	0
Hoodoo	94,345	80,598	119,830	73,740	117,663	0
Mallard-Larkins	49,143	51,651	55,372	55,378	54,101	0
Meadow Creek	0	8,512	0	0	0	0
Meadow Creek - Upper North Fork	0	0	38,236	0	37,186	0
Moose Mountain	0	0	13,048	0		0
North Fork Spruce - White Sand	9,358	0	29,123	0	13,085	0
North Lochsa Slope	0	0	28,276	0	0	0
Pot Mountain	0	0		0	29,495	0
Rapid River	0	0	1,048	1,048	1,048	0
Rawhide	0	0		0	3,965	0
Sneakfoot Meadows	9,465	0	23,330	0	19,609	0
West Meadow Creek	0	0	0	0	2,724	0
Total	**162,310**	**140,761**	**491,013**	**148,861**	**297,293**	**0**

Allocations of recommended wilderness in the Preferred Alternative were in part informed and influenced by the distribution of wolverine habitat. For the Preferred Alternative, of the 47.5 percent (634,380 acres) of modeled primary wolverine habitat in Idaho Roadless Rule Areas, there are about 140,761 acres (22.1 percent of acres in roadless rule) that are recommended wilderness. A total of 83,401 acres of modeled maternal wolverine habitat occurs within recommended wilderness under the Preferred Alternative. Winter motorized recreation is not allowed in recommended wilderness or designated wilderness under the Preferred Alternative. Recommended Wilderness areas are nearly as protective as wilderness areas. They constrain most of the same types of activities that wilderness areas constrain. Within recommended wilderness, wolverine habitats would be protected from motorized winter recreation. Recommended wilderness would provide good protection against disturbance. About 51.3 percent of maternal habitat would be within either designated wilderness or recommended wilderness combined. In addition, about 634,451 acres of modeled primary wolverine habitat and 409,205 acres of modeled maternal wolverine habitat is in Idaho Roadless Rule areas where suitability plan components constrain road building and timber harvest.

Former Hoodoo Recommended wilderness areas would be within Semi-Primitive Motorized settings and would be suitable for winter motorized uses. Summer motorized uses would be constrained by MA2-SUIT-IRA-03 which specifies that roads are suitable in these areas only under strict conditions specified in the Idaho Roadless Rule where they areas are mapped as Semi-Primitive Non-motorized in the summer recreation opportunity spectrum settings. Therefore, summer motorized uses would not be suitability in these formerly recommended wilderness areas. Specific effects from this change are that future travel planning projects might open these areas to winter motorized uses, and if so, wolverines could experience disturbance and displacement because of winter motorized uses. Furthermore, if winter motorized uses are authorized there in the future, allowing winter motorized access in these areas potentially increases the chance of illegal winter motorized uses by the public in adjacent recommended wilderness. However, the public use of adjacent recommended wilderness areas for winter motorized uses is not authorized, and restrictions on this illegal use will be reduced through law enforcement. More details on the effects of winter motorized uses are included in the section on the summer and winter recreation opportunity spectrum of the wolverine analysis below.

Connectivity has been identified as an important facet to wolverine conservation (Schwartz et al. 2009, Idaho Department of Fish and Game 2014b) and recommended wilderness alternatives could contribute to connectivity. The different proposed recommended wilderness areas differ in the extent to which they provide connectivity. The areas that provide the best connectivity for wolverine are:

- Hoodoo
- Meadow Creek - Upper North Fork
- Rawhide
- North Fork Spruce - White Sand
- Sneakfoot Meadows

As noted above, the most important areas for connectivity on the Nez Perce-Clearwater are along the Idaho-Montana border. Other areas that are important for connectivity are along the ridges above the Salmon River between Sabe Creek and MacKay Bar. The area above the Salmon River is already designated wilderness. Those alternatives that propose recommended wilderness lands in these areas would provide more connectivity than those that do not. Recommended wilderness areas that occur along the Idaho-Montana Border include Hoodoo, Meadow Creek Upper North Fork, and Rawhide. The No

Action Alternative, Alternative W, Alternative Y, Alternative Z, and the Preferred Alternative all include all, or a portion, of Hoodoo as recommended wilderness; only Alternative X does not. However, the alternatives vary by how much of the Hoodoo area is included as recommended wilderness.

Collectively, Alternative W provides the greatest area important to wolverine connectivity (Schwartz et al. 2009, U.S. Department of the Interior 2014b) while Alternative X provides the least amount with zero. Alternative Z provides just slightly less acres than Alternative W followed by the No Action Alternative. Alternative Y is second to last. The Preferred Alternative is intermediate in providing connectivity but includes the Hoodoo and adds connection between the Selway-Bitterroot, the Gospel-Hump, and the Frank Church by adding the Meadow Creek recommended wilderness area. These recommended wilderness areas, combined with designated wilderness areas, include most of the areas in the Nez Perce-Clearwater identified by Schwartz et al. (2009) as important to wolverine connectivity, save for the checkerboard area near Lolo Pass. These areas also contain some of the areas in the national forest that may provide denning habitat for female wolverines.

While recommended wilderness provides the greatest amount of protection of connectivity areas, the management under the Idaho Roadless Rule would keep these lands relatively free from human development, which is the primary cause of loss of connectivity.

The checkerboard area appears to be an important connectivity area for lynx, fisher, and wolverine. Desired conditions FW-DC-LND-01 would apply to decisions about this area. Land ownership, rights-of-way, and conservation easements allow the Nez Perce-Clearwater to meet Land Management Plan desired conditions, provide access for recreation, and facilitate restoration or conservation of high value resources, including habitat for Species of Conservation Concern and listed fish and wildlife species and significant cultural sites.

While modeled primary wolverine habitat predicts wolverine habitat across the landscape, female maternal habitat is more important and thought to be more limited. Protecting maternal habitat may be important to the conservation of the wolverine. Copeland et al. (2010) modeled female denning habitat based upon female den locations across the global range of the wolverine (Copeland et al. 2010). The modeled female denning habitat was based upon the amount of persistent spring snow. Copeland et al. (2010) produced a model that delineated areas of the western United States predicted to be maternal wolverine habitat, which are areas predicted to be suitable for use by reproductive females. Areas that have persistent spring snow are much more limited and could be important for wolverine denning.

The alternatives differ in how much maternal habitat is included in recommended wilderness. Table 233 shows the amount of maternal habitat found within the different areas considered for recommended wilderness and by alternative. The best alternative for maternal habitat is Alternative W, followed by Alternative Z, then the No Action Alternative, then the Preferred Alternative and last is Alternative Y.

Suitability plan components identify a number of activities that are or are not suitable (and thus not allowed) within different land allocations including recommended wilderness (see suitability table in the Recommended Wilderness Section of the Revised Forest Plan) and these varied by alternative. Recommended wilderness management is only slightly less restrictive than designated wilderness management. This type of management would protect wolverines from disturbance and habitat impacts within recommended wilderness. Recommended wilderness management protects wolverine habitat from many human disturbances, dispersed recreation activities (except those accessed by foot or stock), transportation corridors, and land management activities (except prescribed fire). They also reduce the access to trapping and conserves connectivity to assist with effects of small populations. Whether over-snow vehicle use is allowed within recommended wilderness varies by alternative as shown in Table 235.

Under the No Action Alternative, Alternative W, and Alternative Y, over-snow motorized travel would not be allowed in recommended wilderness. Within Alternative X, it is not applicable because there would be no recommended wilderness. While under Alternative Z, over-snow travel would be allowed in recommended wilderness. If allowed, it would have disturbance and displacement effects on female wolverines. The Preferred Alternative would not allow motorized over-snow travel to be suitable within recommended wilderness. A few other uses vary as to their suitability in recommended wilderness such as mechanized tool use for administrative purposes, mechanized tools for public use, mechanized travel, aircraft landing for administrative uses, and aircraft landing for recreational uses. Most of these have no or minor impacts to wolverines. Allowing mechanized travel would allow mountain bikes which could have some disturbance or displacement effects. Alternative Z would allow mechanized travel whereas the other alternatives do not. Recreational landing of aircraft could facilitate disturbance and perhaps leave the door open for heliskiing which would disturb wolverines during denning seasons. Again, Alternative Z would allow recreational aircraft landing. The Preferred Alternative allows motorized and mechanized tools for administrative uses, and aircraft landings for administrative uses. Neither of these would have impacts to wolverines. All other uses that varied by alternative are not suitable within recommended wilderness in the Preferred Alternative.

Table 235. Motorized over-snow travel suitability within recommended wilderness, by alternative

Alternative	Motorized Over-snow Travel Suitable in Recommended Wilderness
No Action	No
W	No
X	Yes, all wolverine habitats outside designated wilderness would be suitable for motorized over-snow because there would not be any recommended wilderness.
Y	No
Z	Yes
Preferred	No

Summer and Winter Recreation Opportunity Spectrum

In addition to whether motorized over-snow travel is suitable within recommended wilderness, the alternatives also determine whether areas across the national forest are suitable for both summer and winter motorized uses. The mechanism to determine motorized suitability is the summer recreation opportunity spectrum settings for summer travel and the winter recreation opportunity spectrum for winter travel. The amounts of wolverine primary and maternal habitat within summer recreation opportunity spectrum settings are shown in Table 236 and Table 237. The total amount of wolverine maternal and primary habitat suitable or unsuitable for motorized uses in summer by alternative is shown in tables Table 238 and Table 239. Summer motorized travel can impact habitat within the footprint of the road, can cause mortality via vehicle strikes, and can be a disturbance or displacement factor. Major highways can act as a barrier to dispersal. However, the U. S. Fish and Wildlife Service (2018) determined that roads present a low stressor to wolverines at the individual and population level in most of its current contiguous United States range. This is true for the plan area given that the majority of wolverine habitat (70 percent) is in a non-motorized summer recreation opportunity spectrum setting.

The alternatives with the most wolverine habitat as suitable for summer motorized travel are Alternative X, followed by the Preferred Alternative, followed by Alternative Y then W and last Z. Alternatives with less area suitable for wolverines is better for wolverines. The 1987 plans (No Action Alternative) did not use the recreation opportunity spectrum to identify suitability for motorized uses. Instead, all areas were open until closed by a travel management decision. Other factors like elk habitat effectiveness measures, PACFISH and INFISH, and other resource considerations were factored into decisions on the travel system. Thus, the action alternatives represent a new mechanism in the revised plan to identify where motorized uses could be suitable.

The winter recreation opportunity spectrum settings have the potential to have more influence on wolverine conservation than summer recreation opportunity spectrum. Heinemeyer et al. (2017) studied the response of wolverines to winter recreation in in Idaho, Wyoming, and Montana. In that study, wolverines avoided areas of both motorized and non-motorized winter recreation with off-road recreation, eliciting a stronger response than road-based recreation. Female wolverines exhibited stronger avoidance of off-road motorized winter recreation and experienced higher indirect habitat loss than male wolverines. Wolverines showed negative functional responses to the level of recreation exposure within the home range, with female wolverines showing the strongest functional response to motorized winter recreation. Hienemeyer et al. (2017) suggested indirect habitat loss, particularly to females, could be of concern in areas with higher recreation levels. They speculated that the potential for backcountry winter recreation to affect wolverines may increase under climate change if reduced snow pack concentrates winter recreationists and wolverines in the remaining areas of persistent snow cover (Heinemeyer et al. 2017). These findings suggest that the amount of female wolverine denning habitat affected by the alternatives could have meaningful consequences to the conservation of the wolverine on the Nez Perce-Clearwater.

The amount of modeled female wolverine maternal habitat and modeled primary wolverine habitat that falls within winter recreation opportunity spectrum settings is varies by alternative and is displayed in Table 240 and Table 241. Table 242 and Table 243 show the amount of modeled primary and maternal habitat within motorized and non-motorized settings. The alternatives range from between 83 and 46 percent of primary wolverine habitat and between 84 and 42 percent of modeled habitat in non-motorized winter recreation opportunity spectrum settings. Alternative W has the most acres of modeled maternal and primary wolverine habitat in non-motorized settings, followed by the Preferred Alternative, then Alternative Y, and Alternatives Z and X have the same percentages of wolverine habitats in non-motorized settings. The Preferred Alternative has the second most of the alternatives and would have 61 percent of primary and 58 percent of maternal habitat within non-motorized winter recreation opportunity spectrum settings. More modeled wolverine maternal habitat in non-motorized settings would better conserve the wolverine because these areas would receive greater protection against motorized winter recreation.

Winter recreation opportunity spectrum alternatives would determine where winter over-snow travel would be suitable and potentially authorized in future decisions. While suitable, some areas of the Nez Perce-Clearwater have characteristics that naturally limit motorized over-snow travel or make it more difficult (see Figure 89 above). Therefore, many areas have a lower probability of snowmobile use while technically suitable. Even if identified as suitable, a site-specific travel management decision would need to be made to allow these uses. The snowmobile model estimates where over-snow motorized travel has a higher probability to occur, and where it is less likely to occur. The modeling was based upon findings from Olson et al. (2017). In their study, winter recreationalists volunteered to carry GPS while snowmobiling or participating in winter non-motorized recreation. Statistics were used to identify selection of remotely sensed environmental characteristics, including topography, vegetation, climate, and road access, that were selected by winter recreationalists, such as snowmobilers and backcountry skiers.

Olson et al. (2017) found that snowmobilers selected areas with greater forest road densities, lower canopy cover, and smoother, less steep terrain. Olson et al. (2017) modeled these areas on the Nez Perce-Clearwater using parameters from their study in Colorado. To validate the models, the Land Management Plan team met with Forest Service staff who had on-the-ground expertise of where snowmobile use occurs on the Nez Perce-Clearwater and used data such as spatial data for groomed routes and roads layers. The Land Management Plan team was also provided with information from winter motorized user groups about where their members recreate. This information was used to verify whether the models reasonably predict snowmobile recreation in the plan area. The team found that the Idaho Standard off road snowmobile model performed well at predicting known use.

Many areas of the Nez Perce-Clearwater had low predicted probability of use because of the higher amounts of canopy cover, lower snow depths, steep or broken terrain, or lack of roads. These are landscape features that make it difficult to use snowmobiles but could provide refuges that could contribute to wolverine habitat.

In contrast, areas with low canopy, flatter and less complex terrain, and with access from roads or groomed trails were preferred by snowmobilers. The percent or amount of area with these characteristics represent a subset of the areas where motorized uses would be suitable. Therefore, even in areas suitable for motorized uses, there is a portion of area not capable of providing winter motorized uses. Areas that had a higher probability of use in modeled wolverine habitat include the area near Lolo Pass and some portions of areas near the Gospel-Hump. Most other areas had a low probability of use by snowmobilers. These models do not apply to snow bikes that have an easier time navigating through trees.

Table 236. Acres and forestwide percent of modeled primary wolverine habitat within summer recreation opportunity spectrum (ROS) settings by alternative (Alt)

Summer ROS Class	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
P	597,017	45%	601,653	45%	601,653	45%	607,219	46%	607,219	46%
R	1,413	0%	1,311	0%	1,311	0%	1,311	0%	1,311	0%
RN	73,918	6%	53,216	4%	75,558	6%	66,900	5%	61,404	5%
SPM	322,803	24%	166,208	12%	384,408	29%	182,754	14%	151,009	11%
SPNM	339,087	25%	511,851	38%	271,309	20%	476,055	36%	513,296	38%
Grand Total	**1,334,238**	**100%**	**1,334,238**	**100%**	**1,334,238**	**100%**	**1,334,238**	**100%**	**1,334,238**	**100%**

Table 237. Acres and forestwide percent of maternal wolverine habitat within summer recreation opportunity spectrum (ROS) settings by alternative (Alt)

Summer ROS	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
P	303,982	40%	306,069	41%	306,069	41%	310,512	41%	310,512	41%
R	2	0%	2	0%	2	0%	2	0%	2	0%
RN	25,676	3%	18,402	2%	26,421	4%	25,065	3%	21,944	3%
SPM	212,407	28%	103,767	14%	256,570	34%	116,232	15%	93,264	12%
SPNM	211,509	28%	325,335	43%	164,513	22%	301,764	40%	327,854	44%
Grand Total	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**

Table 238. Acres and forestwide percent of modeled primary wolverine habitat within motorized and non-motorized summer recreation opportunity (ROS) spectrum settings by alternative (Alt)

Summer ROS Primary	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Motorized	398,134	30%	220,735	17%	461,277	35%	250,964	19%	213,724	16%

Summer ROS Primary	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Non-motorized	936,104	70%	1,113,503	83%	872,961	65%	1,083,274	81%	1,120,514	84%

Table 239. Acres and forestwide percent of modeled maternal wolverine habitat within motorized and non-motorized summer recreation opportunity spectrum (ROS) settings by alternative (Alt)

Summer ROS Maternal	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Motorized	238,085	32%	122,171	16%	282,993	38%	141,299	19%	115,209	15%
Non-motorized	515,491	68%	631,404	84%	470,583	62%	612,276	81%	638,366	85%

Table 240. Acres of wolverine maternal denning habitat within winter recreation opportunity spectrum (ROS) classes by alternative (Alt)

Winter ROS Setting	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Primitive	303,982	40%	303,982	40%	303,982	40%	303,982	40%	303,982	40%
Roaded Natural	490	0%	199	0%	1,116	0%	1,116	0%	1,116	0%
Semi-Primitive Motorized	315,362	42%	122,959	16%	434,844	58%	354,112	47%	434,844	58%
Semi-Primitive Non-Motorized	133,742	18%	326,435	43%	13,635	2%	94,367	13%	13,635	2%
Grand Total	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**

Table 241. Acres and forestwide percent of modeled wolverine primary habitat within winter recreation opportunity spectrum (ROS) classes by alternative (Alt)

Winter ROS Class	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Primitive	597,017	45%	597,017	45%	597,017	45%	597,017	45%	597,017	45%
Roaded Natural	5,004	0%	2,318	0%	5,206	0%	5,025	0%	5,206	0%
Semi-Primitive Motorized	520,673	39%	224,812	17%	712,943	53%	564,263	42%	712,937	53%
Semi-Primitive Non-Motorized	211,543	16%	510,091	38%	19,072	1%	167,933	13%	19,077	1%
Grand Total	1,334,238	100%	1,334,238	100%	1,334,238	100%	1,334,238	100%	1,334,238	100%

Table 242. The acres and forestwide percent of modeled primary wolverine habitat within winter motorized and non-motorized recreation opportunity settings by alternative (Alt)

Winter ROS Primary	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Non-Motorized	808,561	61%	1,107,108	83%	616,089	46%	764,950	57%	616,095	46%
Motorized	525,677	39%	227,130	17%	718,149	54%	569,288	43%	718,143	54%
Grand Total	**1,334,238**	**100%**	**1,334,238**	**100%**	**1,334,238**	**100%**	**1,334,238**	**100%**	**1,334,238**	**100%**

Table 243. The acres and forestwide percent of modeled maternal wolverine habitat within winter motorized and non-motorized recreation opportunity settings by alternative (Alt)

Winter ROS Maternal	Alt P (acres)	Alt P %	Alt W (acres)	Alt W %	Alt X (acres)	Alt X%	Alt Y (acres)	Alt Y%	Alt Z (acres)	Alt Z%
Non-motorized	437,724	58%	630,417	84%	317,616	42%	398,348	53%	317,616	42%
Motorized	315,852	42%	123,158	16%	435,959	58%	355,227	47%	435,959	58%
Grand Total	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**	**753,576**	**100%**

Suitable and Eligible Wild and Scenic River Suitability

Alternatives for suitable wild and scenic rivers would establish river corridors that would be managed in a way that that could potentially benefit wolverines. While management in suitable wild and scenic rivers would not be directed towards wolverines, management of suitable rivers could have some indirect beneficial consequences to wolverines as several rivers considered for suitability have wolverine habitat within the river corridor, which is a quarter mile. If found suitable, river corridors would have protections that would be present even when the suitable river is within designated wilderness.

Table 244 shows the amount of modeled wolverine habitat within suitable wild and scenic river corridors by alternative. Suitability plan components found in the Land Management Plan would apply to river corridors to constrain some activities to the benefit of wolverines. The benefits would be modest though. River corridors would constrain activities to different levels depending upon whether they are classified as wild, recreational, or scenic. Table 244 and Table 245 show the amount of modeled primary and maternal wolverine habitat within river corridors considered for eligibility or suitability to be included in the wild and scenic river system by alternative. The Preferred Alternative would include 15,904 acres of primary habitat and 7,538 acres of maternal habitat in suitable river corridors.

Table 244. Acres of modeled wolverine primary habitat within suitable wild and scenic river corridors under all alternatives

Suitable Wild and Scenic	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Bargamin Creek	629	0	0	0	629
Bear Creek	1,375	0	0	0	1,375
Big Sand Creek	0	0	0	0	5,466
Bostonian Creek	0	0	0	0	1,513
Boundary Creek	0	0	0	0	889
Brushy Fork Creek	1,465	0	0	0	1,465
Buck Lake Creek	0	0	0	0	43
Caledonia Creek	0	0	0	0	117

Suitable Wild and Scenic	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Cayuse Creek	4,747	5,943	5,943	5,943	0
Colt Killed Creek	524	3,210	0	0	3,210
Crooked Fork	0	0	0	0	2,156
Cub Creek	1,616	0	0	0	1,616
East Fork Meadow Creek	0	0	0	0	237
East Fork Moose Creek	3,306	0	0	0	3,306
Graves Creek	0	0	0	0	626
Kelly Creek	732	732	732	732	732
Lake Creek	502	0	0	0	0
Middle Fork Kelly Creek	0	1,216	1,216	1,216	1,216
North Fork Clearwater River	322	0	0	1,978	0
North Fork Kelly Creek	0	1,478	1,478	1,478	1,478
North Fork Moose Creek	1,737	0	0	0	1,737
North Fork Storm Creek	0	0	0	0	963
Paradise Creek	1,574	0	0	0	0
Rhoda Creek	2,907	0	0	0	2,907
Running Creek	162	0	0	0	162
Sabe Creek	0	0	0	0	2
Slate Creek	174	0	0	0	0
South Fork Kelly Creek	0	1,654	1,654	1,654	1,654
South Fork Storm Creek	0	0	0	0	902
Storm Creek	0	0	0	0	2,360
Three Links Creek	1,333	0	0	0	0
Wahoo Creek	2,766	0	0	0	0
Weitas Creek	0	1,672	1,672	1,672	1,672
West Fork Gedney Creek	1,135	0	0	0	0
West Fork Three Links Creek	498	0	0	0	0
West Moose Creek	2,157	0	0	0	2,157
Wounded Doe Creek	0	0	0	0	2,310
Grand Total	**29,657**	**15,904**	**12,695**	**14,673**	**42,897**

Table 245. Acres of modeled wolverine maternal habitat within eligible or suitable wild and scenic river corridors

River Name	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Bargamin Creek	283	0	0	0	283
Bear Creek	246	0	0	0	246
Big Sand Creek	0	0	0	0	1,153
Bostonian Creek	0	0	0	0	1,071
Boundary Creek	0	0	0	0	857
Brushy Fork Creek	713	0	0	0	713
Caledonia Creek	0	0	0	0	58

River Name	No Action Alternative	Alternative P	Alternative W	Alternative Y	Alternative Z
Cayuse Creek	2,905	3,726	3,726	3,726	0
Colt Killed Creek	2	349	0	0	349
Crooked Fork	0	0	0	0	758
Cub Creek	303	0	0	0	303
East Fork Moose Creek	291	0	0	0	291
Graves Creek	0	0	0	0	626
Kelly Creek	87	87	87	87	87
Middle Fork Kelly Creek	0	300	300	300	300
North Fork Clearwater River	72	0	0	958	0
North Fork Kelly Creek	0	393	393	393	393
North Fork Moose Creek	787	0	0	0	787
North Fork Storm Creek	0	0	0	0	91
Paradise Creek	833	0	0	0	0
Rhoda Creek	1,398	0	0	0	1,398
South Fork Kelly Creek	0	1,048	1,048	1,048	1,048
South Fork Storm Creek	0	0	0	0	92
Storm Creek	0	0	0	0	55
Three Links Creek	606	0	0	0	0
Wahoo Creek	1,028	0	0	0	0
Weitas Creek	0	1,634	1,634	1,634	1,634
West Fork Gedney Creek	113	0	0	0	0
West Fork Three Links Creek	93	0	0	0	0
West Moose Creek	1,285	0	0	0	1,285
Wounded Doe Creek	0	0	0	0	1,550
Grand Total	**11,047**	**7,538**	**7,189**	**8,147**	**15,432**

Alternative X does not propose any suitable wild and scenic rivers. In and of themselves, the area of the river corridors for suitable wild and scenic rivers under the alternatives represent only a very small difference overall. Rivers found suitable for wild and scenic river designation would be less likely to have dams constructed on them.

Most of the rivers considered for suitability lay within Idaho Roadless Rule areas or designated wilderness areas so the protections are only slightly better than the surrounding landscape for wolverine habitat. However, two alternatives have the potential to influence land management in the roaded front. A small portion of Meadow Creek, the upper sections of the North Fork Clearwater River, small sections of Cayuse Creek, and portions of Crooked Fork each have small portions where the potential suitable wild and scenic rivers have wolverine habitat and occur within the managed front. Alternatives that include these rivers or portions of these rivers could provide small acres with increased protection outside of Roadless Rule areas or wilderness areas.

No Action Alternative

Under the No Action Alternative, the extent to which wolverines are conserved is intermediate to the best alternative for wolverines (Alternative W) and those that provide the least protections (Alternatives X and Z). The No Action Alternative provides intermediate amounts of recommended wilderness in areas important to wolverine connectivity, more than Alternatives X and Y but less than Alternatives W and Z. The No Action Alternative contributes at an intermediate level towards modeled wolverine habitat acres. Forestwide objectives for restoration and vegetation treatments vary by alternative. The No Action Alternative would provide among the lowest acres of vegetation management. However, while the amount differs, the effects of vegetation treatments have little consequences for wolverines, except to their prey. Wolverines eat a wide variety of prey, including large ungulates like moose, caribou, and mountain goats, and a variety of small and medium sized mammals. Ungulates benefit from more early seral vegetation so alternatives with more aggressive vegetation management would benefit wolverine prey. They are less likely to be affected by vegetation treatments because they live in rocky, cold, high elevation habitats. For the most important factor that varies, which is winter motorized suitability, this alternative would allow the current amount of winter motorized use. Currently winter motorized uses are allowed nearly forestwide except for in designated wilderness, nor in the current amount of recommended wilderness areas. In contrast, the Preferred Alternative identifies more areas as recommended wilderness, and less suitable for motorized over-snow travel.

Alternative W

In terms of the ability to conserve wolverine habitat, Alternative W would be the best for wolverines because it would provide the most wolverine habitat in recommended wilderness and the most area unsuitable for winter motorized uses. Modeled wolverine habitat would be unsuitable to over-snow motorized travel on over 80 percent of modeled wolverine habitat in the plan area. This alternative would be the best to reduce potential probability of adverse consequences to wolverine habitat use from winter motorized uses. The amount of recommended wilderness under Alternative W provides the most areas for wolverine connectivity. This alternative also provides the largest acreage that contains modeled maternal wolverine habitat, which is a substantial increase over the No Action Alternative. Objectives for vegetation treatments in this alternative have a quicker pace to achieving desired vegetation conditions compared to the other alternatives, but vegetation treatments are not expected to have any effects on wolverine habitat. The higher amounts of vegetation treatments would be better for wolverine prey compared to the No Action Alternative, which could lead to beneficial consequences to wolverine forage.

Alternative X

In comparison with Alternative W, Alternative X would not identify any recommended wilderness. This alternative would protect the least amount of wolverine habitat. Thus, all roadless rule areas, including those that are currently recommended wilderness under the 1987 plans, would be suitable for winter motorized travel, resulting in about 58 percent of the modeled wolverine habitat on the Nez Perce-Clearwater as suitable for winter motorized recreation while leaving 42 percent unsuitable. This alternative, along with Alternative Z, conserves wolverines the least, at least in terms of recommended wilderness and suitable over-snow motorized travel. Alternative X does not have any connectivity areas in recommended wilderness areas. Objectives for vegetation treatments in this alternative lean towards the highest amounts of vegetation management. The higher amounts would be better for wolverine prey compared to the No Action Alternative, which could lead to beneficial consequences to wolverine forage.

Alternative Y

Alternative Y is intermediate for wolverine conservation and intermediate to Alternative X and Alternative W with moderate amounts of recommended wilderness and has high amounts of motorized suitability. Under this alternative, approximately 58 percent of modeled wolverine habitat is suitable for over-snow motorized travel and 42 percent unsuitable. Alternative Y is modest in the amount of primary and maternal wolverine habitat within recommended wilderness compared to other alternatives. Objectives for vegetation treatments in this alternative favor an intermediate pace towards achieving desired conditions vegetation conditions compared to the other alternatives. They are less than

Alternatives W, X, and the Preferred Alternative but more than the No Action Alternative. The lower amounts would have less benefits for wolverine prey compared to the other alternatives.

Alternative Z

While the amount of recommended wilderness under Alternative Z is intermediate to Alternative W and X, the effects on wolverine conservation are more similar to Alternative X because any recommended wilderness would be suitable for over-snow travel under this alternative. Effectively, this would leave around 54 percent of modeled wolverine habitat as suitable and 46 percent as unsuitable for winter motorized uses and roughly equivalent to Alternative X. Alternative Z provides the second most amount of wolverine connectivity in recommended wilderness with only slightly less than Alternative W. This is because it includes Hoodoo, Meadow Creek-Upper North Fork, Rawhide, North Fork Spruces White Sand, and Sneakfoot Meadows as recommended wilderness. These areas are all occur in important connectivity areas along the Idaho-Montana border. Alternative Z is similar but slightly more than the No Action Alternative in the amount of modeled maternal wolverine habitat in recommended wilderness with about 80,732 acres. While it contains similar acres, the amount of protection this affords female denning habitat is negated by the allowance of winter motorized recreation as a suitable use. Objectives for vegetation treatments in this alternative strike a balance towards less vegetation management and fall at the second lowest pace compared to the other alternatives. The lower amounts would not be as beneficial for wolverine prey.

Preferred Alternative

The Preferred Alternative identified the Mallard Larkin, Hoodoo, and Meadow Creek Idaho Roadless Rule areas as recommended wilderness. This alternative is most similar to Alternative Y for recommended wilderness, except that there were some boundary adjustments to the recommended wilderness areas compared to the other alternatives. The Preferred Alternative would include 140,761 acres of the total wolverine habitat and 83,401 acres of wolverine maternal habitat in recommended wilderness. Again, the change from Idaho Roadless Rule management into recommended wilderness represents only slight changes in on-the-ground management. Under the Preferred Alternative, most of the nonconforming uses would not be allowed in recommended wilderness, including motorized over-snow travel. The exception is that nonconforming uses, such as administrative chainsaw operation and administrative aircraft landing would be allowed. These would have minimal effect on wolverines. Winter motorized travel would be suitable in 32 percent, and not suitable in 68 percent of primary wolverine habitat. It would allow 39 percent of maternal wolverine habitat to be suitable for motorized uses whereas 61 percent would be unsuitable. This combination is an improvement over all but Alternative W. The amount of timber harvest is more aggressive in this alternative; however, this may have beneficial impacts to wolverines because it would provide better conditions for their large ungulate prey that depend on disturbance for high quality nutrition. Alternatives for wild and scenic rivers would have little effect on wolverine habitat but might help conserve small percentages of habitat. The Preferred Alternative found Cayuse Creek, Fish Creek, Hungery Creek, Weitas Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Colt Killed Creek, the Salmon River, and Meadow Creek suitable as wild and scenic rivers and portions of these areas fall within modeled wolverine habitat.

Effects of Plan Direction

Terrestrial Ecosystems

Plan direction within the terrestrial ecosystems section of the Land Management Plan would have no effect or beneficial effects on wolverines. Desired conditions FW-DC-TE-01, FW-DC-TE-05, and FW-DC-TE-06 would contribute to ecosystem integrity and provide a diversity of habitat conditions for wolverine prey.

Biophysical Features

Plan direction within the biophysical features section of the Land Management Plan would have no effect on wolverines.

Forestlands

Plan direction for the forestlands section proposes changes to dominance types, size classes, and forest density and addresses landscape pattern, which would alter some habitats used by wolverines. Plan components in this section are informed by modeling of the natural range of variation so should contribute to ecosystem integrity. The effects would be to provide for the diversity and abundance of wildlife that could contribute to wolverine prey. However, these plan components would direct management to alter some habitats that would be used by wolverines and wolverine prey. Alteration of these habitats would be through timber harvest, wildland fire, planting, mechanical vegetation management, and other forestry or restoration methods after site-specific analysis. Since wolverines tend to use high elevation habitats, forested habitats used most by wolverines would be within the cold and cool moist broad potential vegetation types. Wolverines also cross through lower elevation habitats so plan direction for all broad potential vegetation types might be affected. However, as analyzed above, wolverines do not appear to be adversely affected by timber activities, prescribed fire, and other methods of vegetation manipulation. The U.S. Fish and Wildlife Service (2013b) stated:

> Few effects to wolverines from land management actions such as grazing, timber harvest, and prescribed fire have been documented. Wolverines in British Columbia used recently logged areas in the summer and moose winter ranges for foraging (Krebs et al. 2007). Males did not appear to be influenced strongly by the presence of roadless areas (Krebs et al. 2007). In Idaho, wolverines used recently burned areas despite the loss of canopy cover (Copeland 1996)...
>
> Intensive management activities such as timber harvest and prescribed fire do occur in wolverine habitat; however, for the most part, wolverine habitat tends to be located at high elevations and in rugged topography that is unsuitable for intensive timber management...Wolverines are not thought to be dependent on specific vegetation or habitat features that might be manipulated by land management activities, nor is there evidence to suggest that land management activities are a threat to the conservation of the species.

Therefore, while plan components for forested lands would direct management to alter forest vegetation near and within wolverine habitat, they would not likely have negative environmental consequences to wolverines.

Meadow, Grassland, and Shrubland

Plan direction for the meadows, grasslands, and shrublands section of the Land Management Plan would have no effect or beneficial effects on wolverines. Desired conditions within this section would contribute to ecosystem integrity and provide a diversity of habitat conditions for wolverine prey.

Carbon Storage and Sequestration

Plan direction within the carbon storage and sequestration section of the Land Management Plan would have no effect or beneficial effects on wolverines.

Fire Management

Fire management plan components would allow and encourage fire to play its natural role across the planning area. Fire is likely to play a dominant role in shaping wolverine habitat over the life of the plan.

Wolverines appear tolerant of changes due to fire. For example, wolverines use recently burned areas despite the loss of canopy cover (U.S. Department of the Interior 2013b). Increased early seral conditions across wolverine habitat should provide improved nutritional conditions for wildlife, such as ungulates. Plan direction for fire management would have beneficial consequences for wolverines.

Invasive Species

Plan direction for the invasive species section would have negligible effects on wolverines. Wolverine habitats do not currently have many invasive species, and treatments within wolverine habitat would not likely have direct effects on wolverines.

Soil Resources

Plan direction in the soil resources section of the plan would have negligible effects or beneficial effects on wolverine habitats. They would serve to protect and restore soil resources from management activities. Soil objectives propose restoration activities but those would have lower probabilities of occurring within wolverine habitat and would have, at most, short-term impacts locally on wolverine prey. They would not occur at an extent in wolverine habitat that would be measurable.

Water and Aquatic Ecosystems

Plan direction in the water and aquatic ecosystems section would have negligible effects or beneficial effects on wolverines because they would restore, enhance, and protect aquatic ecosystems. Wolverines are known to eat beavers occasionally and these habitats would provide for them.

Riparian Management Zones

Plan direction in the riparian management zones section would have negligible effects or beneficial effects on wolverines because they would restore, enhance, and protect riparian areas.

Conservation Watershed Network

Plan direction in the conservation watershed networks section would have negligible effects or beneficial effects on wolverines because they would restore, enhance, and protect aquatic habitats. Wolverines would not be sensitive to restoration activities and would benefit from proper functioning aquatic habitats.

Infrastructure (Aquatic and Riparian)

Plan direction for the aquatic and riparian infrastructure section would have negligible effects or beneficial effects on wolverines because they would restore, enhance, and protect aquatic habitats. Wolverines would not be sensitive to restoration activities and would benefit from proper functioning aquatic habitats.

Energy and Minerals (Aquatic and Riparian)

Plan direction in the aquatic and riparian energy and minerals section would have negligible effects or beneficial effects on wolverines because they would protect aquatic habitats.

Livestock grazing (Aquatic and Riparian)

Plan direction in the aquatic and riparian livestock grazing section would have negligible effects or beneficial effects on wolverines because they would protect aquatic habitats.

Wildlife

Plan direction for the wildlife section would have negligible effects or beneficial effects on wolverines. FW-DC-WL-01 would provide conditions for federally listed species including the proposed wolverine. FW-DC-WL-03 and FW-DC-WL-06 would promote connectivity for wolverines. FW-STD-WL-01 requires that the Nez Perce-Clearwater follow the Northern Rockies Lynx Management Direction. Lynx habitat overlaps with wolverine habitat and would contribute beneficial consequences to wolverine habitats.

Multiple Uses Wildlife

Plan direction in the multiple uses' wildlife section would have negligible effects on wolverines and would benefit wolverine prey.

Multiple Uses Elk

Plan direction for the multiple uses' elk section would have negligible effects on wolverines and would benefit wolverine prey. These plan components encourage addressing roads and would increase nutrition for ungulates.

Air Quality

Plan direction for the air quality section would have no effect on wolverines.

Tribal Trust

Plan direction for the tribal trust responsibilities section would have negligible or beneficial effects on wolverines.

Cultural Resources

Plan direction for the cultural resources section would have no environmental consequences for wolverines.

Municipal Watersheds

Plan direction for the municipal watersheds section would have no environmental consequences for wolverines.

Sustainable Recreation

Plan direction for the sustainable recreation section may lead to management that would increase disturbance to wolverines. Specifically, wolverines have been shown to avoid both motorized and non-motorized winter recreation, and plan direction for recreation may affect the amount and distribution of recreational activities. FW-DC-REC-11 could facilitate additional future winter recreation into wolverine habitat. Some activities suitable in various alternatives under the recreation opportunities spectrum may allow disturbance in wolverine habitat and could displace wolverines because of avoidance behavior. It is unknown whether displacement would have population level effects on wolverines. Recreation infrastructure, such as trails, may promote disturbance or increase access for trapping activities which could result in limited incidental take; however, incidental take during of wolverine while legal tapping for other species is rare.

Scenery

Plan direction for the scenery section would have negligible or no effect on wolverines.

Public Information, Interpretation, and Education

Plan direction for the public information, interpretation, and education section would have negligible or no effect on wolverines.

Infrastructure

Plan direction for the infrastructure section may lead to management that would increase disturbance to wolverines. Specifically, this direction could encourage increased road access into wolverine habitat, which could alter wolverine habitat. It is unknown whether access would have population level effects on wolverines. Recreation infrastructure, such as roads, may increase access for trapping activities, which could result in limited incidental take; however, incidental take of wolverines is rare.

Land Ownership and Land Uses

Plan direction for the land ownership and land uses section would have both negative and beneficial consequences on wolverines. FW-DC-LND-01, specifically, would direct land acquisitions to prioritize habitat for at-risk species, which would have beneficial consequences for wolverine connectivity and habitat conservation. On the other hand, FS-DC-LND-06 could facilitate some impacts to wolverine habitat from energy developments. However, a large portion of the wolverine habitat is in designated wilderness where these facilities would not be allowed. Potential for oil or gas extraction is low to very low on the Nez Perce-Clearwater so there would be little chance to have oil and gas extraction projects. Wind energy potential is also low so there is less likely to be wind energy development. More likely would be rights-of-way for electrical grid or oil and pipelines could occur. These types of infrastructure usually have temporary impacts during construction but then would have low impacts after completion. The footprint would be limited to only very a small percent of wolverine habitat in the plan area. Therefore, the impacts would be negligible.

Ecosystem Services

Plan direction for the ecosystem services section would have adverse consequences to wolverines. Specifically, FW-GDL-ES-01 would direct the Nez Perce-Clearwater to consider opening a new road when closing other roads. In many areas of the Nez Perce-Clearwater, road densities are high or very high and may need to be reduced due to resource concerns. In the event that happens, new roads or motorized trails would need be created to keep a net access amount. This guideline would create a situation where watersheds or areas with low road densities in wolverine habitat could see an increase in access because of road closures in other areas for resource benefits. However, because wolverine habitat occurs mostly on lands that do not allow motorized uses this is less likely.

Scrafford et al. (2018) showed that top winter and summer models indicated that wolverines avoided and increased speed near roads. Wolverine movement, but not avoidance, increased with traffic volume. Roads, regardless of traffic volume, reduce the quality of wolverine habitats, and higher-traffic roads might be most deleterious. Krebs et al. (2010) also showed a response to roads. Roaded and recently logged areas were negatively associated with female wolverines in summer. Roads are also well known to affect wolverine prey, such as elk. This plan component might also redistribute winter motorized uses into new areas in the event of closures elsewhere.

Timber

Plan direction for the timber section would alter some wolverine habitats mostly in Management Area 3. However, wolverines are not sensitive to vegetation management and will continue to use those areas. Therefore, there would be negligible consequences for wolverines from timber plan direction.

Energy and Minerals

Plan components for the energy and minerals section may have some environmental consequences to wolverine habitats if mining or energy extraction activities take place in wolverine habitat under the plan. In the event they do, it would result in temporary or permanent loss of wolverine habitat. However, the extent of mining or mineral activities would likely be over only a small proportion of wolverine habitat.

Livestock Grazing

Plan direction for the livestock grazing section would potentially have negligible environmental consequences for wolverine.

Special Forest and Botanical Products

Plan direction in the special forest and botanical products section would have negligible environmental consequences for wolverine.

Designated Wilderness
Plan direction for the designated wilderness section would have beneficial consequences for wolverine.

Wild and Scenic Rivers
Plan direction for the wild and scenic rivers section would have negligible or beneficial consequences for wolverines.

Recommended Wilderness
Plan direction for the recommended wilderness section would have negligible or beneficial consequences for wolverine.

Idaho Roadless Rule Areas
Plan direction for the Idaho Roadless Rule areas section would have negligible effects or beneficial effects on wolverine.

Research Natural Areas
Plan direction in the research natural areas section would have negligible effects or beneficial effects on wolverine.

Gospel-Hump
Plan direction in the Gospel-Hump geographic area section would have negligible consequences or beneficial effects on wolverine.

Lower Salmon
Plan direction in the Lower Salmon geographic area in section would have negligible consequences on wolverine.

Pilot Knob
Plan direction in the Pilot Knob geographic area section would have negligible or no consequences for wolverines.

Lolo Trail National Landmark
Plan direction in the Lolo Trail National Landmark section would have negligible or no consequences for wolverines.

Cumulative Effects

Land Management
The cumulative effects area for wolverines is the Selway-Salmon management regions as delineated by Inman (2013). The majority of wolverine habitat is located in higher-elevation areas that are largely administered by the Forest Service. This area includes National Forest System lands in Idaho that include the Payette, Boise, and some areas on the Wallowa Whitman National Forest in Oregon. Additionally, they occur where many areas are designated wilderness, recommended wilderness, and Idaho Roadless Rule areas, or lands that are relatively unavailable for development. Designated wilderness areas that contribute to wolverine habitat includes the Frank Church-River of No Return, the Gospel-Hump, The Selway-Bitterroot, and the Hells Canyon Wilderness. Forest Plans for other national forests in the northern Rocky Mountains provide direction for activities, such as timber harvest, livestock grazing, and motorized use of forest roads and trails, such that these activities are not expected to negatively affect wolverines or their habitat. Diverse prey items are available for wolverines throughout the cumulative effects analysis area so prey should continue to be available. The U.S. Fish and Wildlife Service determined that Forest Service Land management Plans alleviate several stressors identified in the 2018 Wolverine Species Status Assessment (USFWS 2018).

These plans allow winter motorized uses consistent with their plans and manage decisions on the travel system through site specific decisions that establish the travel system including for winter motorized travel. Some winter motorized recreation occurs in wolverine habitat on national forest lands in this area, but like on the Nez Perce-Clearwater, they include areas that are inventoried roadless, and they do not allow motorized winter recreation in designated wilderness. The identification of winter motorized suitability would continue this use in much of the Nez Perce-Clearwater but would reduce it in other areas of the national forest that would be newly unsuitable for this use.

Lands managed by the State of Idaho and private lands include areas surrounding the Nez Perce-Clearwater on the west. Cumulative adverse effects to the wolverine are not expected as a result of management actions on state lands. Both state and private lands are not generally located in modeled wolverine habitat, though some modeled wolverine habitat exists on these lands.

The Idaho Department of Fish and Game prioritized wolverine conservation in their wolverine conservation plan (U.S. Department of the Interior 2014b). They identified areas with wolverine habitat as Tier I, Tier 2, and Tier3, where Tier I receives the highest priority. Most areas on the Nez Perce-Clearwater were identified as Tier II or Tier III areas. They stated that many areas in the state were not ranked as Tier I due to permanent protections provided by wilderness and roadless designations, which limit potential threats. The Idaho management plan for the Conservation of Wolverines in Idaho identifies seven objectives for actions that would help conserve wolverines. These objectives address concerns about threats to wolverines and would not be inconsistent with this plan. The Nez Perce-Clearwater Land Management Plan would be consistent with these plans and would not lead to cumulative effects.

This area has existing highway systems that are managed by the state or as freeways. Some examples include Highway 95. Most roads on National Forest System lands are unpaved, are traveled at slower speeds, and have lighter traffic volumes than highways. These roads are less likely to result in vehicle strikes. Comparatively few paved roadways traverse through the Nez Perce-Clearwater. The longest paved roadways include Highway 12 along the Lochsa River, the Salmon River Road, portions of the Selway River Road, and Highway 14 along the Southfork Clearwater River. Other paved roadways include Highway 8 and Highway 3 through limited portions of the Palouse District and a few other portions of paved roads that end shortly after entering National Forest System lands. Highway 12 and Highway 14 allow traffic speeds between 45 and 50 miles per hour, so it may be possible on rare occasions for a wolverine to be struck by a moving vehicle on these roads. Highway 12 crosses through areas of wolverine habitat near Lolo Pass. Other paved roads on the Nez Perce-Clearwater cross through modeled wolverine habitat for minor stretches, if any. However, these roads have comparatively low traffic volumes and the majority of these road miles do not travel through wolverine habitat because of their lower elevation. There are no major roadways that travel north to south in the plan area. Few, if any, wolverine are known to have been killed on the paved roads in the plan area. The overall impact from these roads is low because roads in on the Nez Perce-Clearwater only travel through a limited portion of the plan area (small scope) and the severity is slight and not expected to impact more than 10 percent of the wolverine population during the life of the plan because most paved roads do not travel through wolverine habitat and few wolverine are expected to be struck on these roads. Perhaps the most significant impact is to wolverine habitat connectivity where Highway 12 crosses Lolo Pass. These roads currently represent only minor impacts to connectivity because of their limited distribution in wolverine habitat. The Nez Perce-Clearwater is a largely intact block of land with few higher speed roads and provides connectivity and remote locations for wolverines. Squires et al. (2007) concluded that wolverine movements are unpredictable and are not easy to incorporate in the planning of structural highway mitigation projects. The Nez Perce-Clearwater Land Management Plan is unlikely to result in new highways.

Major highways are not abundant in north central Idaho and most of them do not cross through modeled wolverine habitat. In Montana, Highway 93 and I-90 may affect wolverine dispersal and gene flow, as well as developments in western Montana. I-90 may also represent a barrier to connectivity from wolverines in Canada. Highway 95 mostly travels through lower elevation areas, or developed areas where vehicle strikes on wolverines are less likely.

Access during the winter season may indirectly affect the area accessible for trapping. Any cumulative effects to the wolverine resulting from trapping in relation to winter recreation access on the Nez Perce-Clearwater and surrounding lands would be uncommon. Incidental trapping of wolverines is a rare event in Idaho as evident from data (U.S. Department of the Interior 2014b) and, in many cases, the wolverine can be released alive. Some wolverines may cross from the Nez Perce-Clearwater into Montana where wolverine trapping is allowed. Trapping is not regulated by the Forest Service and decisions in the plan are not likely to increase exposure to trapping, as motorized access is widespread in the plan area and trapping is an ongoing activity.

Changing Climate

According to the models used in an assessment by McKelvey et al. (2011), the Nez Perce-Clearwater, northern Montana, the southern Bitterroot Mountains, and the Greater Yellowstone Ecosystem will retain significant spring snow in the next 50 years, whereas, central Idaho south of the Nez Perce-Clearwater is projected to lose significant spring snow. There are variations in climate models, but models generally indicate earlier snowmelt in the northern Rockies in the future, a pattern that has been ongoing since at least the 1950s. Although wolverines are known to spend the majority of their time at high elevations, the degree to which earlier snowmelt may affect wolverines and the connectivity of metapopulations is uncertain. McKelvey et al. (2011) predicted that the geographic extent and connectivity of suitable wolverine habitat in western North America will decline with continued global warming.

At a regionwide scale, the preliminary Northern Rockies Adaptation Partnership risk assessment for the wolverine (Northern Rockies Adaptation Partnership 2015) states that there is no evidence that wolverines in the northern Rocky Mountains can persist in areas distant from extensive areas of spring snow, and their adaptive capacity appears to be low. The authors estimated that the magnitude of effects would be low in 2030 and moderate in 2050, with a high likelihood of effects across all time periods. Across the Northern Rockies as a whole, losses of current levels of persistent spring snowpack are estimated to be around 30 percent by mid-century (Northern Rockies Adaptation Partnership 2015). However, it is likely that snow will persist on some slopes and aspects at higher elevations. Due to the low density of wolverine populations, there may continue to be sufficient snow to meet the needs of the population as a whole. There may be microsites important to wolverines, such as mountain cornices, shaded cirque basins, or talus areas that retain snow during most years or retain snow longer into the spring than surrounding areas. McKelvey et al. (2011) stated “although wolverine distribution is closely tied to persistent spring snow cover, we do not know how fine-scale changes in snow patterns within wolverine home range may affect population persistence.” The U.S. Fish and Wildlife Service concurred with this finding, stating that “an improved understanding of how microclimatic variation alters the habitat associations of wolverines at fine spatial scales is needed” (U.S. Department of the Interior 2014b).

Wolverines are a highly wide-ranging species. Recent research in Glacier National Park has demonstrated that habitat connectivity from Glacier National Park to Canada currently provides for wolverine movement (Copeland and Yates 2006).

Plan components provide for connectivity of wolverine habitat. The natural range of variation for persistent spring snowpack on the Nez Perce-Clearwater is unknown, but variation from year to year is common. High-elevation areas with persistent spring snow at least five years out of seven are more likely to retain snow as the climate changes, whereas lower-elevation areas that retain persistent spring snow only one year out of seven are more likely to lose snow in the future as the climate changes. The Nez Perce-Clearwater provides over 727,320 acres of habitat available to wolverines that is remote and difficult to access by any means during the time periods when wolverines may be sensitive to disturbance.

The 2012 Planning Rule requires the Nez Perce-Clearwater to determine whether the plan components provide the ecological conditions necessary to conserve proposed and candidate species. Key ecosystem characteristics for the wolverine, a proposed species, include high elevations with persistent spring snow, habitat for dispersal, and features, such as rocky alpine areas, glacial cirque basins, and avalanche chutes, that provide food sources, such as marmots, voles, and ungulate carrion. Maternal and natal denning habitat with relatively low levels of human development are important, although the thresholds are unknown. The plan provides for wolverine pray through coarse filter ecosystem plan components that provide for most species. The Land Management Plan is unlikely to reduce population levels of prey species substantially.

The Nez Perce-Clearwater does not anticipate substantial changes to wolverine maternal or natal denning habitat over the anticipated life of the plan but, if conditions change in the future, or if research or monitoring indicates there is a need to address specific threats that are within Forest Service authority or capability to manage, the Land Management Plan may be amended or revised in the future if necessary.

Grizzly Bear Recovery

Changes Between the Draft and Final Environmental Impact Statements

Just before the release of the Draft Environmental Impact Statement, grizzly bear 927 entered the plan area. Prior to that time grizzly bears were not considered "may be present," and so the focus of the analysis in the Draft Environmental Impact Statement was limited to whether the plan provides the ecological conditions within the Bitterroot Recovery Zone to sustain a future population of grizzly bears. In addition, the tight timelines for release of the Draft Environmental Impact Statement did not allow a more developed analysis of ecological conditions for grizzly bears. In response to comments and the arrival of Bear 927, the analysis was adjusted to address whether conditions outside the recovery zone would provide the ecological conditions for connectivity.

Since that time, the analysis has become fully developed, and additional species-specific plan components were added to the plan for grizzly bears. The analysis still primarily rests on whether the plan will provide the ecological conditions to contribute to recovery of grizzly bears within the recovery zone, but also evaluates how the Nez Perce-Clearwater provides the ecological conditions to support connectivity to the recovery zone including the potential for the establishment of resident grizzly bears outside the recovery zone. The grizzly bear analysis now includes several spatial overlays of the various land allocations with secure habitat as an indicator, and includes an in-depth evaluation of how plan components would affect conditions for grizzly bears.

Grizzly Bear Analysis

This section of the analysis focuses on the effects of the plan on maintaining the ecological conditions within the Bitterroot Recovery Zone to contribute to recovery, as well as the effects of the plan on the ecological conditions to provide for connectivity and even support grizzly bears that may live outside the recovery zone in the future. Because there are no current grizzly bear populations in this area, there is little scientific information from this area from which to draw inferences. Therefore, the analysis draws from scientific information produced from the other grizzly bear ecosystems in the lower 48 states with the recognition that many aspects of grizzly bear ecology in this area are currently unknown. To compensate, the analysis assumes that grizzly bear behavior, demographics, ecology, and the effects to grizzly bears and their habitat would be similar here as they are in other grizzly bear ecosystems. The analysis is primarily focused on how the plan would affect the ecological conditions or habitat to support future grizzly bear populations both inside and outside of the Bitterroot Recovery Zone, and how the plan supports ecological conditions to allow connectivity of grizzly bears to become established through migration, dispersal, or gradual expansion. With this emphasis, this analysis also evaluates effects to transient individuals that may be present.

The historical range of the grizzly bear in the continental United States extended from the central Great Plains, west to California, and south to Texas and Mexico. Between 1800 and 1975, grizzly bear populations in the lower 48 states declined from over 50,000 to less than 1,000. As European settlement expanded westward, the grizzly bear was extirpated from most of its historical range (U.S. Department of the Interior 1993).

Four areas in Montana, Wyoming, and Idaho currently support grizzly bear populations. These areas are the Greater Yellowstone Ecosystem (GYE), Northern Continental Divide Ecosystem (NCDE), Cabinet-Yaak Ecosystem (CYE), and Selkirk Ecosystem (SE). According to the 2020 Grizzly Bear Recovery Program Annual Report, it is highly unlikely that the Northern Cascade Ecosystem (NCE) contains a grizzly bear population and there has been no confirmed evidence of grizzly bears within the United States portion of the NCE since 1996 (U.S. Department of the Interior 2022c). The sixth area, the Bitterroot Ecosystem was identified as having potential for providing for another population of grizzly bears. When the revised Grizzly Bear Recovery Plan was finalized, the Bitterroot Ecosystem had been loosely defined and there were questions as to whether it had a population of grizzly bears.

The grizzly bear recovery plan (U.S. Department of the Interior 1993) identified recovery zones that encompass the above five areas as well as the Bitterroot Ecosystem and the San Juan Ecosystem. The Bitterroot Ecosystem Recovery Plan Chapter was not published until 1996. Within the ecosystems, the U.S. Fish and Wildlife Service establishes recovery zones in cooperation with land management areas that are composed of a large proportion of federal lands, including wilderness and national park lands that are protected from the influence of many types of human uses and activities occurring on lands elsewhere. Recovery zones are defined as areas that are necessary for the recovery of the species and are to be managed with an emphasis on conserving grizzly bear habitat. The Bitterroot Ecosystem was never delineated explicitly, though the Bitterroot Chapter of Recovery Plan contains a map of the Bitterroot Ecosystem which included most of the Nez Perce-Clearwater National Forest (See Figure 90 and Figure 91).

The Recovery Zones represent a small fraction (less than 2 percent) of the grizzly bear's historical range (U.S. Department of the Interior 1993). While the range of bears in some ecosystems has significantly expanded since 1975, the overall range and distribution of bears in the lower 48 states remain below historical levels at approximately 6 percent of historical range (U.S. Department of the Interior 2022c).

The U.S. Fish and Wildlife Service suggested in the Grizzly Bear Recovery Plan Bitterroot Chapter that recovery would require reintroduction of bears from other areas and offered alternatives to consider for recovery. In response, the U.S. Fish and Wildlife Service completed the required analysis under the National Environmental Policy Act and decision to establish a final rule to reintroduce grizzly bears in 2000 (50 C.F.R 17.84 (I)), Final Rule 65 Federal Register 69,624 Nov. 17, 2000). In 2000, the U.S. Fish and Wildlife Service issued a 10(j) rule establishing the Bitterroot Grizzly Bear Experimental Population Area, an area in which the U.S. Fish and Wildlife Service considered the population of grizzly bears would be a non-essential experimental population after reintroduction (50 CFR 17.84 (I) 10-1-01 edition, Final Rule 65 Federal Register 69,624 Nov. 17, 2000). It also established that grizzly bears would be reintroduced under Section 4 and 10(j) of the Endangered Species Act (50 C.F.R 17, 65 Federal Register

69,623 Nov. 17, 2000). The decision and associated final rule established the Bitterroot Grizzly Bear Experimental Population Area and delineated the "Bitterroot Grizzly Bear Recovery Area," an area of recovery emphasis within the Experimental Population Area (50 CFR 17.84 (I) 10-1-01 edition, Final Rule 65 Federal Register 69,624 Nov. 17, 2000). The Bitterroot Recovery Area consists of the entirety of the Selway-Bitterroot and Frank Church-River of No Return Wilderness Areas plus limited areas outside of wilderness like the Magruder Road (See Figure 90 of the wilderness areas, and Figure 91 of the Bitterroot Recovery Area and wilderness within the plan area below) (50 CFR 17.84 (I) Final Rule 65 Federal Register 69,624 Nov. 17, 2000, Codified at 50 C.F.R § 17.84(l)). Areas of the Nez Perce-Clearwater National Forest outside these Designated Wilderness Areas are not included in the Bitterroot Recovery Area as delineated except for some very limited areas near the Magruder Road and near Burnt Knob, which were not included as wilderness within the Central Idaho Wilderness Act.

Of importance to note is that the U.S. Fish and Wildlife Service refers to the Bitterroot Recovery Area as the "Bitterroot Recovery Zone" in many of their publications such as the Species Status Assessment for the Grizzly Bear (U.S. Department of the Interior 2021c). Therefore, this document refers to the Bitterroot Recovery Area delineated in 50 C.F.R 17.84 (I) as the Bitterroot Recovery Zone which is shown in Figure 91. The greater area identified in the recovery plan will be referred to in this document as the Bitterroot Ecosystem. In 2001, citing opposition from the States involved and considering other recovery needs, the U.S. Fish and Wildlife Service issued a proposed rule to remove the 10(j) rule from the Code of Federal Regulations. In that notice, the U.S. Fish and Wildlife Service proposed to select the No Action Alternative, although this rule was never finalized. Therefore, the direction currently found in 50 C.F.R. § 17.84(l) for the Selway-Bitterroot ecosystem is still technically in effect. The federal register stated that if grizzly bears naturally dispersed to the Bitterroot Ecosystem, they would be protected as a threatened species under the Endangered Species Act. The U. S. Fish and Wildlife Service has not designated critical habitat within the Nez Perce-Clearwater National Forest.

The U.S. Fish and Wildlife Service reaffirmed in a letter dated January 21, 2020, that:

> …the current Endangered Species Act (ESA) section 10(j) rule for grizzly bears in the Bitterroot Grizzly Bear Experimental Population Area (BGBEPA), 50 CFR § 17.84(1), does not apply to grizzly bears that have dispersed into the BGBEPA on their own…[and]…grizzly bears that are present in the BGBEPA are not covered by the 10(j) rule and are considered threatened under the ESA. This means that ESA section 7 consultation obligations apply to proposed federal agency actions that may affect grizzly bear in the BGBEPA (U.S. Department of the Interior 2020d).

The Alliance for the Wild Rockies challenged the U.S. Fish and Wildlife Service in District Court for failing to finalize the 2001 Proposed Rule, failing to comply with the 2000 Record of Decision and Final rule, and violating National Environmental Policy Act (NEPA) and the Administrative Procedures Act by failing to prepare a supplemental environmental impact statement (EIS). The matter was remanded back to the U. S. Fish and Wildlife Service with direction to prepare a supplemental EIS and if warranted, a new Record of Decision and final rule. The U. S. Fish and Wildlife Service proposed and was granted permission by the court to initiate a new NEPA process, including a draft and final EIS and a new Record of Decision rather than supplementing the 2000 EIS. A key requirement for 10(j) non-essential experimental status is that no members of the species exist in the area where the experimental population is to be established. The U.S. Fish and Wildlife Service cited changes in circumstances arising from individual bears dispersing within the Bitterroot Ecosystem with greater regularity as rational for a new EIS.

The 2000 Final Environmental Impact Statement (U.S. Department of the Interior 2000a, b) explored a variety of alternatives to meet recovery objectives. The alternatives included whether grizzly bears would be translocated either as 10(j) or as threatened species, or established through natural dispersal, with the full protection of the Endangered Species Act. Alternatives also varied about who would have management responsibility, with either a citizen committee or the U.S. Fish and Wildlife Service as alternatives. Also, the alternatives varied where the boundaries of the Bitterroot Recovery Zone depending on whether grizzly bears were translocated or were established through natural dispersal. The different alternative boundaries included different amounts of lands administered by the Nez Perce-Clearwater National Forest. With the preparation of a new Environmental Impact Statement, the U.S. Fish and Wildlife Service anticipates considering a range of alternatives, including options to facilitate natural recolonization through affirmative actions, such as identifying connectivity areas, addressing sanitation issues, future augmentation, and revising the recovery plan chapter for the Bitterroot Ecosystem.

The presence of grizzly bears in the Bitterroot Ecosystem is currently through natural dispersal because no grizzly bears have been translocated to date. The plan area is outside other grizzly bear recovery zones and encompasses areas where grizzly bears could come from mainly the North and East into the Bitterroot Recovery Zone, though less likely, they could also come from the Yellowstone Ecosystem. The Bitterroot Recovery Zone has been identified as one possible path for genetic interchange from the Selkirk, Cabinet Yaak, and Northern Continental Divide Ecosystem (NCDE) into the Greater Yellowstone Ecosystem. Therefore, the Nez Perce-Clearwater has the distinctive role and contribution of providing ecological conditions for grizzly bears to recolonize the Bitterroot Recovery Zone and maintain the ecological conditions to allow for migration, dispersal, and genetic interchange between grizzly bear recovery zones (Figure 90). Figure 92 shows the spatial relationship between the Bitterroot Recovery Zone, the Nez Perce-Clearwater National Forest, and the other grizzly bear Recovery Zones.

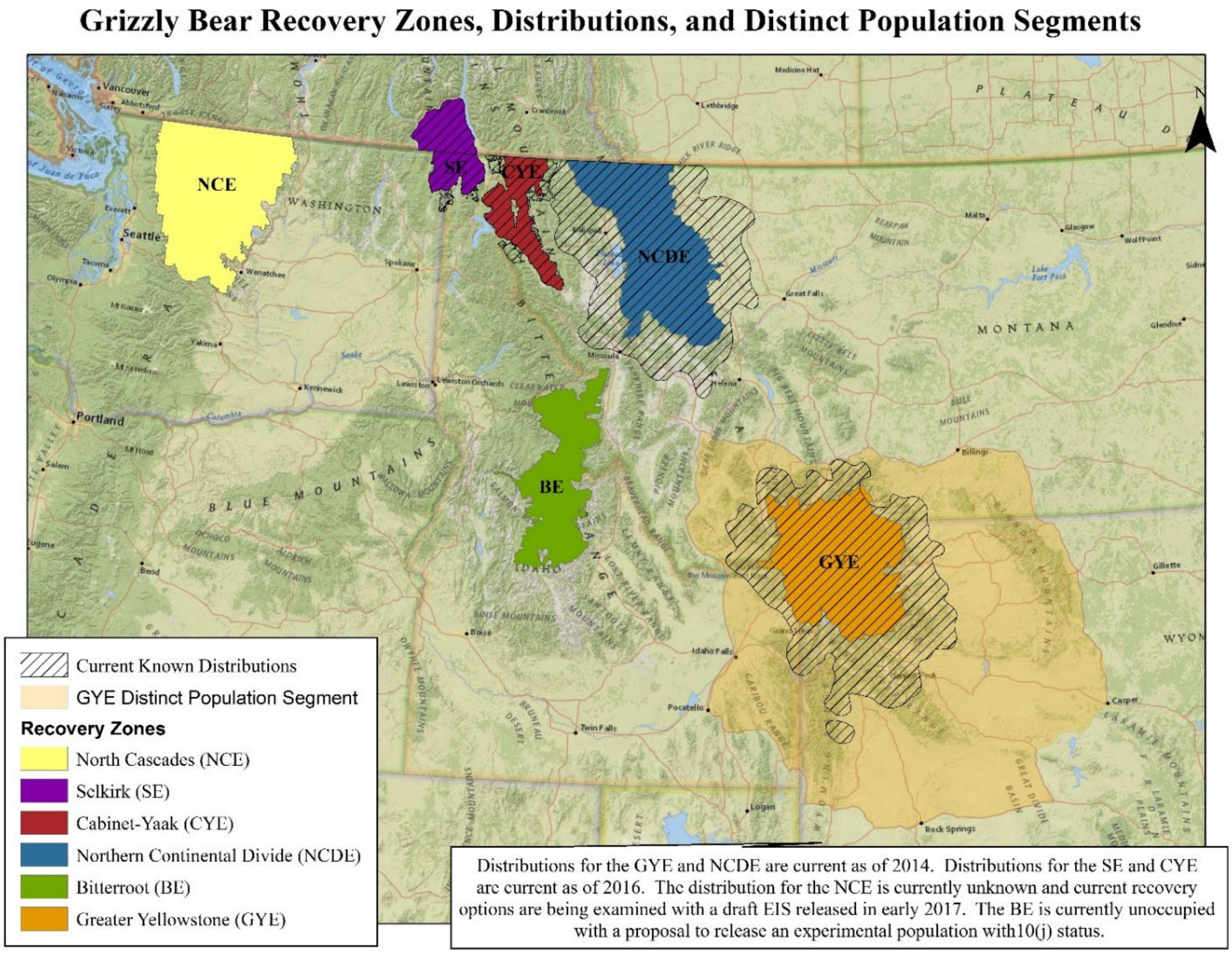


Figure 90. Grizzly bear recovery zones in relation to the plan area and the Bitterroot Recovery Zone

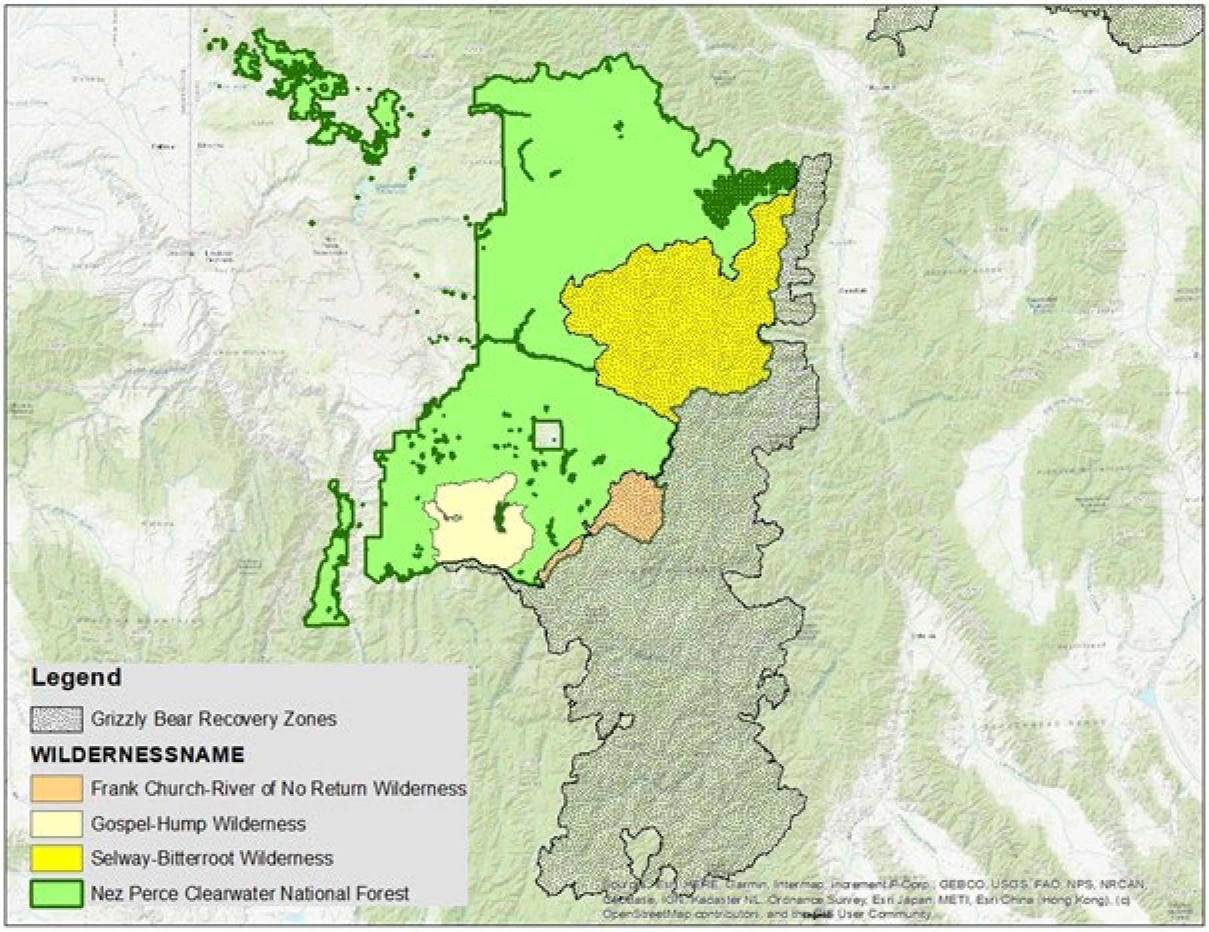


Figure 91. The Bitterroot Recovery Zone (shaded areas) in relation to the Nez Perce-Clearwater Planning Area and the Wilderness Areas within the plan area including the Frank Church-River of No Return in orange, Selway Bitterroot wilderness area in yellow, and Gospel-Hump wilderness Area in tan

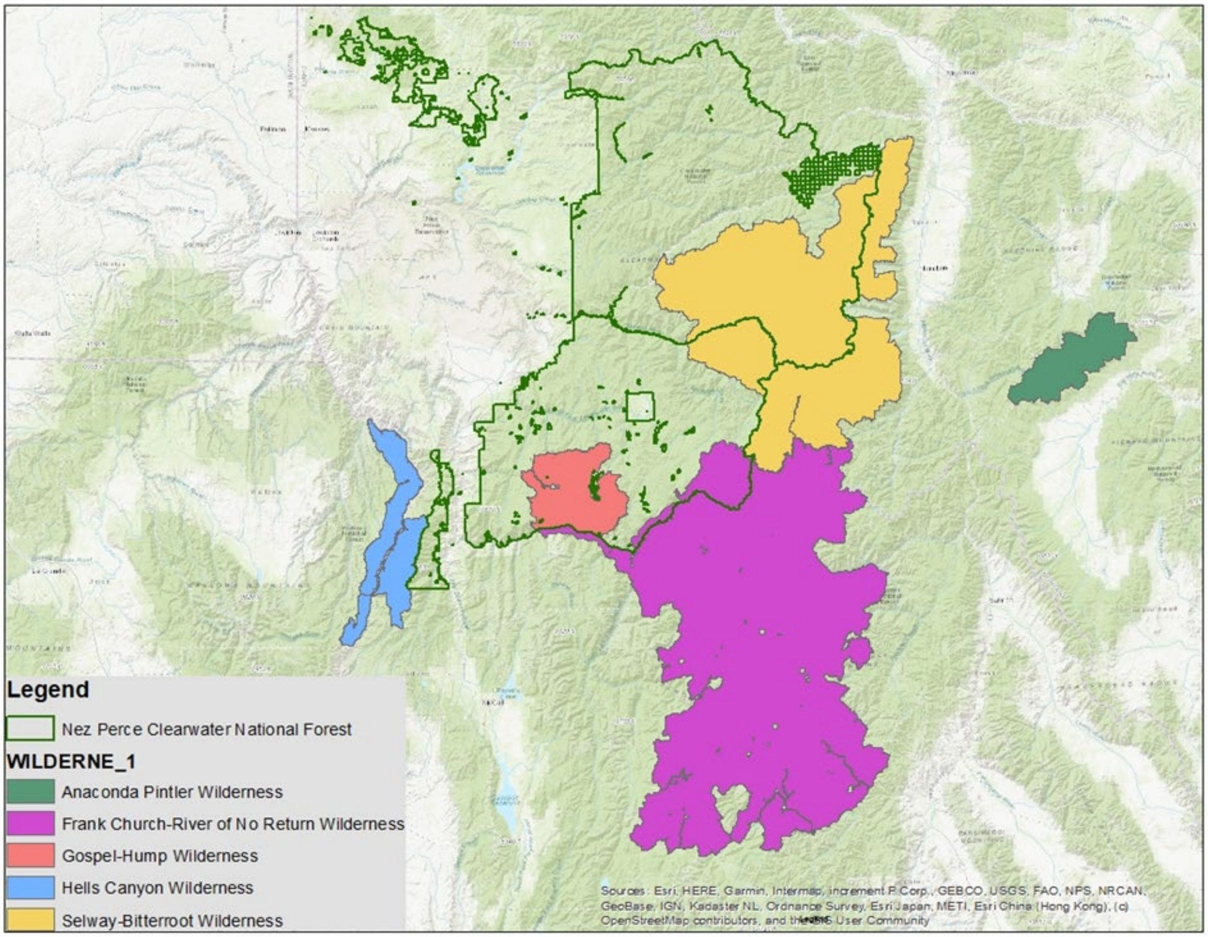


Figure 92. Nez Perce-Clearwater lands in relation to the Selway-Bitterroot, Frank Church-River of No Return, Gospel-Hump, and other nearby designated wilderness areas. The Selway-Bitterroot and the Frank Church-River of No Return Wilderness areas make up the majority of the Bitterroot Recovery Zone.

Regulatory Framework

Aside from the requirements of the 2012 Planning Rule, there is species specific direction for grizzly bears in the Forest Service Manual that apply. Forest Service policy states that forest plan management direction will contribute to the recovery of federally listed species (Forest Service Manual 2622). The responsible official may consult on the plan as a “conservation program” for listed species to comply with Endangered Species Act Section 7(a)(1). If a plan, plan revision, or amendment may affect federally listed species or critical habitat, the responsible official will consult on the forest plan (Forest Service Manual 1920.3) in accordance with the provisions of Endangered Species Act Section 7(a)(2) and accompanying regulations that guide interagency cooperation (50 CFR § 402). If the action may result in the incidental take of a listed species, the consultation may include issuance of a permit for incidental take in accordance with Endangered Species Act Section 10.

The regulations guiding interagency cooperation under the Endangered Species Act (50 CFR § 402.02) define a *framework programmatic action* as a broad-scale plan that provides the framework for development of future action(s) that are authorized, funded, or carried out at a later time. An incidental take statement may be provided, recognizing that actual take of a listed species would not occur unless and until those future action(s) are authorized, funded, or carried out and subject to their own future

Section 7 consultation. This consultation on the forest plan fits the definition of a framework programmatic action.

Forest Service policy found within Forest Service Manual 2676 provides species specific direction for grizzly bears, as listed below.

1. Cooperate with state agencies, the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, and other agencies and groups to carry out active programs to conserve the grizzly bear over the long term.
2. Implement Forest Service commitments for the conservation of grizzly bears and their habitat through coordinated planning and management.
3. Provide appropriate protection for individual grizzly bears that roam outside of delineated recovery zones and primary conservation areas. Work with the states to identify the areas where management for grizzly bears is biologically suitable and socially acceptable and coordinate management of nuisance bears.
4. Establish and implement uniform planning and management procedures concerning grizzly bears and their habitat. These should include cumulative effects analysis processes, public information and education, sanitation, and management of unnatural foods, and coordinated management of motorized access.
5. Establish and implement communication, education, assistance, and land management programs to eliminate preventable mortality of grizzly bears and minimize grizzly-human conflicts.
6. Conduct multiple-use management of grizzly bear habitat in a manner that is compatible with the goal of grizzly bear conservation.
7. Periodically monitor and report on habitat and population conditions and trends at appropriate spatial and temporal scales.

Distinctive Roles and Contribution

The plan area contains a large proportion of the Bitterroot Recovery Zone. The Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness make up the core of the Bitterroot Ecosystem for the federally listed threatened grizzly bear. These two wildernesses make up the largest contiguous block of federal land remaining in the United States and the largest block of wilderness in the Rocky Mountains. Re-establishment of the grizzly bear in this recovery zone is currently through natural dispersal. This zone is in relatively close proximity to other grizzly bear recovery zones and encompasses areas where grizzly bears could come from the north and east into the Bitterroot Recovery Zone. The Bitterroot Recovery Zone has been identified as one possible path for genetic interchange from the Selkirk, Cabinet-Yaak, and Northern Continental Divide ecosystems into the Greater Yellowstone Ecosystem. Therefore, the Nez Perce-Clearwater has the distinctive role and contribution of providing ecological conditions for grizzly bears to recolonize the Bitterroot Recovery Zone and maintain the ecological conditions to allow for migration, dispersal, and genetic interchange between grizzly bear recovery zones.

Current Status of Grizzly Bears in the Bitterroot Ecosystem

The grizzly bear is native to and was once common in the Bitterroot Ecosystem of Montana and Idaho (Servheen et al. 1995). Members of the Lewis and Clark expedition killed at least seven grizzly bears, including one female and two cubs, while camped near present-day Kamiah, Idaho. Hunters, trappers, and settlers around the turn of the century killed a substantial number of grizzly bears. Conservative estimates indicate trappers and hunters killed 25 to 40 grizzly bears annually in the Bitterroot Mountains until the early 1900s. Sheepherders killed many more in subsequent decades. Ultimately, the grizzly bear population in this area was lost due to high human-caused bear mortality. Prior to recent observations since before 2007, the last verified death of a grizzly bear in the Bitterroot Ecosystem was in 1932 and the last verified tracks were documented in the 1940s (Servheen et al. 1995). In the past half century, several studies, including annual aircraft wildlife surveys by state wildlife personnel, black bear studies, DNA hair snares, and remote camera surveys, have been conducted that were designed to or were likely to have incidentally identified grizzly bear presence in the Bitterroot Ecosystem. However, no grizzly bears were detected by those studies.

Melquist (1985), conducted a survey on the Clearwater National Forest using ground and aerial surveys and grizzly bear observations and compiled 88 reports of grizzly bears between 1900 and 1984. No signs of bears were found during aerial or ground surveys. No verifiable observations were reported. Of the 88 reports, there were 2 confirmed—one from around Grangemont in 1909 and one along Colt Killed Creek near Powell in 1956. However, the 1956 observation was subsequently found to NOT be a grizzly bear. Groves (1987) compiled and reviewed 175 historical grizzly bear reports from central and northern Idaho, including 77 reports on all national forests except the Sawtooth and Bitterroot from within the Bitterroot Grizzly Bear Recovery Zone. Most of the reports (62) came from the Clearwater National Forest. Groves did not document any additional evidence that confirmed any of the reports. Servheen et al. (1990) and Kunkel et al. (1991) surveyed for grizzly bears during two summers in the Upper North Fork using remote cameras. No photos of grizzly bears were recorded; however, the small area and low camera densities were cited as a reason to caution against confirming the absence of bears. More recently, from 2008 to 2009, Servheen and Shoemaker (2010) conducted a camera and DNA survey of the Bitterroot Mountains. No grizzlies were detected during either the 2008 or 2009 surveys.

The U.S. Fish and Wildlife Service systematically surveyed for grizzly bears throughout the northern Bitterroot Mountains between U.S. Highway 12 in Idaho and Montana Highway 200 and between Missoula, Montana and Avery, Idaho during 2008 and 2009. Barbed wire DNA hair corrals and remote cameras were deployed. No grizzly bears were detected, but their methods did not allow them to conclude that they were absent from the area. Their failure to document grizzly bears in this survey indicates that if they were regularly occupying the Bitterroot Ecosystem, there were very few individuals and they existed at very low densities (U.S. Department of the Interior 2011c). The U.S. Fish and Wildlife Service considers the Bitterroot Ecosystem to be unoccupied (U.S. Department of the Interior 2021c).

In 2007, a male grizzly bear was accidentally shot and killed on the North Fork Ranger District near Kelly Creek by a hunter who mistook the bear for a black bear. This bear was genetically tested and found to be most closely related to bears in the Selkirk Ecosystem. The distance from the nearest boundary of the Selkirk Ecosystem to the spot where this bear was killed is approximately 141 air miles. The Northern Continental Divide Ecosystem population has been expanding its distribution and a few grizzly bears have been documented to move southward recently. There have been a handful of verified grizzly bear observations in the northwest portion of the Bitterroot Valley and in the Sapphire Mountains. In 2002, a grizzly bear was verified on private property on Sunset Bench southeast of Stevensville, Montana. That bear is thought to have crossed the Sapphire Range from the Rock Creek drainage. In October of 2018, a young male grizzly bear was trapped at the Whitetail Golf Course east of Stevensville and relocated to the southern end of the Northern Continental Divide Ecosystem. This bear was trapped about 11 miles from the eastern boundary of the Bitterroot Recovery Zone.

Bear 927, a radio-collared male augmentation bear was released in the West Cabinet Mountains near Spar Lake on July 21, 2018. An augmentation bear is a bear transplanted into the Cabinet Yaak Ecosystem to increase genetic diversity. This bear crossed I-90 on June 4, 2019 and headed south into the Nez Perce-

Clearwater. Nearly as soon as he entered the Nez Perce-Clearwater, he was photographed by game cameras near a bear bait operated by an outfitter and guide who has a permit to guide on the Nez Perce-Clearwater. The outfitter reported the observation to the Idaho Department of Fish and Game and the Forest Service shortly after detecting the bear. This bear continued to move southeast through the plan area and crossed into the Bitterroot Recovery Zone near Lolo Pass. Bear 927 spent two months moving around the Bitterroot Ecosystem, including time within the Bitterroot Recovery Zone before heading back north into the Cabinet Mountains to den in October (Costello and Roberts 2021). In 2020, he went northwest upon den emergence and lost his collar. One other observation confirmed as a grizzly bear was made near Lolo Pass in 2019 and is suspected to have been Bear 927.

A few anecdotes can be inferred from this event. First, the bear was detected quickly after it entered the Nez Perce-Clearwater, suggesting that, if there were other grizzly bears present, they might also be quickly detected by bear hunter’s cameras at bear bait sites. Second, the ability of this bear to cross through the northern half of the Nez Perce-Clearwater and into the Bitterroot Ecosystem suggests that the Nez Perce-Clearwater is relatively permeable at least for male grizzly bears.

There were two verified sightings in 2019 south of Grangeville, Idaho of the same individual male bear that was not Bear 927. There was another sighting east of Whitebird, Idaho that was photographed by a game camera over bear bait. It is unknown if the Whitebird sighting was the same bear as near Grangeville (approximately 14 air miles apart). Verified observations of grizzly bears are shown in Figure 93 below, which was provided by the U. S. Fish and Wildlife Service’s Grizzly Bear Recovery Office on September 6, 2022.

The criteria for a population of grizzly bears were defined in 50 C.F.R. § 17.84(l) after consulting with 37 scientists familiar with bear populations as:

> A grizzly bear population is defined by verified evidence within the previous six years, consisting of photos within the area, verified tracks and/or sightings by reputable scientists or agency personnel, of at least two different female grizzly bears with young or one female seen with different litters in two different years in an area geographically distinct (separate) from other grizzly bear populations...

Despite the observations, the criteria for a population of grizzly bears have not been met in either the Bitterroot Ecosystem or in the Recovery Zone as defined above, and so it is considered unoccupied. However, grizzly bears may be present as evident from the observations mentioned above (Figure 94 below) and was established by the observations shown in Figure 93. This figure represents the current distribution of where grizzly bears “may be present,” but we acknowledge that where grizzly bears may be present may change over the course of the plan. Grizzly bears are a wide-ranging species and much of the plan area is within the dispersal capabilities of as many as three grizzly bear ecosystems. Based on recent observations of dispersing grizzly bears, additional grizzly bears may enter the Nez Perce-Clearwater, and new areas have a high likelihood of becoming areas where grizzly bears “may be present” over the course of the plan.

Based on this information, the U.S. Fish and Wildlife Service recently expanded their determination of where they consider grizzly bears to be present as part of a new consistency modeling approach (U.S. Department of the Interior 2019). This document identifies the criteria by which the U.S. Fish and Wildlife Service identifies area where bears may be present. There is no way to know how many bears will enter the planning area, where they will enter, and whether they will stay; however, based on current trends, numbers are likely to remain low. It is likely there will be more male grizzly bears moving into the area before females arrive. The Northern Continental Divide, Selkirk, and Cabinet-Yaak ecosystems are within the maximum grizzly bear dispersal range. It is assumed that grizzly bears will continue to recolonize the Bitterroot Ecosystem, albeit slowly (U.S. Department of the Interior 2019). There will not be reproduction until females enter the planning area. The analysis in many ways is based on conditions to support a future bear population but is based on factors known to affect grizzly bear survival in other areas.

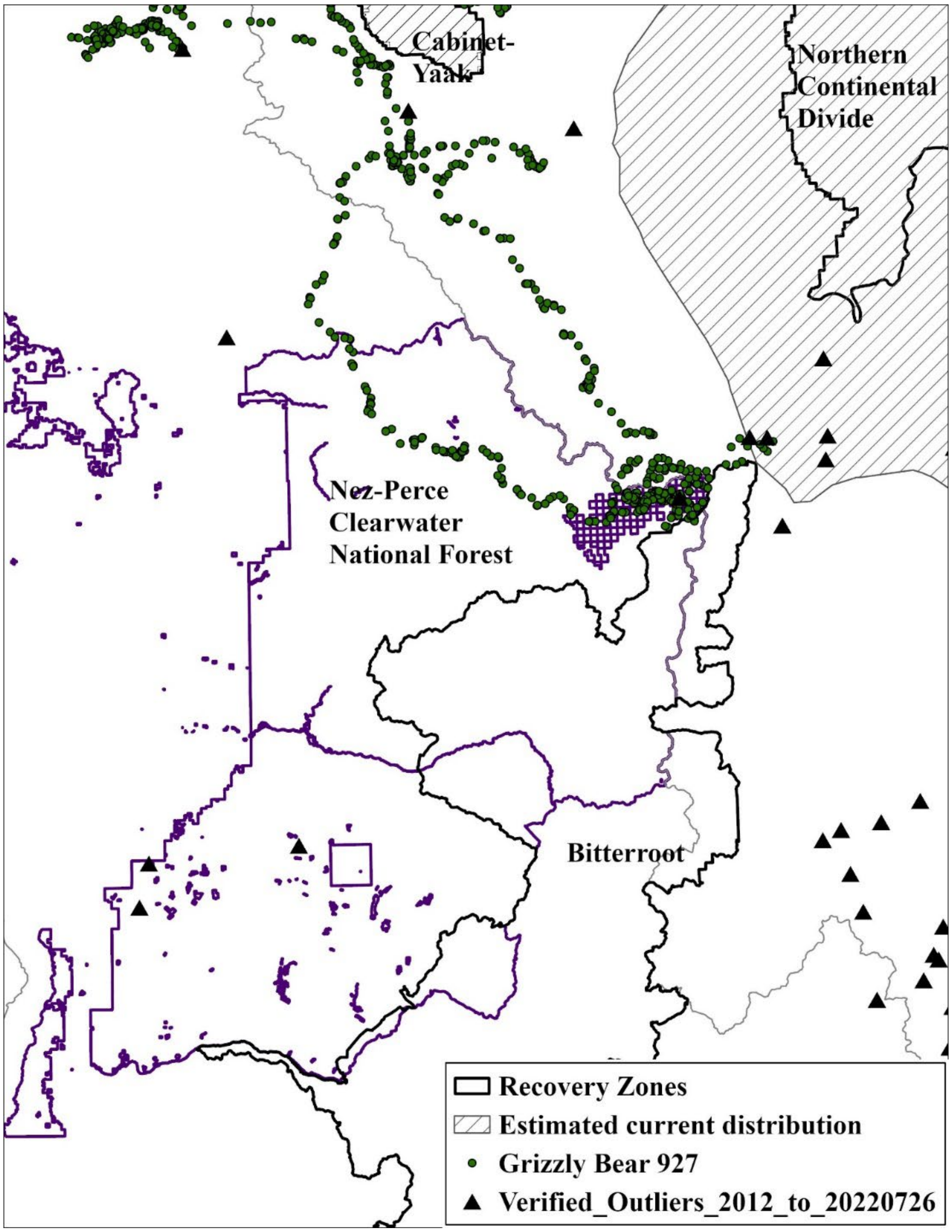


Figure 93. The observations of grizzly bears within the Nez Perce-Clearwater National Forest and the surrounding lands. Verified outliers are grizzly bears who made atypical movements outside of the known estimated current distribution. Note that the bear killed in 2007 is not shown on the map because the observation is more than 10 years old. Map provided by the U.S. Fish and Wildlife Service 9/06/2022.

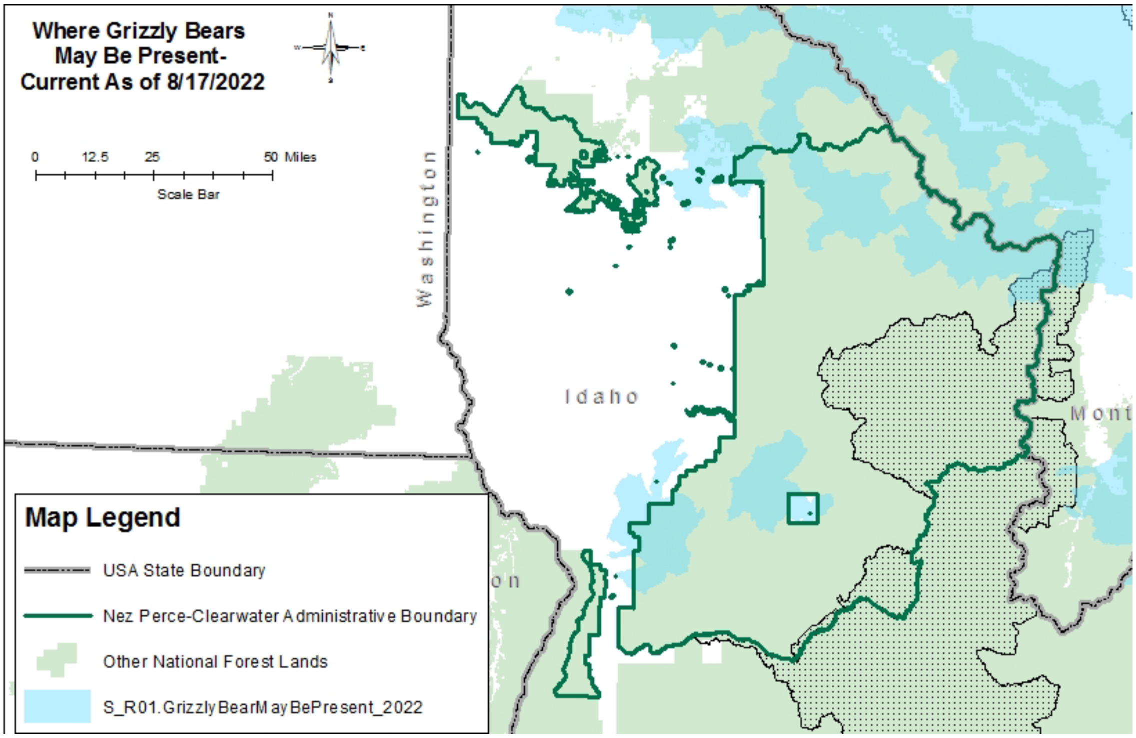


Figure 94. Area where grizzly bears may be present in relation to the Nez Perce-Clearwater planning area and the Bitterroot Recovery Zone as of 8-17-2022

Criteria for Recovery

The Grizzly Bear Recovery Plan (1993), including the Bitterroot Ecosystem Recovery Plan Chapter (Servheen 1996), lays out the criteria needed for recovery. The criteria for when the populations will be viable are when they meet the demographic recovery targets and it can be demonstrated that adequate regulatory mechanisms exist to ensure continued population and habitat management after delisting (U.S. Department of the Interior 1993). The overall goal of the recovery plan is to remove the grizzly bear from threatened status in each of the ecosystems in the 48 conterminous states.

For the Bitterroot Ecosystem, the criterion includes 14 females with cubs over a running six-year average. The method by which this would happen would be through natural dispersal (Federal Register: June 22, 2001, Volume 66, Number 121), however because the final rule was never finalized, 50 CFR § 17.84(l) for the Selway-Bitterroot ecosystem is still technically in effect. The goal for human caused mortality is 0 until at least 90 grizzly bears are established, after which a goal of human cause mortality is not to exceed 4 percent and no more than 30 percent of which would be limited to females. A total of approximately 280 grizzly bears is the tentative long-term recovery objective for the Bitterroot Ecosystem (Supplement: Bitterroot Ecosystem Recovery Plan Chapter (1996)). The recovery plan suggested that management should strive to prevent all human-caused mortality within and surrounding the Bitterroot Ecosystem. Naturally to achieve recovery, female grizzly bears must disperse into the Bitterroot Recovery Zone through connectivity from the other grizzly bear ecosystems and then must reproduce, once established, to grow the population.

The grizzly bear recovery plan anticipated that grizzly bears can and will exist outside the boundaries of the recovery zones. The Recovery Plan (1993) recognizes that grizzly bears occasionally will move and even reside permanently in areas outside of recovery zones. It states that:

> Bears can and are expected to exist outside recovery zones lines in many areas. However, only the area within the recovery zone will be managed primarily for grizzly bear habitat.

However, the recovery plan also acknowledged that linkage would be necessary for isolated populations to increase and sustain themselves at recovery levels. The recovery plan (U.S. Department of the Interior 1993) stated that one factor that may affect the sustainability of grizzly bear populations in the future is the ability of individual animals to move between ecosystems. Accurate information is necessary to assess the potential for this type of movement in linkage zones between existing adjacent grizzly bear recovery zones (U.S. Department of the Interior 1993). Future land management activities within these areas may be critical to maintaining their utility as linkage zones (U.S. Department of the Interior 1993). Thus, outside the recovery zones, the emphasis is on linkage zones. Linkage zones are areas between currently separated populations that provide adequate habitat for low densities of individuals to exist and move between two or more larger areas of suitable habitat (U.S. Department of the Interior 2021c).

According to the recovery plan, mortality from direct and indirect sources within and surrounding the Recovery Zone must be addressed if grizzly bears are to recover (Servheen 1996). Sources of direct mortality include illegal killing, accidental deaths, and management associated removals. Accidental deaths include mistaken identities by black bear hunters and other big game hunters, road kills, or handling errors when bears are captured for management or research. Mortality can also result from control actions by private citizens, such as livestock operators, apiarists, outfitters, resort operators, landowners protecting their property, and by hunters defending their kills. Direct mortality may also occur during agency control of nuisance bears for livestock conflicts, property damage, or situations threatening to human life or self-defense (Servheen 1996). Indirect mortality includes deaths that occur with those actions that bring bears and people into conflict, such as road use, land development, and recreation (Servheen 1996). The grizzly bear recovery plan recommends that every effort should be made to limit mortality to zero in the initial phases of recovery when the number of bears will be low.

Habitat Requirements and Life History

The 2021 grizzly bear species status assessment (U.S. Department of the Interior 2021c) identified large intact bocks of land, cover, high-caloric foods, and dens as habitat needs for the grizzly bear in the lower 48 states. For demographic needs, it identified connectivity, adequate fecundity and survival, genetic diversity, population trend, and abundance as ecosystem-level needs for resiliency. For analysis of current and future condition, the status assessment selected a subset of these needs, two habitat factors and six demographic factors that are most influential to ecosystem resiliency and that could be measured relatively consistently across all six ecosystems. The two habitat factors and six demographic factors used to evaluate condition were: natural, high-caloric foods, large intact blocks of land, adult female survival, abundance, population trend, fecundity, inter-ecosystem connectivity, and genetic diversity (U.S. Department of the Interior 2021c).

Habitat Use

Grizzly bears are large animals that have high metabolic demands during the non-denning season. Adequate nutritional quality and quantity are important factors for successful reproduction. Grizzly bears are omnivorous and use a wide variety of habitats, including meadows, shrublands, and forests from valley bottoms through alpine habitats, to locate food sources. Available food sources vary annually, seasonally, and even day-to-day (Mietz 1994). Grizzly bears are dependent upon learned food locations within their home ranges and can switch food habits according to which foods are available (Aune and Kasworm 1989b, Kendall 1986, Mace and Jonkel 1986, Servheen 1983).

Grizzly bears use a wide variety of habitats. Since grizzly bears are generalists with a high variability in diet among individuals, seasons, and years (Schwartz et al. 2003, Servheen 1981, Mattson, Blanchard, and Knight 1991, Mattson, Gillin, et al. 1991, Interagency Grizzly Bear Committee 1987b, Felicetti et al. 2004, Northern Continental Divide Ecosystem Subcommittee 2013, Aune and Kasworm 1989b), they generally have an omnivorous diet (Jacoby et al. 1999, Schwartz et al. 2003). The historical distribution of grizzly bears is evidence of their habitat plasticity, as they inhabited diverse ecosystems throughout their historic range from Northern Alaska and Canada south to Central Mexico.

Home Range

Adult grizzly bears are normally solitary, except females with cubs or during short breeding relationships. They will tolerate other grizzly bears at closer distances when food sources are concentrated, and siblings may associate for several years following weaning from their mother (Egbert and Stokes 1976). Home ranges of subadult females generally overlap with the maternal home range (Blanchard and Knight 1991). Males consistently exhibit greater indices of movement and less fidelity to home ranges than females (Blanchard and Knight 1991).

Home range size varies with the availability of food resources, sex, age, reproductive status, and other factors (Blanchard and Knight 1991, Interagency Grizzly Bear Committee 1987a). Across their range, home range sizes for female grizzly bears are approximately 150 square miles (96,000 acres) (Interagency Grizzly Bear Committee 1987a) though habitat quality can affect the size. Females with cubs-of-the-year have the smallest home range sizes (Blanchard and Knight 1991, Mace and Roberts 2011). The annual home range of adult male grizzly bears in the lower 48 states is typically 2 to 3 times the size of an adult female's annual home range (Interagency Grizzly Bear Committee 1987a).

No estimates exist for home range size for the Bitterroot Ecosystem so the assumptions are that they would be similar to those in other grizzly bear ecosystems. Home range sizes are smaller in the Northern Continental Divide Ecosystem (NCDE) than in the Greater Yellowstone Ecosystem (GYE). For example, in the NCDE, female annual home range size (95 percent isopleth using the fixed kernel method) ranged from an average of about 50 square miles for females with cubs-of-the-year to an average of about 93 square miles for subadult females (Mace and Roberts 2011). In the GYE, average home range size (using the minimum convex polygon method) was 108 square miles for all adult females and 141 square miles for subadult females (Blanchard and Knight 1991). Annual home range size for adult males in the GYE study area averaged 337 square miles. Home ranges in the NCDE have been reported for female grizzly bears by Mace and Waller (1997) at 48 square miles, and by Aune and Kasworm (1989b) at 159 square miles. In the greater Yellowstone, female home ranges have been reported to average 341 square miles (Blanchard and Knight 1991). Lifetime female home ranges in the Cabinet-Yakk Ecosystem (CYE) averaged 216 square miles (U.S. Department of Agriculture 2020d), while those in the Selkirk Ecosystem (SE) averaged 161.7 square miles (U.S. Department of Agriculture 2020d). Young, female grizzly bears usually establish home ranges within or overlapping their mother's and this pattern of home range establishment can make dispersal of females across landscapes a slow process (U.S. Department of the Interior 2021c). According to the Grizzly Bear Species Status Assessment (U.S. Department of the Interior 2021c), grizzly bear females average 138 mi^2 in the NCDE, 50mi^2 in the GYE, 127 mi^2 in the CYE, and 115 mi^2 in the SE. Male grizzly bear's home ranges average 527 mi^2 in the NCDE, 183 mi^2 in the Greater Yellowstone Ecosystem, 835 mi^2 in the CYE, and 241 mi^2 in the SE. Home range size is affected by resource availability, sex, age, and reproductive status (U.S. Department of the Interior 2021c). Estimates of home range size can also be influenced by the timeframe through which data were collected, and the method used to delineate them from telemetry data. Examples of home range methods include minimum convex polygon method, kernel density estimators, and so forth. This analysis assumes that grizzly bear home ranges would range in size somewhere between the estimates above. Home ranges sizes are useful consideration for evaluating effects of future projects against baseline conditions, and each new project conducted under the direction of the Revised Forest Plan will undergo site specific analysis and consultation for effects to grizzly bears.

The sizes of female home ranges have informed the size of management units within recovery zones such as Bear Management Units (BMUs) and subunits. BMUs and subunits are analysis areas delineated by the Interagency Grizzly Bear Committee and were established to meet recovery criteria outlined in the recovery plan (U.S. Department of the Interior 1993). BMUs have been delineated typically only within recovery zones and have not been delineated in areas outside of recovery zones. BMUs in other recovery zones vary in size from approximately 250 km^2 (96 mi^2) to 1,380 km^2 (532 mi^2) and were usually delineated using topographic and hydrologic features. BMUs are established by the Interagency Grizzly Bear Committee when appropriate. Thereafter, BMUs were adopted as the boundaries to establish conservation measures in land management plans such as forest plans. Neither BMUs nor subunits have been established within the Bitterroot Recovery Zone.

The plan does not include direction for BMUs nor subunits; however, these are typically established by the Interagency Grizzly Bear Committee and can be implemented outside of the Forest Plan. Also given the limited use by grizzly bears no estimate exists for home range size in the Bitterroot Ecosystem, as such this analysis assumes that grizzly bear home ranges would be like those in other ecosystems. Each new project conducted under the direction of the Revised Forest Plan will undergo site specific analysis and consultation and at that time best available science will guide the analysis for grizzly bear both within and outside the Bitterroot Recovery Zone. There is no available data to inform the size of grizzly bear home ranges within the Bitterroot Ecosystem.

Denning

Grizzly bears are quite variable in their selection of denning habitat and structures (Schwartz et al. 2003). Grizzly bears usually dig dens on steep slopes where wind and topography cause an accumulation of deep snow and where the snow is unlikely to melt during warm periods. In addition, grizzly bears are more likely to den in areas with greater canopy cover (Pigeon et al. 2016) and at elevations above 6,371 feet (greater than 1,942 meters) (Mace and Waller 1997). Grizzly bears usually excavate their dens for hibernation in areas that will be covered with a blanket of snow (Craighead and Craighead 1972). Grizzly bears generally enter their dens from September to November and remain until mid-March or late April (Dood et al. 2006). Males typically enter dens later in the fall and emerge earlier in the spring than do females. Both males and females have a tendency to use the same general area for hibernation year after year, but the same den is rarely reused by an individual (Linnell et al. 2000). In the Northern Continental Divide Ecosystem, most grizzly bear dens were documented at elevations above 6,400 feet in northwestern Montana (Mace and Waller 1997) with the average elevation somewhat higher on the Rocky Mountain front (Aune 1994). Upon emergence from the den, grizzlies move to lower elevations, drainage bottoms, avalanche chutes, and big game winter ranges to exploit spring food resources.

Diet

Grizzly bears have a high degree of dietary plasticity and are capable of shifting to alternate food sources when key food items are scarce or unavailable. Gunther et al. (2014) documented 266 species of plant, animal, fungi, algae, and soil consumed by grizzly bears in the Greater Yellowstone Ecosystem. Important food items include berries, ungulate biomass, mast (for example, whitebark pine seeds), ants, clover, dandelion, vegetation, and fish. Grizzly bears use numerous different habitats for foraging. Use tends to be more frequent in areas that offer some type of hiding cover nearby, particularly during daylight hours (Aune and Kasworm 1989b, Mace and Waller 1997). Waller (1992) reported that grizzly bears avoided lower-elevation, more accessible harvested stands, as well as stands less than 30–40 years old where the vegetation had not recovered enough to provide cover. Vegetation management may alter the amount and arrangement of cover and forage available to bears. Timber harvest and fire can locally increase bear foods by stimulating the growth of grasses, forbs, and berry-producing shrubs. Associated roads and human activity can negatively affect grizzly bears by disturbing or displacing bears during logging activities and by increasing mortality risk (Zager et al. 1983).

Grizzly bears have a strong sense of smell which they use to find food sources. They are known to travel far distances following their sense of smell to find forage. They also tend to return to high quality nutritional resources repeatedly and habitually as a strategy to gain weight to meet the demands of hibernation. Their keen sense of smell sometimes leads them to human foods and attractants that lead to conflicts and affects their survival. Human-grizzly bear conflicts can be caused by unsecured attractants, habituation to human presence, and food conditioning of bears. These conflicts lead to grizzly bear mortality or removal (Knight et al. 1988). Developed recreation sites that support overnight public use are thought to have a higher potential to increase both the levels of bear attractants and grizzly bear mortality risk (Northern Continental Divide Ecosystem Subcommittee 2018).

Secure Habitat and Motorized Access

Historically, grizzly bear populations persisted in landscapes without permanent human presence where the frequency of contact with humans was low (Mattson and Merrill 2002). Maintaining large blocks of secure habitat is important to the survival and reproductive success of grizzly bears, especially females (Mace et al. 1999, Schwartz, Haroldson, and White 2010). The most important predictors of survival in the Greater Yellowstone Ecosystem were the amount of secure habitat within a bear's home range and road densities outside of secure habitat (Schwartz, Haroldson, and White 2010). In the Northern Continental Divide Ecosystem, human-caused mortality was the most important factor driving grizzly bear survival rates (Mace et al. 2012). The majority of management removals of grizzly bears resulted from human-bear conflicts at sites with frequent or permanent human presence and unsecured attractants, such as garbage, human foods, pet and livestock foods, and orchard fruit.

Numerous studies using various methods have documented that roads in grizzly bear habitat affect behavior and habitat use and can lower a bear survival rate during the non-denning season (Mattson et al. 1987, Mattson et al. 1996, Boulanger and Stenhouse 2014, Waller and Mace 1997, McLellan and Shackelford 1988). Research demonstrates that roads and associated human activities impact grizzly bears during the non-denning season by displacing them from important habitats and lowering their survival and reproduction rates (Boulanger and Stenhouse 2014, Mace and Waller 1996, Mattson et al. 1987, McLellan and Shackelford 1988). Displacement may be responding with a relatively short term, short distance response or may be displaced with a longer-term avoidance response and movement to another area. Motorized access can affect bears by increasing human interaction and the potential for conflict, increasing the chance of habituation to humans, and increasing energetic requirements related to disturbance by humans (U.S. Department of the Interior 2011c). Displacement from habitat or increased stress levels may be especially problematic for female grizzly bears attempting to reproduce by causing decreased nutritional status (Mattson et al. 1987). The amount and pattern of motorized access in grizzly bear habitat is a stressor that can be influenced by Forest Service management of National Forest System lands.

Although road density provides a tool to describe human-caused effects to grizzly bears based on existing literature, it fails to consider traffic volume, proximity to forage resources and how road placement affects habitat patch size (Proctor et al. 2019). Secure areas are a major component of grizzly bear habitat because they provide opportunities for bears to meet energetic needs with low potential for disturbance from human intrusions.

Studies have shown that female grizzly bears selected for, or survived better in, areas with greater secure habitat (Mace et al. 1996, Wakkinen and Kasworm 1997). Mace et al. (1996) showed females selected for home ranges with 56 percent secure habitat compared to 30 percent secure habitat outside the composite female home ranges. Across the border in Canada, researchers found that female grizzly bears selected for, and survived better in, areas with 56 percent secure habitat as compared with available areas with 46 percent secure habitat (Proctor et al. 2019). While these values are useful for comparative purposes, this information does not justify a specific threshold towards which to manage because the amount of secure habitat is a continuous variable that occurs on a spectrum of ranges across a variety of landscape conditions. Thus, a specific, justifiable threshold is unlikely to exist, and instead would more likely represent a decreasing probability of survival as the amount of secure habitat decreases. Determining the relationship would necessarily require evaluating many more than the 13-bear sample size used by Mace (1996) and would require evaluating vital rates in many landscapes across the range of grizzly bears rather than from one area. Also, interpretation of these values requires understanding the context under which the studies were conducted and the questions the research was attempting to answer. The purpose of Mace's (1996) study was not to identify what the minimum threshold for secure habitat required for female reproduction and survival as a minimum absolute value but to answer what were the conditions in a landscape managed for multiple uses (timber harvest, roads and recreation) under which female grizzly bears were successful at produce surviving cubs into sub-adulthood. Furthermore, it would be inappropriate to apply such a metrics from Mace's (1996) limited study from a different area as a constraint or management objective in the plan to an unoccupied landscape like the Bitterroot Recovery Zone which has no site-specific information on grizzly bear use in this area. Any comparisons in this analysis to these secure habitat ranges are limited to evaluating whether (and where in) the Planning Area has 1) the current existing conditions similar to those that have supported grizzly bear female survival or reproduction in other areas, and 2) whether the plan would maintain those conditions for future potential occupancy.

The Grizzly Bear Recovery Plan (U.S. Department of the Interior 1993) noted that the most crucial element in grizzly recovery is securing adequate effective habitat for bear populations, which include food, cover, denning habitat, solitude, and space (Craighead and Mitchell 1982). With respect to grizzly bears, habitat is "secure" generally when recurring human use is low. For the purposes of conservation and recovery of grizzly bear populations, secure habitat has commonly been defined as areas of a specified minimum size that are beyond a specified distance from motorized routes (Mace et al. 1996, Boulanger and Stenhouse 2014). Grizzly bear secure habitat is defined slightly differently in grizzly bear literature and in different conservation strategies.

Female home-range selection and survival also has related to the proportion of habitat greater than 500 meters from an open or gated road, often termed "secure habitat" (Proctor et al. 2019). Wakkinen and Kasworm (1997) demonstrated that smaller-sized core blocks tended to be underutilized by their study animals, particularly those of less than two square miles (1,280 acres). However, while more than 97 percent of the use by successfully reproducing females occurred in blocks greater than two square miles, actual use occurred in blocks as small as 0.22 square miles (141 acres). However, there have not been any studies that identify the minimum size of secure habitat that grizzly bears will use.

Human use of public lands is highly correlated to the availability and distribution of motorized access. The intersection between secure habitat and motorized use occurs due to associated mortality factors such as bear-vehicle collisions, potential lawful or illegal hunter harvest, and interaction with humans. Jaeger (Jaeger 2000, Jaeger et al. 2005) found the distribution and configuration of roads can influence secure habitat patch sizes significantly. For instance, even in areas with overall low road density, there may be patches of high road density interspersed with patches of low road density or unroaded areas, influencing how grizzly bears use the landscape. Identifying secure habitat incorporates the effects of motorized use while better addressing spatial issues associated with variable road density within an area.

Schwartz et al. (2010) determined that secure habitat within female home ranges had a larger influence on their survival than road densities. Schwartz (2010) suggested that secure habitat is correlated with road densities but provided distinct and important contribution to grizzly bear survival modeling and showed that increased road density had a greater effect on predicted survival as secure habitat decreased. The most important predictors of survival in the best survival models were the amount of secure habitat within a bear's home range and road densities outside of secure habitat (Schwartz, Cain, et al. 2010). They concluded that managing the landscape to reduce hazards to grizzly bears requires balancing road density standards with the amount of secure habitat available (Schwartz, Cain, et al. 2010). Multiple studies concluded general that areas with a higher percentage of secure habitat showed greater selection for and survival of female grizzly bears (Mace et al. 1996, Wakkinen and Kasworm 1997, Gibeau et al. 2001). The amount of secure habitat metric more adequately represents the potential effects related to motorized access as it provides a more accurate indication of the spatial mix of motorized routes and secure habitat (Proctor et al. 2019).

Winter Recreation

The impacts of winter recreation activities on denning bears are not well studied. The Grizzly Bear Species Status Assessment (U.S. Department of the Interior 2021c) suggested it is important to consider the potential impact from winter recreation because grizzly bears are easily awakened in their dens. It also suggested that disturbance of grizzly bears in the den can result in cub abandonment or early den exit, which could kill a grizzly. The Species Status Assessment (U.S. Department of the Interior 2021c) found no studies in the peer-reviewed literature documenting the effects of snowmobile use on any denning bear species and no records of litter abandonment by grizzly bears in the lower 48 states due to snowmobiling; the information that is available is based on opportunistic sightings and small sample sizes, for example Hegg et al. (2010). The Species Status Assessment cited evidence from studies from Scandinavia (Swenson et al. 1997) suggesting that abandonment is possible as a result of den disturbance.

Reproduction and Dispersal

Grizzly bears live at relatively low population densities, disperse slowly, and are vulnerable to human-caused mortality. Female grizzly bear dispersal occurs gradually over several years and over short distances (McLellan and Hovey 2001b, Proctor et al. 2004, Proctor et al. 2015). A genetic analysis to estimate dispersal distances in Canada estimated the average dispersal for female grizzly bears was about 8.9 miles and about 26 miles for males away from their natal home ranges (Proctor et al. 2004). Another study used radio collared and marked bears to estimate dispersal after family break up (McLellan and Hovey 2001b). McLellan and Hovey (2001a) measured the distances between the home range center of a mother and her dispersed offspring over 20 years. Their study looked at 30 offspring, 12 females, and 18 males. This study suggested that female bears dispersed about on average 6 miles from their natal home range between one to four years after the family break up. Males in this study dispersed on average 18.5 miles from their natal home range. The farthest distances dispersed were 41.6 miles for males and 12.42 miles by females in this study.

On average, females reach sexual maturity sometime between four and seven years of age and give birth to one to three cubs about every three years (Schwartz et al. 2003). Depending upon where female grizzly bears eventually enter the forest, and if they follow their typical pattern of dispersal, it could take generations of females living in portions of the Nez Perce-Clearwater before they reach the Bitterroot Recovery Zone. However, the distances are all within the dispersal capabilities of female grizzly bears. There are no known recent observations of female grizzly bears within the plan area since they were extirpated. According to the U.S. Fish and Wildlife Service, a female known as Ethyl passed within approximately 6.2 miles (10 km) from the Nez Perce-Clearwater's northern boundary. Ethyl was a management bear that was relocated several times and exhibited unusual, very long-range movements in response to relocation, that are not typical of most female grizzly bears. This female traveled on both sides of I-90. She returned to the Northern Continental Divide Ecosystem (NCDE) and dropped her radio collar which at the time was very far from the plan area boundaries.

Most females demonstrate smaller dispersal ranges, long-distance dispersal does occur occasionally. The next closest female locations are approximately 25 miles away and north of I-90. The closest verified sighting of a known female was approximately 37 miles to the east, south of I-90. Females typically establish home ranges 6 to 8.8 miles away from the center of their mother's home range. However, long-distance dispersal by females has been documented up to 49.7 to 55.9 miles, typically on the edge of expanding populations. While it is unknown how long it will take females to enter the plan area, given the normal dispersal tendencies of female grizzly bears, it could be a long time until female grizzly bears disperse onto the national forest, but we cannot discount that females could arrive earlier. Thus, female dispersal into the Nez Perce-Clearwater during the life of the Forest Plan has a low probability but cannot be discounted.

Proctor et al. (2012) used genetic data from 3,134 grizzly bears along with radio telemetry location data from 792 grizzly bears across the distribution in western Canada and northern United States to assess large-scale movement patterns and genetic connectivity among bear populations. In the northern more remote portion of their distribution, grizzly bear populations were found to be well connected with movement, dispersal, and gene flow influenced by distance and natural topographic features such as icefields, as would be expected. In contrast, in the southeastern part of their distribution, rates of movement and genetic interchange were impaired. Population fragmentation in these areas was associated with human settlements, highways, and human-caused mortality. Maintaining or improving connectivity is critical for isolated populations, such as the Greater Yellowstone Ecosystem; small populations, such as in the Cabinet-Yaak Ecosystem; and unoccupied areas, such as the Bitterroot Ecosystem. Proctor et al. (2012) found that male grizzly bears generally move more frequently and over longer distances than females. The maximum dispersal distances estimated by Proctor et al. (2012) were about 47 miles for a female and 104 miles for a male. The distance between the currently occupied areas around the Northern Continental Divide Ecosystem to the Bitterroot Ecosystem are approaching or within the dispersal range of female bears.

It is to be expected that any grizzly bears outside the recovery zones are likely to experience a higher level of adverse impacts and will occur at lower densities than within the recovery zones. Nevertheless, Section 9 of the Endangered Species Act prohibition against "taking" applies irrespective of where the animal occurs, and the areas outside recovery zones can play a significant role in supporting movement of bears between recovery zones. Successful dispersal of bears is important to enable recolonization of vacant habitat (that is, improving redundancy and security against stochastic events across the range); bolster small populations, such as in the Cabinet-Yaak Ecosystem; and provide genetic connectivity between the other ecosystems and the isolated population in the Greater Yellowstone Ecosystem.

Threats and Stressors to Grizzly Bears

Interactions with people are by far the leading factors affecting grizzly bear populations. Motorized access routes (roads and trails) detract from secure habitat and has been shown in several studies to displace bears and adversely affect grizzly bear survival because it brings people in proximity to bears. The Interagency Grizzly Bear Committee (1998, 1994) recognized the impacts of human access on grizzly bear habitat. Specifically, motorized vehicle access has been shown to increase human interactions with bears and potentially increase associated grizzly bear mortality risk, increase grizzly bear displacement from important habitats, increase bear habituation to human presence, reduce reproduction, and reduce habitat security. Motorized access routes (roads and trails) and areas of concentrated human use (developed site footprints) detract from secure habitat.

The same likely holds true for grizzly bears that inhabit or pass through the Nez Perce-Clearwater National Forest. Permitted livestock grazing allotments contain live animals, livestock feed and supplements, and occasionally livestock carcasses that may attract grizzly bears into potential conflict situations with people. Developed sites provide places for people to concentrate use, which can contribute disturbance factors that may displace wary bears, while at the same time storing, preparing and eating food, or disposing of garbage, which may act as attractants for less wary bears. Availability of secure habitat, key natural food sources, and human-related attractants, can influence grizzly bear survival, reproductive success, and distribution.

According to the recovery plan, mortality from direct and indirect sources within and surrounding the recovery zone must be addressed if grizzly bears are to recover (Servheen 1996). Sources of direct mortality include illegal killing, accidental deaths, and management associated removals. Accidental deaths include mistaken identities by black bear hunters and other big game hunters, road kills, or handling errors when bears are captured for management or research. Mortality can also result from control actions by private citizens, such as livestock operators, apiarists, outfitters, resort operators, landowners protecting their property, and by hunters defending their kills. Direct mortality may also occur during agency control of nuisance bears for livestock conflicts, property damage, or situations threatening to human life or self-defense (Servheen 1996). Indirect mortality includes deaths that occur with actions that bring bears and people into conflict, such as road use, land development, and recreation (Servheen 1996). The grizzly bear recovery plan recommends that every effort should be made to limit mortality to zero in the initial phases of recovery when the number of bears will be low.

The recent five-year review of grizzly bear recovery (U.S. Department of the Interior 2021c) evaluated stressors and other actions that can positively or negatively affect grizzly bears. Stressors were fit into three broad categories including those with habitat-related effects, sources of human-caused mortality, and other stressors. Stressors with potential habitat-related effects include motorized access and its management, developed recreation sites, livestock allotments, mineral and energy development, recreation, vegetation management, habitat fragmentation, development on private lands, and activities that may disturb dens. Sources of human-caused mortality included management removals, accidental killings (for example, train and vehicular strikes), mistaken identity kills, illegal killings, and defense of life kills. Other stressors included natural mortality; connectivity and genetic health; changes in food resources; effects of climate change; and catastrophic events, earthquakes, and volcanic eruptions. The stressors above will be evaluated below as to how the plan addresses or ameliorates these factors.

Some research has been conducted on potential winter recreation effects on grizzly bears by identifying the characteristics of grizzly bear denning habitats from telemetry data, then use GIS to project or model areas of the landscape that have these characteristics and then evaluate the spatial overlap of modeled denning habitat with winter recreation use areas. For example, Podrunzny (2002) used modeling to evaluate the potential effects of winter recreation on grizzly bear denning in the Greater Yellowstone Ecosystem. These studies suggest potential for disturbance to denning bears (Podruzny et al. 2002). These types of studies are not available for the Bitterroot Recovery Zone.

In order to be considered the best available scientific information, the science should be accurate, reliable, and relevant as described above and in the directives for the 2012 Planning Rule (U.S. Department of Agriculture 2015b). There are three documents that are not considered to be the best available scientific information for grizzly bears for reasons related to their accuracy, reliability, and relevance (U.S. Department of Agriculture 2015b). The specific documents are titled “The Grizzly bear Promised Land, Past, Present and Future of Grizzly Bears in The Bitterroot, Clearwater, Salmon and Selway Country” authored by David Mattson (2021), “Grizzly Bear Denning Habitat and Demographic Connectivity in Northern Idaho and Western Montana” authored by Mike Bader and Paul Sieracki in (2021) and “Grizzly bear denning habitat and demographic connectivity in northern Idaho and western Montana” by Mike Bader and Paul Sieracki which was published in Northwestern Naturalist (Bader and Sieracki 2022). Mattson (2021) and Bader and Sieracki (2021) have not undergone peer review and are considered gray literature produced by non-governmental organizations. Bader and Sieracki (2022), while peer reviewed, is based on the same data and very similar analysis and contains some of the same challenges with assumptions and methodology that Bader and Sieracki (2021) have.

Mattson (2021) was recently reviewed by the Bitterroot Science Team of the Interagency Grizzly Bear Bitterroot Subcommittee (U.S. Department of Agriculture 2023a). The Science Team review summarized this document as follows:

> “The Mattson monograph is not peer-reviewed and was self-published by the non-profit advocacy group Grizzly Bear Recovery Project. It draws upon a broad range of literature across numerous topics to explore “the past history, present conditions, and future prospects of grizzly bears and... habitat (p. 4) in central and north-central Idaho.” Importantly, Mattson’s monograph presents little new information, infers certainty from historic information that is impossible to verify, relies on gray literature that has not been peer-reviewed, and extrapolates from peer-reviewed literature beyond their scope. The author presents analysis specific to projected population viability, delineation of Bear Management Units, and existing habitat security. However, these analyses have not undergone peer-review, nor can such a review be conducted based upon the information provided; the document does not describe the methods and assumptions used in a clearly articulated fashion that is typical of peer-reviewed publications. Without such detail it is impossible to replicate the study or further test the assumptions made in the document, which makes it likewise impossible to weigh the value and validity of the modeled findings. In many cases, the author also does not clearly identify the data sources used. Mattson’s conclusions are over-confident at times and strained by data limitations and layered assumptions, particularly with respect to historic and existing conditions on the Nez Perce-Clearwater National Forest. The author acknowledges some of the constraints and limitations of his review, as well as the need for additional research in multiple areas.”

The accuracy is questionable because of the layered assumptions, reliance on gray literature, extrapolation of peer reviewed literature beyond their scope, and lack of peer review. In short, the reliability of Mattson’s monograph is questionable because of the lack of supportable evidence of current and historic conditions, and its results and conclusions cannot be regarded as the best available scientific information because it is not accurate, nor reliable (U.S. Department of Agriculture 2015b).

Bader and Sieracki (2021) and (2022) used grizzly bear den locations to model grizzly bear denning habitat. They obtained data for a number of bear den sites to derive characteristics of den sites and then modeled denning habitat across a wider area. The 2021 study was not peer reviewed and was funded by advocacy groups. A subsequent study based on the same data and similar analysis was published in the Northwestern Naturalist in 2022 (Bader and Sieracki 2022).

These two documents (Bader and Sieracki 2022) and (Bader and Sieracki 2021) were reviewed by a team of wildlife biologists made up of representatives from the U. S. Forest Service and U. S. Fish and Wildlife Service. The team produced a written document to evaluate the merits of these studies. The review concluded that there are substantial concerns regarding their methodology and conclusions, as well as statements about research and current management direction. They state that the non-peer-reviewed version (Bader and Sieracki 2021) was widely distributed in 2021 and should not be cited or used. For the review of the 2022 publication (Bader and Sieracki 2022), the team cited concerns about assumptions, data analysis, statistical irregularities, geographic information systems irregularities, a temporal mismatch of denning locations and motorized data, inadequate evaluation of results compared to other studies, biased interpretations of results and unrelated management recommendations in conclusions as problematic. The Review Team does not regard (Bader and Sieracki 2022) as best available science due to its numerous issues with accuracy and reliability. These two publications are not considered best available science in this analysis for the same reasons.

Evidence from published literature on dens suggests that mortality, or poor outcomes during denning season, are rare or uncommon. There is not much evidence in peer reviewed literature, even after observing hundreds of denning bears, that den site quality matters in terms of survival or reproductive success. Aune and Kasworm (1989a), observed 68 dens, but did not mention any failed dens; Craighead and Craighead documented 11 dens from 22 bears, but did not mention failed dens; (Kasworm et al. 2021) evaluated 129 dens from 1983 to 2020 and noted no grizzly bear mortality was observed during the denning season. Servheen and Klaver (1983) studied ten dens used by radio equipped bears but did not report mortality from failed or abandoned dens. Linnell (2000) evaluated dozens of studies on dens of black bear, polar bear, and brown bears and reported den abandonment, mostly in relation to human disturbance within the immediate area early in the denning season. While Linnell (2000) did identify some dens being abandoned because of flooding, the study did not otherwise identify any differences in survival or outcome related to den site quality. Linnell (2000) noted that when dens were abandoned, bears often reinitiated new dens soon after. While grizzly bears prefer denning areas with some characteristics, there appears to be limited consequences to dens located in less preferred areas.

Existing Direction in the 1987 Plans

The grizzly bear was listed as a threatened species in the lower 48 states on July 28, 1975. No critical habitat has been designated. The U.S. Fish and Wildlife Service proposed critical habitat for the grizzly bear in 1976 (41 FR 48757, November 5, 1976); however, the designation was never finalized. Until recently, the grizzly bear was considered extirpated from the plan area.

Management Direction Under the 1987 plans for the Nez Perce and Clearwater Forest contain elements that contributed to grizzly bear recovery. The Nez Perce Forest Plan (1987b) has forestwide direction as amended states:

- “The Forest will cooperate in the recovery of species listed in accordance with the Endangered Species Act.”
- “In compliance with assigned objectives in the Grizzly Bear Recovery Plan, the present status of the grizzly bear will continue to be monitored and updated. Habitat within the Selway Bitterroot Grizzly Bear Recovery Zone will be inventoried and evaluated to determine its capability to support viable grizzly bear populations. Established proactive actions will be exercised in accordance with current federal and state regulations.”
- “In compliance with sub-section 7(a)(2) of the Endangered Species Act a biological evaluation will be prepared (as described in FSM 2672.42) for all proposed management activities.”

The grizzly bear was a Management Indicator Species on the Nez Perce National Forest as well.

The Clearwater National Forest Plan (1987a) also contains elements or direction for grizzly bears as follows:

- "Manage habitat to contribute to recovery of each threatened and endangered species occurring on the Forest, including the grizzly bear, gray wolf, and bald eagle."
- "Cooperate with future recovery efforts on behalf of the gray wolf, bald eagle, and grizzly bear."

The 1987 plans have elk plan components that contribute to conserving habitat for future grizzly bear occupation via management of elk habitat effectiveness and elk vulnerability. These plans manage elk habitat effectiveness and elk vulnerability through roads management and use, and other factors (Leege 1984, Servheen et al. 1995). The elk vulnerability model estimates the effects of access and hunter effort activities during fall hunting seasons on elk at the game management unit scale. It considers both open and closed roads in the calculation of elk habitat effectiveness.

Direction in the 1987 Forest Plans required lands to provide for elk by maintaining areas with specified amounts of elk habitat potential. The 1987 plans imposed standards that required different areas to maintain certain levels of elk habitat potential. The elk habitat potential standards were associated with land allocations in the 1987 plans and elk habitat effectiveness (EHE) was the metric used to calculate elk habitat potential. The 1987 plans standards required projects to analyze factors, such as road density, livestock grazing, in relation to elk habitat preferences including quality, quantity, and distribution of cover, forage, and security areas. The Clearwater Plan was later amended and emphasized elk habitat effectiveness and reducing elk vulnerability. The 1987 Plans from both forests used elk analysis units as the scale for which effects were analyzed. The plan standards required that each elk analysis unit was identified to maintain a minimum amount of elk habitat effectiveness of either 25 percent, 50 percent, 75 percent, or 100 percent. Elk analysis units are not delineated within wilderness.

The U.S. Fish and Wildlife Service issued the Nez Perce-Clearwater's interim direction for Section 7 consultation for considering grizzly bear habitat management in or adjacent to the Bitterroot Ecosystem (1995a) as a result of efforts to reintroduce grizzly bears into the Bitterroot Recovery Zone (Letter from Fish and Wildlife Service dated November 13th, 1995). Direction from the U.S. Fish and Wildlife Service in that letter was that the Forest Service should:

> consider the effects to grizzly bear habitat as being incorporated into the analysis for big game habitat. As long as the Forest Plan Standards for big game are being met, and/or big game issues are sufficiently covered within NEPA documents, projects would be considered to be in compliance with section 7(a)(1) of the Endangered Species Act. In addition, grizzly bear habitat will be incorporated into effects analysis and management direction for big game habitat. If big game issues are properly dealt with in the NEPA process then it will be assumed that grizzly bear habitat issues are also adequately addressed.

This was given as interim guidance (USFWS Letter to the U.S. Forest Service, November 13th, 1995). In response, the Forest Supervisor wrote a letter directing the District Rangers (Letter written by James Caswell, Forest Supervisor to District Rangers, December 4, 1995) that "If big game issues are properly dealt with in the NEPA process then it will be assumed that grizzly bear habitat issues are also adequately addressed."

In 2008 when the Idaho Roadless Rule was established, many areas that had objectives for elk analysis units to maintain 75 percent and 100 percent habitat effectiveness, were identified as having roadless character and thus were designated as Idaho Roadless Rule Areas, though the process for identification of areas with roadless character were not directly related to elk measures. Elk and grizzly bears both prefer to use and survive better in habitats without motorized access. The restrictions on activities in the Idaho Roadless Rule Areas established a new mechanism to provide ecological conditions to contribute to grizzly bear recovery because the roadless rule restricts road construction or reconstruction, timber and vegetation management, and some mineral uses as outlined below in the Idaho Roadless Rule direction. These new mechanisms imposed by the Idaho Roadless Rule, in part, replaced the need for elk habitat effectiveness measures in the proposed plan within Idaho Roadless Rule Areas.

The existing road and motorized trail, along with newly proposed routes, are one the main factors calculated that determines elk habitat effectiveness outcomes within each elk analysis unit. The mathematics involved in calculating elk habitat effectiveness included consideration of open routes, closed routes, and the types of closures they were (for example, gates or barriers), and whether they were open or closed during hunting season. These standards imposed significant restrictions on motorized routes forestwide based on different levels of required elk habitat effectiveness objectives (Figure 95). The 100 percent and 75 percent elk habitat effectiveness objectives imposed limits of either no or very low amounts of motorized uses, whereas even in areas allocated for multiple uses for example, the elk habitat objective of 25 percent allowed more roads, but imposed a more permissive limit.

Many of the areas with objectives for high amounts of elk habitat effectiveness later became Idaho Roadless Rule areas when the Idaho Roadless Rule was established in 2008 as these areas were maintained without roads by the elk habitat effectiveness direction in the 1987 plans. Thus, the need for elk security measures in the Forest Plan has been reduced or eliminated because most of the areas protected by elk habitat effectiveness measures in the 1987 plans were subsequently designated as Idaho Roadless Rule Areas. Therefore, Idaho Roadless Rule area now protects many areas that were managed for elk security which replaced the need to management for elk habitat effectiveness in the Revised Forest Plan in those areas. For example, the acres and percentage of elk habitat effectiveness areas from the 1987 plans now designated as Idaho Roadless Rule areas are shown in the table below. Approximately 99.8 percent of areas that had a 1987 plan objective of 100 percent elk habitat effectiveness was either already in wilderness (32.3 percent) or became Idaho Roadless Rule areas (67.5 percent) for a total of about 1,562,770 acres (see Table 246 and Table 247). Similarly, approximately 84.36 percent of areas with a 1987 Forest Plan elk habitat effectiveness objective of 75 percent became Idaho Roadless Rule Area. Approximately 18.29 percent and 22.1 percent of areas with 1987 plan elk habitat effectiveness objectives of 25 percent and 50 percent respectively was later designated as Idaho Roadless Rule. Figure 95 shows the elk analysis units and their elk habitat effectiveness objectives. Note that the different objectives correspond to the different amounts of secure habitat presently existing. Therefore, the majority of areas that had objectives for elk habitat effectiveness in the 1987 plans were designated Idaho Roadless Rule areas or wilderness areas and are now protected against roads. Thus, because Idaho Roadless Rule areas restrict roads with only limited exceptions depending upon Roadless Rule Theme, and Wilderness Areas outright prohibit roads and motorized trails, there is no longer a need to manage for elk habitat effectiveness objectives in the Revised Forest Plan.

Table 246. The acres of area in the 1987 Forest Plans with 25%, 50%, 75% and 100% elk habitat effectiveness objectives. Note the acres within the Idaho Roadless Rule Areas.

Elk Habitat Effectiveness Objective	Acres within Non-Roadless	Acres with Wilderness	Acres within Idaho Roadless Rule
Acres of area with 25% EHE	570,819	46	127,800
Acres of area with 50% EHE	379,521	241	107,125
Acres of Area with 75% EHE	95,699	223	516,362
Acres of Area with 100% EHE	1,686	262,457	548,516
Sum of Acres	**1,047,725**	**262,967**	**1,299,803**

Table 247. The percent of area with elk habitat objectives of 25%, 50%, 75%, and 100% within non-roadless, Designated Wilderness, and Idaho Roadless Rule areas. Note that high percentages of elk habitat objectives became Idaho Roadless Rule Areas.

Elk Habitat Effectiveness Objective	Percent within Non-Roadless	Percent within Wilderness	Percent Within Idaho Roadless Rule
Percent of areas with a 25% Elk Habitat Effectiveness Objective	82.00%	0.01%	18.29%
Percent of Areas with a 50% Elk Habitat Effectiveness Objective	77.99%	0%	22.01%
Percent of areas with a 75% Elk Habitat Effectiveness Objective	15.64%	0%	84.36%
Percent of Areas with a 100% Elk Habitat Effectiveness Objective	0.21%	32.30%	67.50%

Note that minor spatial errors resulted from misalignment of elk habitat effectiveness layer boundaries with wilderness, non-roadless rule and Idaho Roadless Rule boundaries. This is why some percentages add up to slightly over 100%.

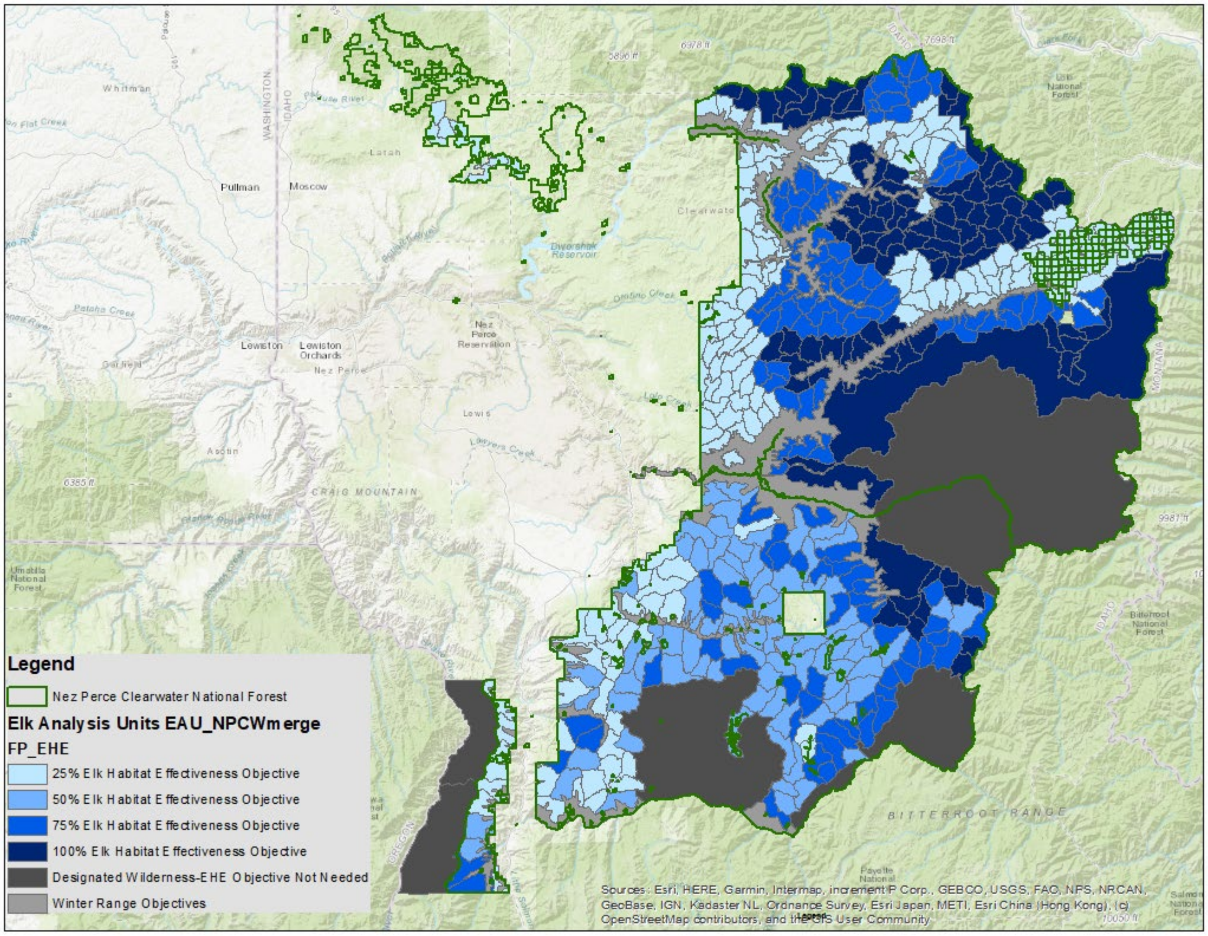


Figure 95. The elk habitat effectiveness objectives within elk analysis units from the 1987 Forest Plans

Instead, the Revised Forest Plan would shift to plan components that emphasize integrating nutrition and evaluates the useability of that nutrition in relation to the displacement effects of roads. The Idaho Roadless Rule will also help provide secure areas for grizzly bears.

The revised Forest Plan will change the allocation of management areas and management area emphasis. The revised Forest Plan will simplify management into three management areas, each with unique management emphasis and they are further subdivided into sub-management areas.

Designated Wilderness

Of the 3,939,056 acres administered by the Nez Perce-Clearwater National Forest, there are approximately 1,139,059 acres of designated wilderness. These consist of three designated wilderness areas, two of which extend South across forest boundaries on to other national forests. Congress has designated approximately 1,139,059 acres of wilderness within the plan area. These include the Gospel-Hump, the Selway-Bitterroot, and Frank Church-River of No Return Wilderness areas. The Selway-Bitterroot and Frank Church-River of No Return Wilderness Area makes up the entirety of the Bitterroot Recovery Zone.

The Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness make up the core of the Recovery Zone for the federally listed threatened grizzly bear. These two wildernesses make up the largest contiguous blocks of federal land remaining in the United States and the largest block of wilderness in the Rocky Mountains. Reestablishment of grizzly bear in this recovery zone is currently through natural dispersal.

The Bitterroot Recovery Zone lies almost entirely within the Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness. The area known as the Bitterroot Ecosystem is centered around the federally designated Wilderness Areas of central Idaho, while a small portion extends eastward over the crest of the Bitterroot Mountains into Montana. It includes about 26,072 square miles of contiguous national forest lands in central Idaho and western Montana (50 C.F.R. § 17.84(l). These include portions of the Bitterroot, Boise, Salmon-Challis, Clearwater, Nez Perce, Payette, Sawtooth, and Panhandle National Forests in Idaho, and the Bitterroot and Lolo National Forests in western Montana. By contrast, the Bitterroot Recovery Zone (Servheen 1996) is approximately 3,731,733 acres (5,831 mi^2) in size and lies almost entirely within the Selway-Bitterroot Wilderness Area and the Frank Church-River of No Return Wilderness Area. The Bitterroot Ecosystem encompasses most of the Nez Perce-Clearwater National Forest (Servheen 1996). The Bitterroot Recovery Zone overlaps with the southeast side of the Nez Perce-Clearwater. On the Nez Perce-Clearwater, the Bitterroot Recovery Zone lies almost entirely within the Selway-Bitterroot Designated Wilderness and the Frank Church-River of No Return Wilderness, the only exception being the Magruder road. About 23.6 percent of the Nez Perce-Clearwater is included within the Bitterroot Ecosystem's grizzly bear Recovery Zone, also known as the Bitterroot Recovery Zone. The acres of Designated Wilderness Areas are shown in Table 248.

Approximately 1,139,059 acres, just under 30 percent, of the Nez Perce-Clearwater is within three designated wildernesses. Portions of the Frank Church-River of No Return, portions of the Selway-Bitterroot, and the Gospel-Hump wilderness areas lie within the Nez Perce-Clearwater.

Table 248. Wilderness acres on the Nez Perce-Clearwater

Wilderness	Jurisdiction (National Forest)	Nez Perce-Clearwater (size in acres)	Total (size in acres)
Selway-Bitterroot	Bitterroot, Lolo[3] and Nez Perce-Clearwater[4]	823,151	1,348,663
Frank Church-River of No Return	Boise[1], Bitterroot, Nez Perce-Clearwater, Payette and Salmon-Challis[2] and BLM lands	110,236	2,359,948
Gospel-Hump	Nez Perce-Clearwater	205,672	205,672

1 Management of acres located on the Boise National Forest have been assigned to the Challis National Forest (now combined with the Salmon to form the Salmon-Challis National Forest)

2 The Salmon-Challis National Forest is the lead agency for management of the Frank Church-River of No Return, pursuant to plan direction for the appropriate Forest.

3 Management of acres located on the Lolo National Forest have been assigned to the Bitterroot National Forest

4 The Bitterroot National Forest is the lead agency for management of the Selway-Bitterroot Wilderness, pursuant to plan direction for the appropriate Forest.

Table 249. Acres of the Nez Perce-Clearwater inside and outside of the Bitterroot Recovery Zone

Nez Perce-Clearwater National Forest	Acres	Percent
Acres within the Bitterroot Recovery Zone	935,715*	23.7%
Acres outside the Bitterroot Recovery Zone	3,003,341	76.2%
Total acres	**3,939,056**	**100%**

*The Bitterroot Recovery Zone contains the Magruder corridor, which is not wilderness. Therefore, the Bitterroot Recovery Zone is slightly bigger than the wilderness areas.

Wilderness management is governed not only by the Revised Forest Plan but by law, and policy. Wilderness management restricts many activities that can affect federally listed species. The Wilderness Act states that a wilderness area is to be managed so that it is “untrammeled by man” and “generally appears to have been affected primarily by the forces of nature, with the imprint of man’s work substantially unnoticeable.” It also directs agencies to manage wilderness to preserve natural ecological conditions. The act directs the management of wilderness “for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, the preservation of their wilderness character.”
Section 4(c) of the Wilderness Act states the following regarding roads:

“Except as specifically provided for in this Act, and subject to existing private rights, there shall be no commercial enterprise and no permanent road within any wilderness area designated by this Act and, except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area.”

The Wilderness Act also prohibits motorized or mechanical entry, via cars, trucks, off-road or all-terrain vehicles, bicycles, aircraft, or motorboats, except in emergencies and in specified circumstances. The exceptions to motorized prohibitions are very narrow and rarely used.

Forest Service Policy also governs management of wilderness areas. Forest Service Manual 2320 includes the following direction:

- Where there are alternatives among management decisions, wilderness values shall dominate over all other considerations except where limited by the Wilderness Act, subsequent legislation, or regulations.
- Manage the use of other resources in wilderness in a manner compatible with wilderness resource management objectives.
- In wildernesses where the establishing legislation permits resource uses and activities that are nonconforming exceptions to the definition of wilderness as described in the Wilderness Act, manage these nonconforming uses and activities in such a manner as to minimize their effect on the wilderness resource.
- Cease uses and activities and remove existing structures not essential to the administration, protection, or management of wilderness for wilderness purposes or not provided for in the establishing legislation.
- Because wilderness does not exist in a vacuum, consider activities on both sides of wilderness boundaries during planning and articulate management goals and the blending of diverse resources in forest plans. Do not maintain buffer strips of undeveloped wildland to provide an informal extension of wilderness. Do not maintain internal buffer zones that degrade wilderness values. Use the Recreation Opportunity Spectrum (FSM 2310) as a tool to plan adjacent land management.
- Manage each wilderness as a total unit and coordinate management direction when they cross other administrative boundaries.
- Use interdisciplinary skills in planning for wilderness use and administration.

- Gather necessary information and carry out research programs in a manner that is compatible with the preservation of the wilderness environment.
- Whenever and wherever possible, acquire non-Federal lands located within wildernesses, as well as non-Federal lands within those areas recommended for inclusion in the system.
- Inform wilderness visitors that they face inherent risks of adverse weather conditions, isolation, physical hazards, and lack of rapid communications, and that search and rescue may not be as rapid as expected in an urban setting in all publications and personal contacts.
- Manage primitive areas as wilderness areas consistent with 36 CFR 293.17 until their designation as wilderness or to other use is determined by Congress.

It is the five qualities of wilderness character that the agency leans on as a way to monitor to meet the intent of the Wilderness Act. So, as a matter of policy, managing an area to be untrammeled, natural, and undeveloped is managing for grizzly bear and other wildlife special features such as lynx or wolverine for example. The existing wilderness areas are managed to preserve wilderness character. Five qualities help describe wilderness character (Landres et al. 2015).

- Untrammeled—Wilderness is essentially unhindered and free from modern human control or manipulation.
- Naturalness—Wilderness ecological systems are substantially free from the effects of modern civilization.
- Undeveloped—Wilderness is essentially without permanent improvements or modern human occupation.
- Outstanding opportunities for solitude or a primitive and unconfined type of recreation—Wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge.
- Other features of value—Wilderness may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

With certain very limited exceptions, the Wilderness Act prohibits motorized equipment, structures, installations, roads, commercial enterprises, aircraft landings, and mechanical transport. The Act permits mining access to private lands, fire control, insect and disease control, grazing, water resource structures (upon the approval of the President), and visitor use. Restricted or prohibited activities include road building, motorized and mechanized uses, construction of structures or recreation sites, timber harvest, and in the case of the Selway Bitterroot and Frank Church-River of No Return, mineral rights were withdrawn. So, no new mineral or mining activities are allowed. Fire suppression activities are only allowed under certain conditions but are otherwise allowed to burn naturally. These measures would ensure that wilderness areas provide wild landscapes with little human alteration, little access, and fewer visitors. Thus, designated wilderness areas provide ecological conditions to contribute to recovery of federally listed species because this management framework restricts many activities that could affect listed species.

Wilderness management does not restrict grazing, recreational uses, nor does it address management of food or attractants. The Nez Perce-Clearwater National Forest does not have restrictions on management of food or attractants in place currently.

While grazing is allowed in wilderness, there are only 380 acres of one vacant allotment in the Selway-Bitterroot wilderness area. So, this activity is not currently occurring within the Selway-Bitterroot and

Frank Church Wilderness Areas nor within the Bitterroot Recovery Zone within the boundaries of the plan area. However, the vacant allotment at some point may again become active. The Central Wilderness Act (1980), which was the enabling legislation for the Selway-Bitterroot and Frank Church-River of No Return Wilderness areas, provided some allowance of grazing. It states:

> Within the River of No Return Wilderness and the Selway-Bitterroot Wilderness additions designated by this Act…the grazing of livestock were established prior to the date of enactment of this Act, shall be permitted to continue subject to such reasonable regulations as the Secretary deems necessary, as provided in paragraph 4(d)(4) of the Wilderness Act.

This language suggests that new grazing allotments not established prior to 1980 would be restricted within the Selway-Bitterroot and Frank Church-River of No Return Wilderness Areas.

Idaho Roadless Rule

Currently, the Idaho Roadless Rule contributes to the ecological conditions to provide for grizzly bear connectivity and contribute to recovery. As described above, the Idaho Roadless Rule contributes to the existing condition and ongoing actions that assist with protections for grizzly bears because the rule provides prohibitions with exceptions or conditioned permissions governing road construction, timber cutting, and discretionary mineral development (36 CFR Part 294 Federal Register/Vol. 73, No. 201). These activities have been known to affect grizzly bear habitat and the prohibitions contribute to grizzly bear conservation. The Nez Perce-Clearwater National Forest contains approximately 1,481,565 acres of Idaho Roadless Rule area within the five roadless rule area themes. The acres of each theme are shown in Table 250, a map showing the distribution of these themes are shown in Figure 96, and a summary of these prohibitions is included below. The current management of the Idaho Roadless Rule areas helps maintain grizzly bear habitats from the effects of the prohibited activities.

Factors that may affect grizzly bears not addressed by the Idaho Roadless Rule includes the construction and use of motorized trails, livestock grazing, some fuels treatments, some vegetation treatments, road construction within community protection zones, extraction of saleable minerals, leasable minerals, geothermal development, energy corridors, or wind or biomass energy. Idaho Roadless Rule areas also do not restrict primitive and semi-primitive recreation, address attractants, hunting or fishing activities, special use permits for outfitting and guiding, and there are some allowances for municipal water management. The plan will not change Idaho Roadless Rule Areas, Idaho Roadless Rule Themes, nor associated prohibitions and allowances established by the rule. All recommended wilderness areas, as well as some Research Natural Areas, the Lolo Trail National Historic Landmark, and some Suitable Wild and Scenic Rivers in the Preferred Alternative are also Idaho Roadless Rule areas.

Idaho's roadless areas make up the core of the last intact forest ecosystem in the lower 48 states. The U.S. Forest Service adopted a state-specific, final rule establishing management direction for designated roadless areas in the State of Idaho. The final rule designated 250 Idaho Roadless Areas (IRAs) and establishes five management themes that provide prohibitions with exceptions or conditioned permissions governing road construction, timber cutting, and discretionary mineral development (36 CFR Part 294 Federal Register/Vol. 73, No. 201). The Nez Perce-Clearwater National Forest contains approximately 1,481,565 acres of Idaho Roadless Rule area. Areas were divided into themes by the Idaho Roadless Rule and are managed differently within each theme. The acres of the different themes are shown in Table 250.

Table 250. The Idaho Roadless Rule themes and approximate acres of each of them within the plan area

Idaho Roadless Rule Theme	Approximate Acres within the Nez Perce-Clearwater
Backcountry Restoration	835,649
Forest Plan Special Areas	38,278
Primitive	311,154
Special Area of Historic or Tribal Significance	49,341
Wildland Recreation	247,133
Total	1,481,565

Acres differ from those reported in Chapter 2 of the EIS which is reported at 1,481,636 due to slight changes in calculated acres due to overlay errors in GIS that occurred when calculating secure habitat

Idaho Roadless Rule Areas make up approximately 37.6 percent of the plan area. The majority of Idaho Roadless Rule areas are distributed on the Clearwater National Forest, though significant Roadless Rule areas occur adjacent to the Selway Bitterroot Wilderness area and Frank Church Wilderness Area on the Nez Perce National Forest. The Idaho Roadless Rule restrictions and exceptions for each theme are summarized below and are shown in Figure 96 below.

The following sections summarize and contrast the different management restrictions on activities within each Idaho Roadless Rule Theme. For a complete description of the prohibitions with exceptions or conditioned permissions within each theme see the Idaho Roadless Rule (36 CFR Part 294 Federal Register/Vol. 73, No. 201).

Wildland Recreation Theme

Road Construction or Reconstruction

Prohibited except regional forester may authorize to meet statute, treaty, reserved or outstanding rights or other legal duty of the United States.

Timber and Vegetation Management

Timber cutting, sale, or removal is prohibited except for personal or administrative use or where incidental to the implementation of an activity not prohibited.

Minerals

Existing mineral leases can continue under leases, contracts, permits authorized before October 16, 2008. No change to minerals activities under General Mining Law of 1872. Roads will not be authorized for mineral leasing after October 16, 2008. Common variety mineral materials will not be sold after October 16, 2008.

Special Area of Historic and Tribal Significance Theme

Road Construction or Reconstruction

Prohibited except the regional forester may authorize to meet statute, treaty, reserved or outstanding rights or other legal duty of the United States.

Timber and Vegetation Management

Timber cutting, sale, or removal is prohibited except to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition, structure or processes; to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply; for personal or administrative use or where incidental to the implementation of an activity not prohibited; or where cutting, sale or removal is incidental to the implementation of a management activity not otherwise prohibited by this subpart. These actions must maintain or improve one or more of the roadless characteristics; use existing roads or aerial harvest systems; maximize the retention of large trees as appropriate for the forest type to the extent these trees promote fire-resilient stands; be consistent with land management plan components; and be approved by regional forester.

Minerals
Existing mineral leases can continue under leases, contracts, permits authorized before October 16, 2008. No change to minerals activities under General Mining Law of 1872. Roads will not be authorized for mineral leasing after October 16, 2008. Common variety mineral materials will not be sold after October 16, 2008.

Primitive Theme

Road Construction or Reconstruction
Prohibited except regional forester may authorize to meet statute, treaty, reserved or outstanding rights or other legal duty of the United States.

Timber and Vegetation Management
Timber cutting, sale, or removal is prohibited except to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition, structure or processes; to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply; for personal or administrative use or where incidental to the implementation of an activity not prohibited; or where cutting, sale or removal is incidental to the implementation of a management activity not otherwise prohibited by this subpart. These actions must maintain or improve one or more of the roadless characteristics; use existing roads or aerial harvest systems; maximize the retention of large trees as appropriate for the forest type to the extent these trees promote fire-resilient stands; be consistent with land management plan components; and be approved by regional forester.

Minerals
Existing mineral leases can continue under leases, contracts, permits authorized before 10/16/2008. No change to minerals activities under General Mining Law of 1872. Roads will not be authorized for mineral leasing after 10/16/2008. Common variety mineral materials will not be sold after 10/16/2008.

Backcountry Restoration Theme

Road Construction or Reconstruction
Prohibited unless regional forester determines that road is needed for public health and safety for imminent threat of loss of life or property; or in response to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Clean Water Act or Oil Pollution, or Statute, treaty, reserved or outstanding rights or other legal duty of the United States; or Road realignment to prevent irreparable resource damage that cannot be mitigate by normal road maintenance for roads essential for public or private access, natural resource management, or public health or safety; or road reconstruction for road safety on a road determined to be hazardous; or Secretary of Agriculture determines a Federal Aid Highway (Title 23 of the U.S. Code) is warranted.

Timber and Vegetation Management
Timber cutting, sale or removal is prohibited except to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition, structure or

processes; to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply; for personal or administrative use or where incidental to the implementation of an activity not prohibited; where cutting, sale or removal is incidental to the implementation of a management activity not otherwise prohibited by this subpart. These actions must maintain or improve one or more of the roadless characteristics; use existing roads or aerial harvest systems; maximize the retention of large trees as appropriate for the forest type to the extent these trees promote fire-resilient stands; be consistent with land management plan components; and be approved by the regional forester.

Minerals
Existing mineral leases can continue under leases, contracts, permits authorized before October 16, 2008. No change to minerals activities under General Mining Law of 1872. Roads will not be authorized for mineral leasing after October 16, 2008 but surface use or mineral leasing without road construction or reconstruction may occur if consistent with Forest Plan. The use or sale of common variety mineral materials and associated road construction to access them may be authorized only if the use of these materials is incidental to an activity otherwise permissible in the backcountry.

Backcountry Restoration Theme—Community Protection Zones

Road Construction or Reconstruction
Responsible official may authorize temporary road construction or reconstruction for community protection zone activities if these cannot be reasonably accomplished without a road.

Timber and Vegetation Management
Same as backcountry restoration theme plus: To reduce hazardous fuels conditions within the community protection zone if it generally retains large trees and is consistent with land management plan.

Minerals
Existing mineral leases can continue under leases, contracts, permits authorized before October 16, 2008. No change to minerals activities under General Mining Law of 1872. Roads will not be authorized for mineral leasing after October 16, 2008, but surface use or mineral leasing without road construction or reconstruction may occur if consistent with Forest Plan. The use or sale of common variety mineral materials and associated road construction to access them may be authorized only if the use of these materials is incidental to an activity otherwise permissible in the backcountry.

Forest Plan Special Areas Theme

Road Construction or Reconstruction
Management under current Forest Plan not changed by Idaho Roadless Rule.

Timber and Vegetation Management
Management under current Forest Plan not changed by Idaho Roadless Rule.

Minerals
Management under current Forest Plan not changed by Idaho Roadless Rule.

The roadless rule allows motorized travel on existing roads and trails to continue. Decisions concerning future management of roads and trails are made in applicable travel management process. Grazing under existing grazing permits is not affected by the Idaho Roadless Rule. Motorized equipment and mechanical transport do not change under the Idaho Roadless Rule.

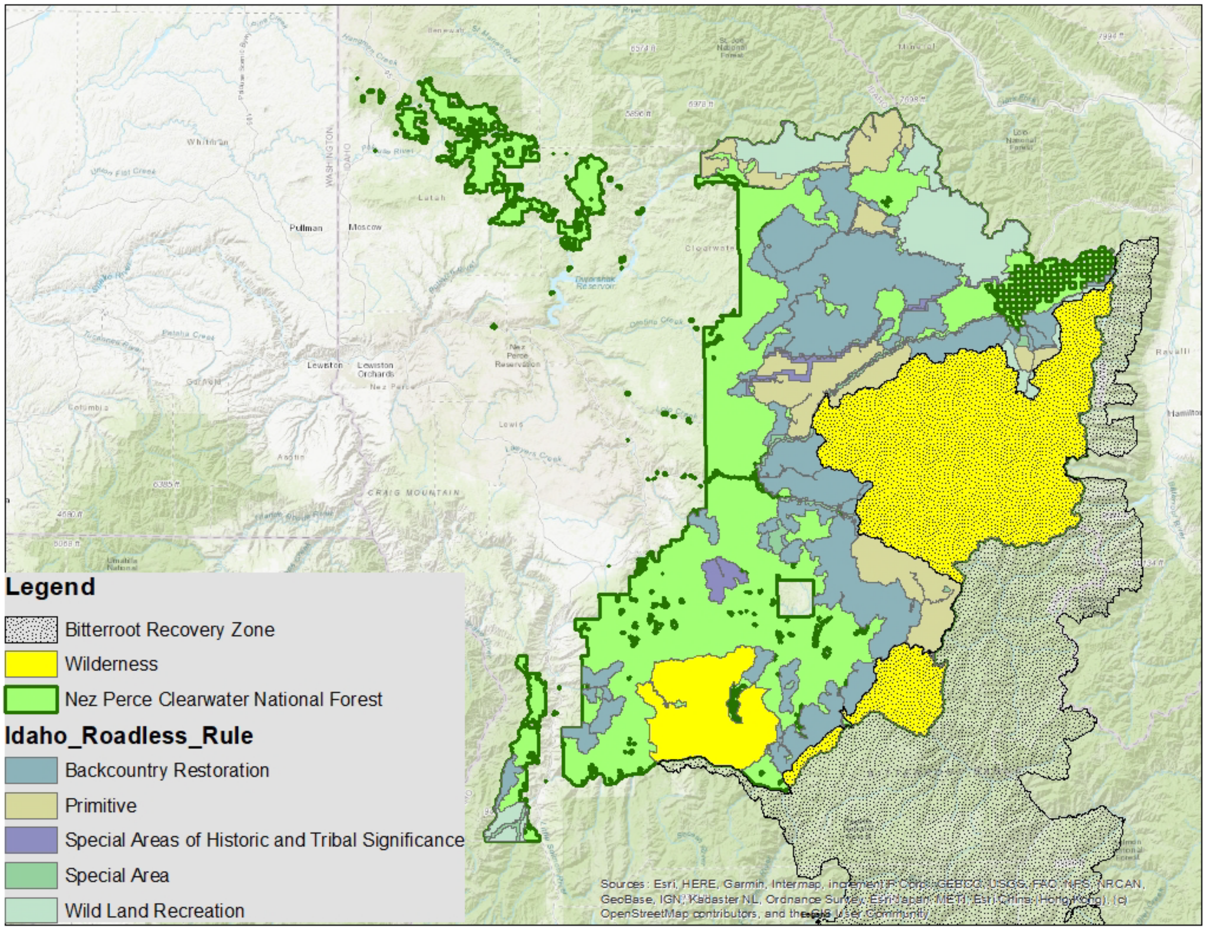


Figure 96. The distribution of Idaho Roadless Rule areas in relation to designated wilderness and the Bitterroot Recovery Zone

Recommended Wilderness

The 1987 Forest Plans recommended about 198,200 acres for wilderness, all within the boundaries of the Clearwater National Forest. More recent updated GIS data shows the area as about 197,695 acres (Table 251). These areas are Hoodoo, Mallard Larkin, North Fork Spruce-White Sands, and Sneakfoot Meadows. There were no wilderness recommendations in the Nez Perce National Forest Plan. The 1987 Clearwater National Forest plan standards for recommended wilderness state that the management standards for these areas will meet a visual quality objective of preservation and will manage all uses to maintain wilderness qualities and retain semi-primitive settings. Travel management in existing recommended wilderness areas was addressed in the Clearwater Travel Planning Record of Decision dated October 31, 2017. Under this direction, areas that are currently managed as recommended wilderness prohibit mechanized transport, including mountain bicycles or game carts, and motorized use, including wheeled and motorized over-snow vehicles. Road construction, timber harvest, and mineral activities may only be allowed to the extent permitted in the Idaho Roadless Rule.

Table 251. The existing condition for the acres of recommended wilderness areas

Recommended Wilderness Area	1987 Forest Plan Acres	Updated GIS Acres
Hoodoo	113,000	111,988

Recommended Wilderness Area	1987 Forest Plan Acres	Updated GIS Acres
Mallard-Larkins	66,700	66,377
North Fork Spruce-White Sand	9,800	9,865
Sneakfoot Meadows	8,700	9,465
Totals	**198,200**	**197,695**

Data Source: 1987 Forest Plans and updated Nez Perce-Clearwater GIS data. Note that in the 1987 Forest Plan Sneakfoot meadow, and Northfork Spruce-White sand were referred to as Storm Creek, Elk Summit, and Lakes.

These areas are also Idaho Roadless Rule Areas either under the Wildland Recreation theme or the Primitive theme and are currently managed to maintain their wilderness character. Management of recommended wilderness is similar to management for designated wilderness and Idaho Roadless Rule areas in the Wildland Recreation theme. These areas provide ecological conditions to contribute to recovery. Activities that are not prohibited in wilderness or roadless rule areas are also not prohibited in recommended wilderness.

Lolo Trail National Historic Landmark

The Lolo Trail, a National Historic Landmark administered in cooperation with the National Park Service, is part of the Nez Perce National Historical Park. It is managed with special direction that contributes to grizzly bear conservation. For example, it is designated and managed as Idaho Roadless Rule areas and in addition to maintaining the integrity of the monument which includes some restrictions on new road construction and vegetation treatments. The trail extends through the Nez Perce-Clearwater from Lolo, Montana to Weippe, Idaho. The Lolo Trail National Historic Landmark designated in 1963 is composed of 55,760 acres and is located through the heart of the Clearwater National Forest. Its significance lies in its roots as an ancient American Indian trail and comprises the route Lewis and Clark traveled from 1805 to 1806, as well as the path of flight taken by the Nez Perce Indians during the Nez Perce Indian War of 1877. The landmark stretches about 62 miles from the Nez Perce-Clearwater boundary near Musselshell Meadows to the Nez Perce-Clearwater boundary near Lolo Pass. It is an area designated by Congress thus, the plan will not change the landmark boundaries, but it will provide special direction for its management and is analyzed below. Management emphasis of this area is to maintain the National Register integrity of the landmark as high and convey its exceptional value and qualities in illustrating the heritage of the United States.

Travel Management

The Clearwater Travel Plan decided the travel system for the Clearwater National Forest. The Clearwater Travel Plan designated a site-specific transportation system and prohibited indiscriminate cross-country traffic. The Nez Perce National Forest has not completed travel planning, so the Nez Perce National Forest is open to motorized travel unless closed by a site-specific decision. Travel planning on the Nez Perce portion of the national forest will be completed in the future following the Land Management Plan. Travel planning on the Clearwater National Forest would continue to be revised under the Land Management Plan on a site-specific basis, as needed.

The Nez Perce-Clearwater overall has 7,680 miles of forest roads, accessing approximately 1,331,040 acres, or 34 percent, of the Nez Perce-Clearwater. A map of Management Area 3 can be found in Appendix A.

On November 9, 2005, the Forest Service published the final rule "Travel Management: Designated Routes and Areas for Motor Vehicle Use" in the Federal Register. The 2005 Travel Management Rule requires national forests to develop a minimum road system to accommodate resource needs. In 2015, a forest-level roads analysis was completed for the Nez Perce-Clearwater. This analysis established a minimum road system for arterial, collector, and important local class national forest roads on the Nez Perce-Clearwater. This broad-scale analysis encompassed all existing National Forest System roads on the Nez Perce-Clearwater. The report provided an assessment of the road infrastructure and a set of findings and recommendations for revisions to the Nez Perce-Clearwater transportation system. The report provided information to Nez Perce-Clearwater managers regarding the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of the land.

As shown in Table 252 and Table 253, the total number of roads on the Nez Perce-Clearwater has been steadily decreasing since 1999. A total of about 1,625 miles of National Forest System roads and non-National Forest System roads have been decommissioned during this time. Most of this decommissioning took place on the non-system roads that were legacy roads from former timber harvest practices, which are no longer needed for new harvest techniques and roads in unstable terrain or with failing drainage structures. However, there have been additions to National Forest System roads during this time as well. These additions include the construction of approximately 46 miles of new roads for vegetation, special uses, recreation management, and watershed improvements by moving roads away from sensitive stream habitats. The majority of the increases are due to the need for better located roads that provide for a more stable, less impacting road system.

Table 252. Miles of roads decommissioned from 1999 to 2018 on the Clearwater National Forest

Year	Miles	Year	Miles
1999	127.8	2009	127.0
2000	67.3	2010	138.3
2001	92.0	2011	90.1
2002	42.7	2012	154.9
2003	41.9	2013	194.4
2004	156.9	2014	97.4
2005	29.6	2015	60.5
2006	55.0	2016	65
2007	52.1	2017	30
2008	114.4	2018	46

Table 253. Miles of roads constructed from 1999 to 2018 on the Nez Perce National Forest

Year	Miles	Year	Miles
1999	13.62	2009	1.58
2000	2.33	2010	1.13
2001	0.65	2011	0
2002	0.5	2012	4
2003	0.45	2013	6.6
2004	0.38	2014	9.88
2005	0	2015	0.13
2006	2.08	2016	2.4
2007	0	2017	0.1
2008	0	2018	0

Grizzly bears might encounter increased human presence and conflicts in areas with more roads. These conflicts often lead to bear deaths and so are detrimental to individual grizzly bears. There are far fewer acres of secure habitat within Management Area 3, with most of them smaller than 1,000 acres. These areas would not be biologically suitable nor socially acceptable for grizzly bear occupancy. A visual representation or map of the current travel situation is shown in Figure 98 and Figure 99 below.

The national forest often uses temporary roads to implement projects such as timber or fuels treatments. These features temporarily impact localized areas during project implementation but are subsequently removed shortly after projects are completed. Thus, their effects are temporary and localized. It is possible that temporary routes used for vegetation management could affect polygons of secure habitat in the future temporarily. Most temporary roads tend to occur in proximity to existing motorized routes. Temporary roads are prohibited within designated wilderness areas and so are not allowed in the Bitterroot Recovery Zone. The Idaho Roadless Rule included a provision to allow roads existing before the establishment of the rule to remain and be maintained, but new roads are only allowed with limited exceptions as outlined in above under the Idaho Roadless Rule direction. For example, they are allowed within the Backcountry/Restoration areas only within Community Protection Zone areas to treat hazardous fuels. These are limited areas even within the backcountry restoration theme. Thus, temporary roads are mostly used within the managed front where multiple uses are emphasized, which are areas that present risk to grizzly bear survival.

A private entity's non-compliance with the Nez Perce-Clearwater's access management is an illegal activity. While illegal use of the national forest via motorized access in areas unauthorized for such use may occur within the planning area, such illegal use is not considered a forest action and therefore not analyzed under effects of the Plan; however, their influence is considered for describing the existing condition.

While illegal motorized access has the potential to affect individual grizzly bears, the amount, location, duration, and timing of effects resulting from such illegal use is typically not known. Illegal motorized access is expected to be spatially disparate, temporary, and is not likely to collectively cause an adverse effect because most forest users follow travel regulations. When illegal use is observed or when user-created roads become apparent, the national forest corrects the situation as soon as they are able. Illegal use is, in part, facilitated by the presence of authorized forest routes because they allow access from which illegal uses can start. Thus, the effects are considered here as part of the existing condition but are not quantified because of uncertainty in predicting where, when, or how much it would occur. Most closed routes brush in quickly and are unusable because of the high productivity of vegetation growth on the national forests.

Airplane and Helicopter Use

Grizzly bears have been reported to be displaced by fixed wing aircraft and helicopter use (McLellan and Shackleton 1989b, McLellan and Shackleton 1989a). These studies used radio telemetry to evaluate response of grizzly bears to various human related disturbance activities and describe displacement of bears in response to recurrent helicopter and fixed wing aircraft uses. McLellan and Shackleton (1989b) describe displacement of grizzly bears from recuring flights in support of seismic activities. McLellan and Shackleton (1989a) showed displacement by grizzly bears in response to aircraft flights was farther when bears were in open habitat and the flight was less than 150 m (164 yards) away. Thus, helicopter and fixed wing flights can displace grizzly bears, especially when the flights are recurring or within close proximity.

The Forest Service does not have authority over whether aircraft can fly over National Forest System lands. Instead, the Forest Service has discretion and authority over whether aircraft interact with the ground such as when they land or take off from National Forest System lands, or when they drop or retrieve passengers or objects on National Forest System lands. Helicopters are used by the Forest Service and other agencies for emergency or administrative uses in some situations as explained below. The Nez

Perce-Clearwater National Forest has some ongoing aircraft and helicopter use currently for administrative purposes and this activity will continue under the Preferred Alternative.

The Nez Perce-Clearwater National Forest has seven designated airstrips. Public airstrips on the Nez Perce-Clearwater are considered infrastructure and are a segment of the transportation system. The seven airstrips on the Nez Perce-Clearwater are available for public use and are located in the following locations: Cayuse at Cayuse Creek in the North Fork Clearwater drainage, Dixie at Dixie Guard Station, Fish Lake in the Lake Creek drainage of the Lochsa River, Moose Creek along the Selway River at Moose Creek Guard Station, Orogrande along Crooked River, Shear Airstrip along the Selway River at Shear Guard Station, and Wilson Bar along the Salmon River. The Fish Lake, Moose Creek, and Shear airstrips are located within the Selway-Bitterroot Wilderness and are managed as wilderness airstrips. Wilson Bar is managed as a Wild and Scenic River airstrip. Landing airplanes by the public can only happen at the designated airstrips and is not allowed otherwise. Helicopters used by the public may also land at the seven designated airstrips.

The backcountry airstrips are valuable recreational infrastructure, and the 2012 Planning Rule requires consideration of air and recreational aviation uses. Members of the public may use the public backcountry airstrips without restrictions and this ongoing use will continue after the revised Forest Plan is finalized. Thus, they can be used by anyone including Forest Service administrative use, state agencies like Idaho Department of Fish and Game, private planes, or air transport shuttle companies. Under the existing condition, the airstrip at Moose Creek in the Selway Bitterroot Wilderness is limited to 800 visitors annually, which was established by the Selway Bitterroot Wilderness Plan, though the limit has not been reached in any year. The Nez Perce-Clearwater National Forest has not tracked airstrip use beyond monitoring the number landings at the Moose Creek airstrip. While use has been considered low, the use is growing with private plane landings. Airstrips encompass a relatively small footprint compared to roads and trails, usually around 2,500 feet by 75 feet. They are usually located in a relatively flat natural meadow. Backcountry airstrips are often maintained by pilot communities through the Forest Services' Volunteer program.

The Central Idaho Wilderness Act allowed continued use of backcountry airstrips and landing of aircraft within the Selway-Bitterroot and Frank Church-River of No Return Wilderness as follows:

“the landing of aircraft, where this use has become established prior to the date of enactment of this Act shall be permitted to continue subject to such restrictions as the Secretary deems desirable: Provided, That the Secretary shall not permanently close or render unserviceable any aircraft landing strip in regular use on national forest lands on the date of enactment of this Act for reasons other than extreme danger to aircraft, and in any case not without the express written concurrence of the agency of the State of Idaho charged with evaluating the safety of backcountry airstrips landing of aircraft within a designated unit.”

With the exception of backcountry airstrips, landing aircraft in designated wilderness areas is prohibited by the Wilderness Act. Use of these backcountry airstrips is retained in the revised Forest Plan consistent with the Central Idaho Wilderness Act.

Helicopters and fixed wing aircraft are commonly used in firefighting activities and prescribed burning. Aircraft and helicopter use associated with firefighting include surveillance, reconnaissance of new fires, to moving people to or away from fires, and to drop fire suppressing agents such as water or fire retardant. Helicopter and aircraft use during suppression activities do not require prior authorization.

During prescribed burning activities, helicopter and aircraft are used to ignite, monitor, and to maintain control of prescribed fire. These types of projects are authorized after a site-specific environmental analysis including Endangered Species Act consultation.

There have been some cases where requests have been made to allow landings in wilderness for scientific and research purposes. A minimum requirements analysis is required by law whenever land managers are considering a use prohibited by Section 4(c) of the Wilderness Act of 1964. These have been evaluated and authorized on a case-by-case basis after site specific analysis.

The Idaho Department of Fish and Game uses helicopters and fixed wing aircraft in their wildlife management and research activities. Wildlife management activities include areal wildlife surveys and sometimes use helicopters in the capture, radio collaring, relocation, or reduction of animals. Future activities related to aircraft use could also include research or monitoring of grizzly bears. These activities sometimes require landing helicopters or aircraft on national forest lands. They generally require coordination with the Forest Service in these activities outside of wilderness and require authorization within wilderness.

Some vegetation management is conducted through aerial harvest systems, utilizing helicopters. Aerial harvest is often desirable to avoid unacceptable resource damage such as the creation of new roads or to access timber not otherwise accessible. However, aerial methods of harvest are more expensive than other harvest types. Harvest using aerial methods are a relatively common practice on the Nez Perce-Clearwater National Forest. Like other actions, projects proposing aerial harvest systems for vegetation management are evaluated and authorized on a case-by-case basis as part of a project National Environmental Policy Act analysis and also undergo Endangered Species Act consultation.

Forests in other areas have had helicopters used in seismic exploration for oil and gas minerals. This type of exploration is not likely to occur on this forest because the area is considered to have low potential for oil and gas. These types of projects are required to undergo site specific environmental analysis and Endangered Species Act consultation as well prior to authorization.

The Revised Forest Plan will not make any decisions to authorize, nor close, aircraft use and does not make decisions to authorize nor close backcountry airstrips. Instead, the Preferred Alternative will provide plan components to guide future authorization of aircraft and helicopter use. Decisions on the establishment, maintenance, reauthorization or closing of backcountry airstrips, would require site specific environmental analysis and consultation and must comply with the Forest Plan. Plan direction governing aircraft use and the effects of that plan direction are described below in the effects to the Effects of Airplane and Helicopter Use section.

Winter Motorized Use

For winter motorized travel, the entire forest was open to winter motorized uses unless closed by a travel management decision. The Clearwater Travel Plan, and closures in designated wilderness, are examples of travel management decisions the established closures. While the national forest used the recreation opportunity spectrum settings to guide the recreation opportunities users could expect to experience, it was not used to identify areas where motorized uses were suitable.

Currently, motorized over-snow recreation is allowed nearly forestwide except in recommended wilderness areas and designated wilderness areas. Prior to the Clearwater Travel Plan Decision, recommended wilderness areas were open to over-snow motorized travel. The Clearwater Travel Plan closed recommended wilderness areas to over-snow motorized recreation.

Recreation Sites

There are several developed and dispersed recreation sites on the Nez Perce-Clearwater National Forest, some of which grizzly bears may travel through the national forest in route to the Bitterroot Recovery Zone. Of particular note are the campgrounds along the North Fork of the Clearwater and the Lochsa corridor. The plan area hosts 55 developed campgrounds, 53 dispersed camping facilities, 12 picnic sites, 16 lookouts or cabins, and 40 trailhead facilities. There are 121 miles of motorcycle trails, 1,018 miles of trails for vehicles less than 50-feet, and 63 miles of trails for vehicles larger than 50-feet. There are a total of 15 miles of bike trails, 3,211 miles of pack trails, and 15 miles of hiking only trails. There are 1,241 non-developed dispersed overnight sites and 109 dispersed trailheads. The majority of recreation use on the Nez Perce-Clearwater occurs in primitive dispersed sites rather than developed facilities. These recreation sites might attract grizzly bears and are potential sites for conflict. The national forest does not yet have a food storage order in place and lacks facilities to provide the public with bear safe storage. Many campgrounds need upgrades to refuse storage or new bear resistant dumpsters. Most developed sites are located within Management Area 3. To this point, there has not been an incident at a recreation site of a grizzly bear-human conflict. The Forest Service often posts signs to educate the public at recreation facilities recommending bear safety measures.

In the event that grizzly bears become established, a number of actions would be conducted by the Forest Service in partnership with the Interagency Grizzly Bear Subcommittee for the Bitterroot Ecosystem along with the Idaho Department of Fish and Game, the Nez Perce Tribe, and the U.S. Fish and Wildlife Service among others to take an adaptive approach to respond to the presence of grizzly bears. Among possible actions include a special forest order implementing a food storage order, installation of infrastructure for bear safety, a public outreach and education program, and coordination on bear-human conflict interventions as appropriate.

Northern Rockies Lynx Direction

The Northern Rockies Lynx Management Direction (NRLMD) is a Forest Plan amendment that amended 18 Forest Plans across the western United States for the conservation of the federally threatened Canada lynx. On March 23, 2007, the U.S. Fish and Wildlife Service issued a biological opinion and incidental take statement on the effects of the NRLMD on the Distinct Population Segment of Canada lynx (lynx) in the contiguous United States (U.S. Department of Agriculture 2007f), in accordance with Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The NRLMD provides direction primarily for lynx habitat management to avoid or reduce the potential for projects proposed under Forest Plans to adversely affect lynx. The NRLMD indirectly conserves habitat for grizzly bear by promoting and conserving the habitat conditions needed to produce snowshoe hare (lynx primary prey) densities that are adequate to sustain lynx within their home ranges, and thus sustain lynx populations and promote recovery of lynx. Snowshoe hare habitat includes forested areas with multi-story characteristics which may provide cover for grizzly bears and restrictions on alteration of multi-story snowshoe hare habitat within the NRLMD constrains management of forests with these features. Implementation of the NRLMD will continue as planned under the revised Forest Plan via a plan standard which incorporates the NRLMD into the plan in its entirety.

Secure Habitat

Secure habitat is a key indicator for this analysis. As discussed above, this analysis adopted the definition of secure habitat from the Greater Yellowstone Ecosystem. We combined the road and motorized trails datasets into one dataset of motorized route, meaning both road and motorized trails. From that dataset, we then identified any motorized routes as “open motorized routes” that were either open, open seasonally, or open to administrative uses but closed to the public. Any roads or motorized trails that were closed permanently to all users were not included. We used ArcGIS to buffer any open motorized routes by a distance of 0.31 miles, then included areas outside of that buffer as secure habitat. In other words, we identified secure habitat as any lands outside of the 0.31-mile buffer distance from an open motorized route. While every attempt was made to include all road and trail features and accurately represent them, some inaccuracies or accidental omissions are possible in the data. This analysis did not include calculations or buffers of roads outside of National Forest System lands nor did we buffer the Forest Service Boundary in the calculation of secure habitats. Thus, some areas of secure habitat may be impacted by roads and trails outside National Forest System lands. However, Figure 108 in the cumulative effects section below shows that the Nez Perce-Clearwater National Forest is surrounded on three sides by other Forest Service lands. Lands along the western boundary are composed of a mix of private, state, tribal and industrial forest lands. However, there is little secure habitat on the national forest's western boundary because of existing forest roads. Thus, only limited amounts of secure habitat are impacted by roads outside of National Forest System lands.

For the Greater Yellowstone Ecosystem, secure habitat has been defined as any contiguous area greater than 10 acres that is greater than 0.31 miles from an open or gated motorized access route (road or trail) or recurring low level helicopter line during the non-denning period of March 1 through November 30 (Interagency Grizzly Bear Committee 1998 (Interagency Grizzly Bear Committee (IGBC) 1998, Interagency Conservation Strategy Team 2007). CFR 50 part 17 indicates that this size was selected for the Greater Yellowstone Ecosystem because the Interagency Grizzly Bear Study Team and Yellowstone Ecosystem Subcommittee concluded that all secure habitats are important for grizzly bears, regardless of size, particularly in peripheral areas. There is no scientifically based minimum secure habitat size based on statistically repeatable use-availability analysis for reproductive females for any of the currently occupied recovery zones. No current research on grizzly bear habitat use exists for the Bitterroot Ecosystem to inform a minimum size patch of secure habitat. While larger, less fragmented patches of secure habitat are likely better for a grizzly bear, even a small patch of secure habitat may afford a grizzly bear a valuable space to avoid the effects of motorized routes and to move through or find valuable habitat in the area, and thus may be important for connectivity. This is the definition that was adopted for use in this analysis, though unlike in the Greater Yellowstone Ecosystem, there are no associated requirements in the plan associated with this definition because there are no resident bears in the Bitterroot Recovery Zone. Its use is only for analysis purposes and was selected because secure habitats of any size probably contribute to grizzly bear ecology. However, recognizing that larger secure areas probably have more value to grizzly bears, we report the amount of secure habitat larger than 1,280 acres consistent with findings of Wakkinen and Kasworm (1997) that suggested that areas this size and larger were used more by grizzly bears than smaller blocks.

Secure habitat was evaluated spatially by identifying how much secure habitat would overlap with the land allocations and the suitability of various uses. Land allocations and their associated suitability of uses dictate where future activities have the potential to impact ecological conditions for grizzly bears. Where impactful activities are suitable, there is a higher potential for impacts. However, where activities are not suitable, there is low or no potential for impacts from those activities. Therefore, the land allocations explicitly control future potential impacts. For example, the amount of secure habitat that could potentially be affected by motorized uses are dictated by the distribution of lands where that activity is suitable. The potential future impact of timber activities, and associated roads, are dictated by the lands where that activity is suitability. There is virtually no potential for impact from timber or motorized uses within lands where that activity is not suitable. Even if an activity is suitable, it only means that this activity has potential to occur but does not mean that it will occur, even where it is suitable. Land allocations and their associated suitability affect potential future impacts to secure habitat include Management Area allocation, Designated wilderness, recommended wilderness, Idaho Roadless Rule areas, Recreation Opportunity Spectrum (ROS) settings, timber suitability, designated wild and scenic rivers, eligible and suitable wild and scenic rivers, the National Historic Landmark, and research natural areas. Each of these land allocations find various uses either suitable or not suitable to various extents, and thus dictate whether there is potential or no potential for effects from each activity. The suitability for each land allocation and the suitability of different activities are discussed in various sections below. While these delineations do not affect grizzly bears directly, they would dictate the broad direction in the plan that would apply to these areas and the types of activities allowed or disallowed. Land allocations and suitabilities could lead to either potential for future impacts in some cases or protections for grizzly bears in other cases. While activities that could affect grizzly bear habitat could occur in suitable areas, where, when, or how much of these activities is not yet known. In the event future activities are proposed under the plan, there would be a site-specific analysis, decision, and consultation with the U.S. Fish and Wildlife Service before implementation. The effects of these suitability plan components are analyzed below by evaluating the total area where these activities are suitable and describing the amounts of secure habitat that overlaps lands where various activities are either suitable or not in the plan based on land allocations.

Secure habitats were calculated by buffering all roads and motorized trails by 0.31 miles open to the public or closed to the public but open to administrative uses, and then included any areas that were within the Forest Service control, but outside of the road and motorize trail buffer as secure habitat. The secure habitat forestwide is shown in Figure 97. Secure habitats were then analyzed as to how they overlap spatially with the Preferred Alternative in the revised Forest Plan. The amount of secure habitat within various decisions in the plan were calculated using ArcGIS. Examples included the amounts and percentages of secure habitat within recommended wilderness, recreation opportunity spectrum, timber suitability, and the management areas. ArcGIS was used to calculate these amounts by using the identity tool in that software, repairing geometry, and then calculating acres.

We used the best available data when calculating secure habitat including the road data and the motorized trail data. To calculate secure habitat, we updated our spatial road and motorized trails data with all the known closures and added any routes that were known. Updating the motorized route data was a process that took approximately six months of full time GIS work to complete. This included updating any closures, road status, alignment, or other known discrepancies in the data. However, despite this extensive effort, it is still probable that there are cases where the road or motorized trail alignment is different on the ground than in the data. In some cases, some segments of road or motorized trail may extend farther on the ground than is represented in the data. There may be some user created features that are used by the public that are not reflected in the data. In some cases, these are unauthorized or illegal uses of motorized vehicles. Illegal uses are corrected on the ground as soon as they are known via signs or physical barriers. It should be noted that we believe that, despite the discrepancies, the methods used here in this analysis underestimates the amount of secure habitat on the ground because many of the administrative roads are in storage to be used at a future date but are not actually drivable currently. Maintenance of motorized road and trail data is an ongoing activity of the Forest Service and is continually updated to be as accurate as possible. Correcting the data to fix all errors would take a lot of time ground truthing and editing the data. It should be expected that the data will continue to be updated in the future to address any discrepancies and accurately reflect the amount of secure habitat. Additionally, the second tier of this programmatic consultation framework would provide us an opportunity to continue to update in the future via site specific consultations where appropriate.

In total there are about 2,463,079 acres of secure habitat larger than 10 acres, with the majority of it within the Idaho Roadless Rule areas, wilderness areas, and recommended wilderness areas. The forestwide total acres of secure habitat make up about 63 percent of the Nez Perce-Clearwater land base with about 37 percent not secure. Areas of secure habitat range in size from contiguous blocks of approximately 10 acres up to 1,103,922 acres, with the largest block centered in the Selway Bitterroot Wilderness area. There are 12 blocks of secure habitat that are larger than 5,000 acres but smaller than 10,000 acres and 26 that have greater than 10,000 acres each. The largest blocks of secure habitat are within designated wilderness and recommended wilderness. Most of the larger sized blocks outside of Designated wilderness are within Idaho Roadless Rule Areas within the Clearwater National Forest. The plan area contains 84 blocks and a total of 2,380,232 acres of secure habitat larger than 1,280 acres reported to compare to findings from Wakkinen and Kasworm (1997) that suggested grizzly bears preferred secure habitats this size and larger. Thus, 96.6 percent of secure habitat in the plan area are in blocks larger than 1,280 acres.

It should be noted that in our calculation of secure habitat, we excluded areas as secure habitat where we have roads closed to the public but open to administrative uses. Administrative roads were included in the secure habitat buffer analysis and therefore excluded from the calculation of secure habitat. On the ground they could be secure habitats for grizzly bears. We excluded these features from secure habitat to account for any potential effects from these features but in reality, the on-the-ground situation is that these roads are probably not usable in many cases. Roads closed to the public but open to administrative uses are in what are termed basic custodial care and are not typically drivable because vegetation grows on them, the culverts are pulled, and they often have barriers that prevent use. They are retained as roads in the databases so that future timber management could be performed without having to reconstruct road prisms in the event they are needed for future uses. The spatial data the Nez Perce-Clearwater has for these features does not have information about their usability, nor whether they are being used by the public, so they were buffered and excluded as secure habitat as a precaution. Calculations without administrative roads counting against secure habitat results in an estimate of secure habitat of 2,721,604 or about an additional 258,525 acres more of secure habitat compared to estimates where administrative roads are accounted. In all analysis below, areas with administrative roads were excluded as secure habitat.

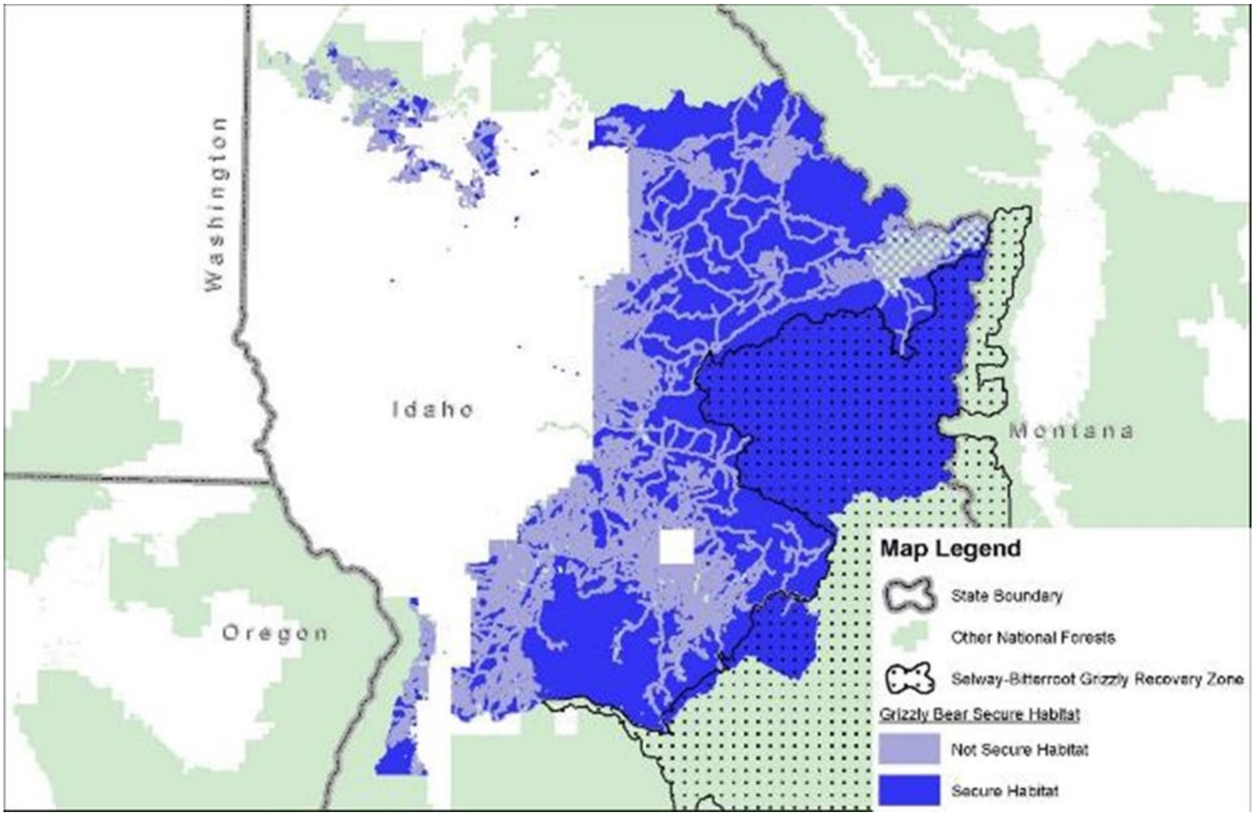


Figure 97. Secure habitat on the Nez Perce-Clearwater National Forest shown in dark blue, while areas in light blue are not secure due to roads or motorized trails open to the public and roads closed to the public but open for administrative use

It should be noted that many roads on the Nez Perce-Clearwater National Forest are open only part of the year and closed seasonally to reduce elk vulnerability during fall hunting season. Many roads are closed to motorized travel at the start of hunting seasons or at various times in the fall and remain closed until spring. They are typically gated, and the gates are closed and locked in the fall or late summer on specified dates. When calculating secure habitat, we considered roads as not secure if they were open to motorized uses at any time of the year and did not account for roads that are closed seasonally. In reality, seasonal closures potentially increase the amount of secure habitat at least temporarily.

The scale and units at which to evaluate secure habitat was carefully considered. Watersheds were used as the unit because these provide a consistent unit delineated by landscape features and are used broadly in natural resource management by many natural resource disciplines. They form discrete units that must fall within a range of sizes. The plan used HUC 10 or 5th code watersheds as the scale at which to evaluate secure habitat because this is the size of watershed most consistent with the size of female home ranges. HUC 12 or 6th level HUCs range in size from 10,000 acres to 40,000 acres and are too small generally to replicate female home range sizes. HUC 10 watersheds range in size between 40,000 and 250,000 acres (62 to 390 square miles). In comparison, as described above average female home ranges range from 30,720 to 101,760 acres (48 to 159 square miles) (Mace and Waller 1997, Aune and Kasworm 1989b, Blanchard and Knight 1991, Mace and Roberts 2011, Kasworm et al. 2022, Kasworm et al. 2021).

The amount and percent of secure habitat within HUC 10 (5th level) watersheds is shown in Table 254. HUC 10s range from 40,000 to 250,000 acres so they overlap the range of female home range in size. However, the calculations in Table 258 only included portions of the watersheds within the Nez Perce-

Clearwater boundaries, therefore some watersheds are only partially in the plan area, so some of them may be smaller than a female home range (Table 258). The data in Table 254 below only reflects the area and percent of secure habitat within watersheds and within the Forest Planning Area. Six watersheds that extend outside of the plan area boundaries fall within adjacent National Forest System lands. Assuming that a minimum female home range is 32,000 acres, 47 out of 63 or 74.6 percent of HUC 10 watersheds have enough secure habitat inside the planning area to provide for at least one female home range.

Table 254. The amount and percent of secure habitat within HUC 10 (5th level) watersheds. The calculation only includes lands administered by the Nez Perce-Clearwater National Forest. The asterisks indicate watersheds that extend outside of Nez Perce-Clearwater lands.

Watershed Name	Total Watershed Acres in Plan Area	Acres Secure Habitat	Percent Secure Habitat
American River	40,795	8,992	22%
Bargamin Creek	69,941	60,925	87%
Bear Creek	114,866	114,866	100%
Beaver Creek-North Fork Clearwater River*	41,938	25,157	60%
Big Bear Creek*	3,895	357	9%
Big Mallard Creek-Salmon River*	98,569	74,994	76%
Big Squaw Creek-Salmon River*	15,402	15,402	100%
Breakfast Creek*	466	14	3%
Cayuse Creek	107,918	74,172	69%
Clear Creek*	42,847	9,603	22%
Colt Killed Creek	155,773	138,183	89%
Crooked Creek	82,989	62,059	75%
Crooked Fork Creek	77,252	37,421	48%
Crooked River	44,282	13,359	30%
Deep Creek-Palouse River*	53,381	2,943	6%
Dicks Creek-North Fork Clearwater River*	130	130	100%
Elk Creek*	36,363	9,531	26%
Fish Creek	56,332	41,744	74%
Fourth of July Creek-North Fork Clearwater River	84,007	55,321	66%
Gedney Creek-Selway River	137,344	73,917	54%
Johns Creek	71,389	59,287	83%
Kelly Creek	87,313	76,519	88%
Lake Creek-North Fork Clearwater River	128,632	80,412	63%
Lolo Creek*	79,134	6,327	8%
Lower Clearwater River	159	101	64%
Lower Little North Fork Clearwater River*	10,039	6,784	68%
Lower Little Salmon River*	11,177	2,947	26%
Lower Lochsa River	147,547	89,633	61%
Lower South Fork Clearwater River*	3,110	95	3%
Meadow Creek	155,336	112,744	73%
Middle Fork Clearwater River*	25,405	8,628	34%
Middle Lochsa River	169,173	139,355	82%
Middle Potlatch River	16,681	3,253	20%

Watershed Name	Total Watershed Acres in Plan Area	Acres Secure Habitat	Percent Secure Habitat
Middle South Fork Clearwater River	82,618	12,056	15%
Moose Creek	279,754	262,280	94%
Newsome Creek	42,303	8,653	20%
Orofino Creek*	10,822	101	1%
Orogrande Creek*	38,845	4,532	12%
Partridge Creek-Salmon River*	39,951	11,389	29%
Pettibone Creek-Selway River*	89,597	89,597	100%
Pine Creek*	66	8	13%
Quartz Creek-North Fork Clearwater River	48,312	22,041	46%
Race Creek-Salmon River*	43,893	7,313	17%
Rapid River*	27,897	19,956	72%
Red River	99,424	15,032	15%
Running Creek*	36,779	30,896	84%
Sabe Creek*	21,925	21,072	96%
Sheep Creek-Salmon River*	78,769	73,956	94%
Silver Creek-North Fork Clearwater River*	821	717	87%
Skookumchuck Creek-Salmon River*	22,746	3,212	14%
Skull Creek	55,924	46,088	82%
Slate Creek	78,166	24,698	32%
Three Links Creek-Selway River	129,984	127,286	98%
Upper Clearwater River	9	0	<1%
Upper Hangman Creek*	2,253	317	14%
Upper Lochsa River	64,209	28,307	44%
Upper Potlatch River	29,418	9,249	31%
Upper South Fork Clearwater River	131,857	52,384	40%
Warm Springs Creek	45,800	45,625	100%
Washington Creek-North Fork Clearwater River*	50,646	20,171	40%
Weitas Creek	139,873	88,774	63%
White Bird Creek*	35,571	4,088	11%
Wind River	41,242	28,104	68%
Grand Total	**3,939,056**	**2,463,079**	**63%**

Figure 98 shows a visual representation of the percent of secure habitat within each watershed. The watersheds are colored to show secure habitat amount of between 0 and 25 percent secure habitat, 25 to 50 percent secure habitat, 50 to 75 percent secure habitat, and 75 to 100 percent secure habitat. It is assumed that higher percentages of secure habitat would provide for better connectivity for dispersing bears.

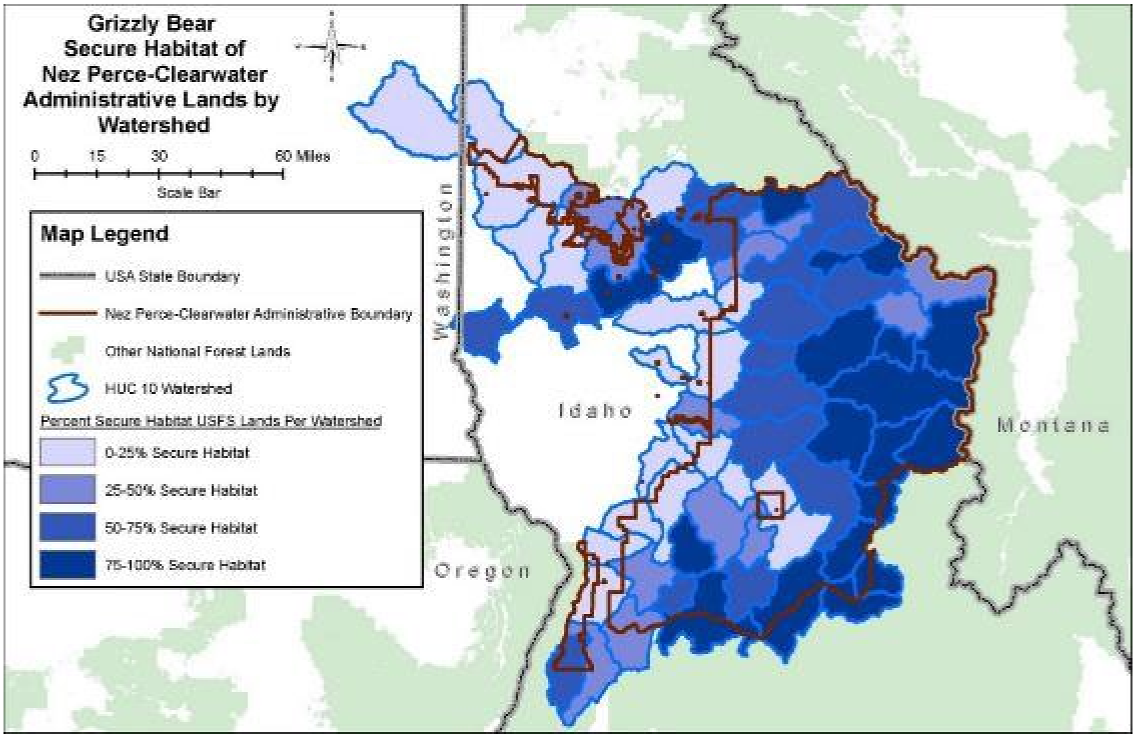


Figure 98.The amount of secure habitat by HUC 10 watershed broken out into four categories by percentage of secure habitat within the watershed. Categories include watersheds with between 0-25 percent secure habitat, 25-50 percent secure habitat, 50-75 percent secure habitat, and 75-100 percent secure habitat

Connectivity

Habitat connectivity is widely recognized as a crucial component for maintaining plant and animal diversity and managing for sustainable populations of native species (Western Governor's Association 2008, Hansen 2009, McIntyre and Ellis 2011, Cushman and Landguth 2012, Parks et al. 2012, Haber and Nelson 2015, Wade et al. 2015, McClure et al. 2016). There are two primary requirements for habitat connectivity. The first is that suitable habitats are present for species of interest, and the second is that landscapes are permeable to wildlife movement. Long-range dispersal movements may contribute to gene flow between populations, genetic rescue of small or isolated populations, and colonization of new areas (Parks et al. 2012). Habitat connectivity is crucial to the establishment of grizzly bears in the Bitterroot Recovery Zone and could contribute to genetic interchange and demographic support between occupied grizzly bear recovery zones.

The Species Status Assessment (U.S. Department of the Interior 2021c) states that connectivity is important to grizzly bear recovery and identified connectivity as an important demographic need and one of the six demographic factors important to resiliency. It identifies two types of connectivity important grizzly bear populations in the recovery zones, demographic, and genetic connectivity. For genetic connectivity, long distance dispersal by males enables immigrants to act as a counter to genetic fragmentation and loss of nuclear genetic diversity for example within the Greater Yellowstone Ecosystem. Male and female movements within and between ecosystems can enhance genetic diversity and reduce genetic fragmentation. Females tend to be the focus of demographic connectivity because they are necessary for reproduction. Female dispersal is gradual (McLellan and Hovey 2001b), usually significantly shorter than males (McLellan and Hovey 2001b, Proctor et al. 2004), and holds the potential for small population augmentation or demographic rescue through their ability to bear offspring post-immigration into small isolated populations. Female grizzly bear dispersal patterns suggest that to enhance or re-establish female connectivity, female occupancy of linkage areas is necessary to facilitate inter-generational connectivity (U.S. Department of the Interior 2021a).

Efforts have been made to evaluate and model grizzly bear connectivity across the different ecosystems in the lower 48 states and Canada(Craighead and Olenicki 2005), (Walker and Craighead 1997, Servheen, Shoemaker, and Lawrence 2003, Proctor et al. 2012, Proctor et al. 2015, Peck et al. 2017). While their methods to model habitat connectivity differed, these studies all identified roads or human developments as factors that affect connectivity. Highways in particular have been identified as restraints to grizzly bear dispersal (Peck et al. 2017, Proctor et al. 2005, Proctor et al. 2015, Kasworm et al. 2021, Servheen, Waller, and Sandstrom 2003). Features related to connectivity appear to be related to highways and developments outside of the Nez Perce-Clearwater National Forest. The best study to date was published by Sells (2023), which used grizzly bear movements from radio collared grizzly bears to identify preferred features used for travel, then extrapolated the results to a wide area that encompassed the Greater Yellowstone Ecosystem (GYE), the Cabinet-Yaak Ecosystem (CYE), and the Northern Continental Divide Ecosystem (NCDE), and the Bitterroot Ecosystem. Not surprisingly, the model shows that the plan area appeared to provide good connectivity within the North Fork Clearwater area and the Selway-Bitterroot Wilderness Area. Areas appearing important to grizzly bear connectivity include a route south of Hamilton through the Bitterroot National Forest, the Lolo Pass Area, the Hoodoo recommended wilderness, and the Mallard Larkin recommended wilderness area.

The most significant barriers to connectivity are outside the planning area and include the I-90 corridor, Montana Highway 200, and Montana Highway 93 and associated human development. I-90 appears to be a barrier between the Bitterroot Ecosystem and the NCDE, the CYE, and Selkirk Ecosystems. Servheen (2003) predicted several linkage areas through these developed areas into the Bitterroot Ecosystem. Passage of bears through these linkage areas may dictate where bears enter the Nez Perce-Clearwater and the Bitterroot Ecosystem to some extent.

Most fragmentation between the NCDE and Bitterroot Ecosystems occurs along the I-90 corridor between Missoula, Montana and Superior, Montana and along U.S. Highway 93 north of Missoula from Evaro Hill to Ravalli Hill. Missoula is a rapidly growing city and suburban development has been rapidly spreading west and north along these major highway corridors. Some connectivity areas were available between Alberton, Montana and Superior, Montana; between Superior, Montana and St. Regis, Montana; and northwest of St. Regis (Servheen, Waller, and Sandstrom 2003). Bears traveling through these linkage areas would most likely enter the Nez Perce-Clearwater through the Hoodoo or Mallard Larkin areas. The area between Lolo, Montana and Lolo Hot Springs along U.S. Highway 12 is well connected. Bears traveling through this area would have little trouble passing into the plan area and would do so near Lolo Pass.

Servheen (2003) did not evaluate connectivity south of Lolo, Montana. The spread of the NCDE population southward may enable this area to serve as a path through which bears may disperse. Bears dispersing through this area would also face significant barriers through Highway 93 and associated development into the Bitterroot Ecosystem area. However, if they made it through these areas, bears would have would enter into the Bitterroot National Forest and have passage into and through the Nez Perce-Clearwater National Forest to the Bitterroot Recovery Zone.

Large portions of the plan area appear to be well connected currently (Figure 99). For example, if it is assumed that large areas with high amounts of secure habitat in proximity to each other are used more by grizzly bears and would facilitate grizzly bear dispersal, then areas with these characteristics would facilitate connectivity. Based on these assumptions, Figure 99 visually displays secure habitats greater than 1,280 acres as the basis for potential pathways of secure habitat through the Nez Perce-Clearwater, wherein a grizzly bear could disperse through to the Bitterroot Recovery Zone under existing conditions. This is of course assuming that lands without roads (secure habitat) would provide more permeable habitat to provide potential passage of grizzly bears. Grizzly bears can pass through non-secure habitat as has been documented here with Bear 927 passing through the area with checkerboard ownership near Lolo pass, which has higher road densities.

Some of these areas were identified in the Preferred Alternative as non-motorized, in part to provide connectivity for grizzly bears. Areas identified as non-motorized for grizzly bear connectivity are displayed in Figure 99 below in the Recreation Opportunity Spectrum Setting section.

All federally managed lands generally provide protection from permanent residential and urban development. Grizzly bears may be able to pass through Forest Service lands in areas with higher road densities as well because roads are typically backcountry roads with lower traffic volumes and lower travel speeds. While backcountry roads perhaps are not as good for bears as un-roaded areas, they are likely more permeable than highways. Bear 927 for example, crossed through and spent time within the Lolo pass checkerboard area on his way to the Bitterroot Recovery Zone. The Grizzly Bear Recovery Program 2020 Annual Report showed a map of Bear 927's path and areas of use, which showed use of the Lolo Pass and nearby checkerboard ownership area. Grizzly bear 927 also passed between these areas, which have higher road densities and less secure habitat but perhaps is still relatively permeable.

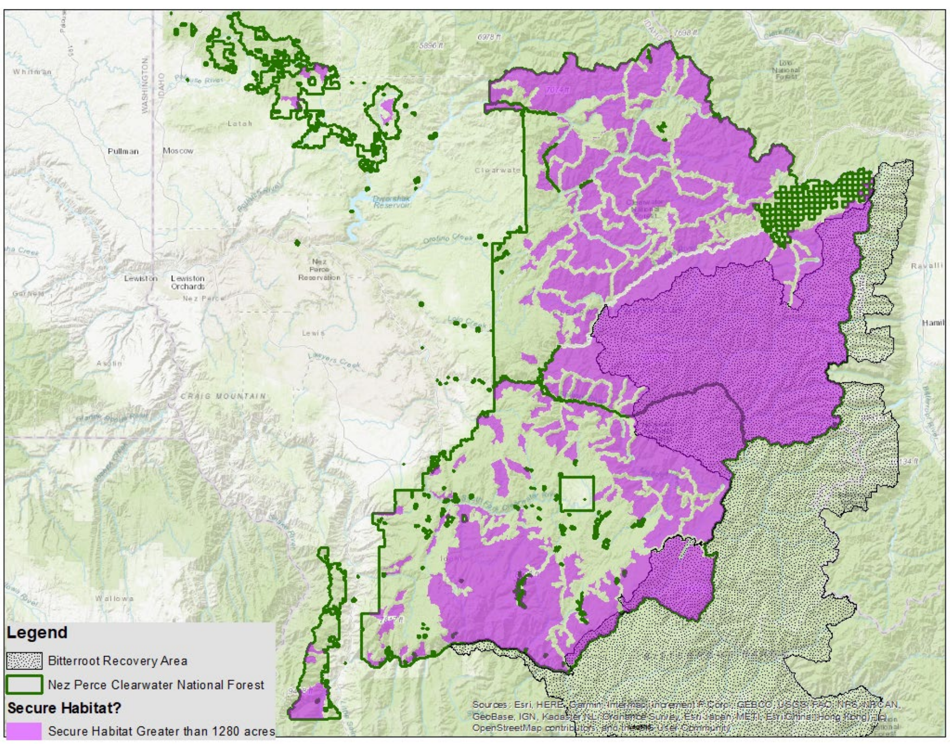


Figure 99. Secure habitat greater than 1,280 acres in size shown in purple that hypothetically provide permeable habitat that could provide for potential connectivity for grizzly bears. This graphic provides a rough visual representation of relative connectivity into the Bitterroot Recovery Zone based on the assumption that secure habitats larger than 1,280 acres in proximity would facilitate grizzly bear use and dispersal.

Some areas of multiple use management may be important for connectivity because of their location. Some are located where grizzly bears have a higher likelihood of encountering on their way into the

Bitterroot Recovery Zone. Specific examples include the checkerboard ownership areas near Lolo Pass, and two areas of Management Area 3 in the Kelly Creek Area in the North Fork Clearwater Area (Figure 99). Dispersing bears entering the Nez Perce-Clearwater from the north or east could encounter these areas. These areas have existing conditions that could potentially lead to human-bear conflicts because of higher road density and more human uses. Bear 927 used the checkerboard area near Lolo Pass (that is, mixed private and Forest Service landownership in a checkerboard pattern) and passed through the secure habitat between the multiple use areas near Kelly Creek. The grizzly in 2007 was accidentally killed near the Kelly Creek area. It is possible that grizzly bears could navigate around or through these areas when establishing new home ranges or passing through as Bear 927 did.

Rangeland Management and Grazing

Livestock grazing occurs through a permit system on Nez Perce-Clearwater lands. Table 377, Table 378, Table 379, and Table 380 in the Range Section below describe current grazing allotments, acres and types animals grazed on the Nez Perce Clearwater National Forest. (). Grazing allotments generally occur in areas of low amounts of secure habitat. They are arranged away from areas where grizzly bears might be expected to cross the Nez Perce-Clearwater and away from the Bitterroot Recovery Zone. Only one vacant cattle allotment overlaps with approximately 380 acres of the Frank Church-River of No Return Wilderness area. No new grazing allotments would occur within the Selway Bitterroot and Frank Church-River of No Return Wilderness because language in the Central Idaho Wilderness specifies that only allotments in place before 1980 would be allowed to continue (Central Idaho Wilderness Act 1980). While livestock grazing on the national forest is distributed mostly outside of the recovery zone, there are livestock allotments currently operating on the national forest where grizzly bears may possibly find them simply because grizzly bears are such wide-ranging animals that it is not discountable that they would probably encounter livestock at some point. If a grizzly bear were to encounter livestock, there could be livestock loss which might lead to human-bear conflict. Such conflicts between grizzly bears and domestic livestock can result in the capture, relocation, injury, or removal of grizzly bears. The revised Forest Plan will not authorize nor close grazing allotments. The plan only identifies where grazing is suitable or not. Instead, it would guide where, and how grazing would be managed. New authorizations or re-authorizations would occur after site-specific analysis and undergo Endangered Species Act consultation.

Grizzly bears are more prone to come into conflict with sheep grazing. In the Preferred Alternative, the only sheep allotment currently in the plan area would be found unsuitable under the Preferred Alternative. There are currently no active sheep allotments in the plan area. It is assumed that additional sheep grazing is unlikely under the revised Forest Plan in the future. Existing allotments are cattle allotments which have a lower probability of grizzly bear conflicts, but conflicts are still possible. There have been no documented grizzly bear mortalities associated with livestock that have occurred in the action area since their extirpation circa the 1930s.

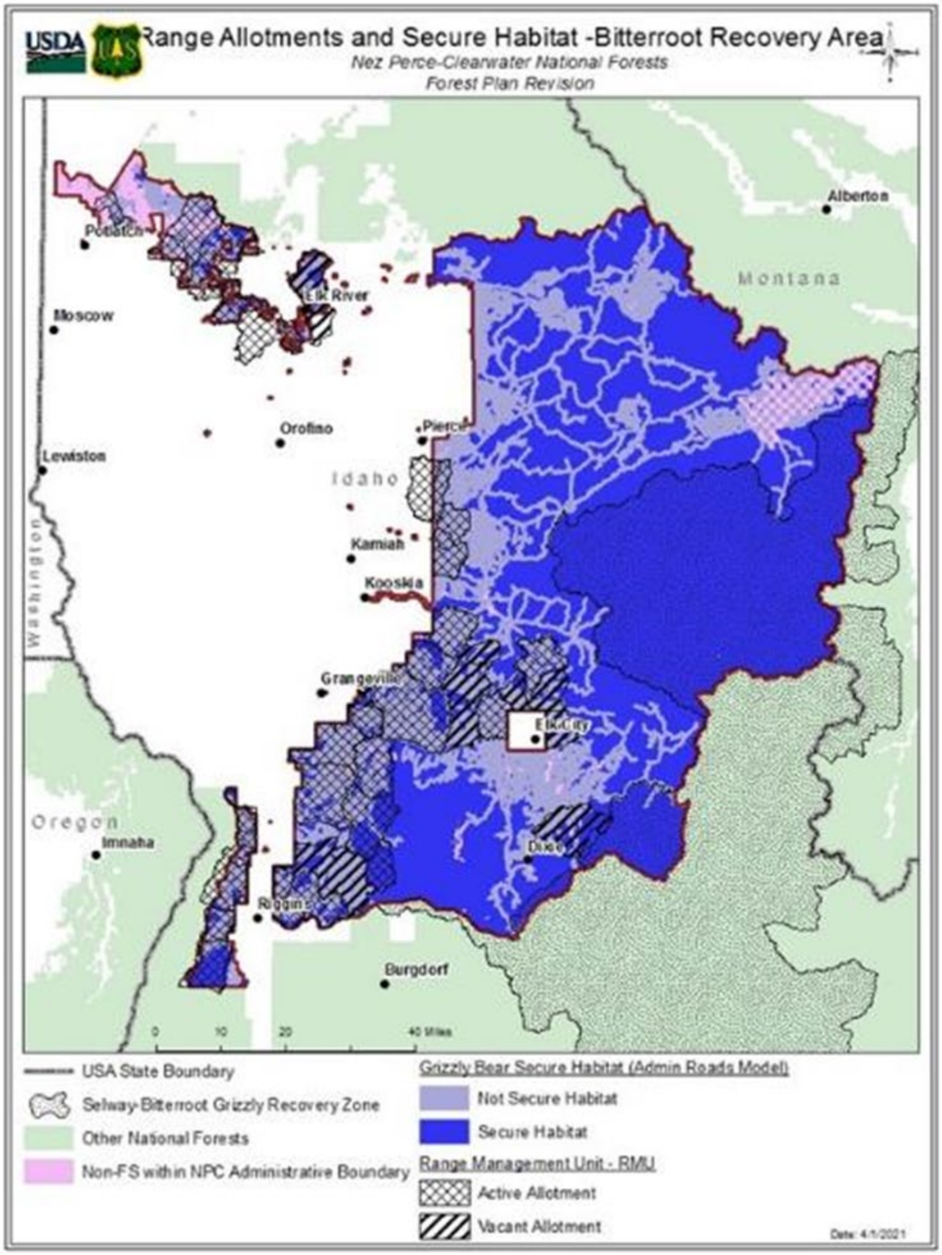


Figure 100. Range allotments in relation to the Bitterroot Recovery Zone and secure habitats

Vegetation Management

Vegetation management is an ongoing activity within the Nez Perce-Clearwater currently and will continue after the revised Forest Plan is revised. Vegetation management as considered here includes timber harvest, timber production, prescribed fire and fuels reduction, habitat restoration, forest restoration, and planting. The trend in vegetation management has changed through the decades in response to demand, capacity, and regulatory constraints. Table 255 shows the acres of harvest, prescribed fire, and fuels reductions since 1987.

Table 255. Vegetation management activities by type and decade from 1987 to 2018

Decade	Harvest[1] Acres	Prescribed Fire[2] Acres	Fuel Reduction[3] Acres
1987-1996	25,827	24,706	20,443
1997-2006	10,299	39,154	15,667
2007-2016	4,999	5,810	7,905
2017-2018	6,200	971	655

1 Harvest activities include even-aged, uneven-aged, and intermediate harvest treatments.

2 Includes overlap of burning in harvested stands. Prescribed fire activities include broadcast burning, jackpot burning, site preparation burning, and under burning. Wildfire acres are not included; see the Fire Management section for information on past wildfires, including those used for resource benefit.

3 Fuel reduction treatments include burning of piled material, chipping of fuels, compacting/crushing of fuels, fuel break, miscellaneous treatment of natural fuels, piling of fuels, rearrangement of fuels, and thinning for hazardous fuels reduction.

Data Source: FACTS database, acres completed by fiscal year up to September of 2018

Vegetation conditions within the Nez Perce-Clearwater National Forest are departed from historic conditions in some important ways. First, white pine was more prevalent than it is today, dominating many areas within the Clearwater National Forest. White pine has decreased through a combination of mostly mortality from blister rust but also some from historic harvest practices. White pine has been replaced by growth of Douglas-fir, grand fir, or western hemlock in its stead and now exists at a fraction of its former dominance. It is unknown how the change in dominance types has altered the ecological conditions to serve as grizzly bear habitat.

Decades of fire exclusion has also changed the composition and condition of vegetation. Fire exclusion has increased forest density, favored fire intolerant tree species, and decreased forest resilience. With fire exclusion, dense understories and thickets of conifers have produced stands that are highly susceptible to a variety of insect and disease epidemics and severe wildfires. Many stands have missed a complete fire return interval and are now considered departed from the historical or reference conditions. It is unknown what effect, if any, this would have on grizzly bears, once they re-establish in the plan area.

Whitebark pine is another species affected by blister rust and has declined in abundance. Whitebark pine is known to have provided mast thought important for grizzly bear nutrition. The loss of whitebark pine has potentially reduced a food source for grizzly bears. Ongoing restoration efforts have been made to restore whitebark and white pine. See the Whitebark Pine section of this document for more information.

The 1987 Forest Plans projected high timber outputs. For example, the Nez Perce Plan identified an allowable sale quantity of 108 million board feet in the first decade and which increased to 210 million board feet between 2018 and 2027. The Clearwater Plan identified a yearly timber volume of 173 million board feet per year. Despite these projections, the existing amount of timber production is the acreage conducted annually under the 1987 plans which has typically been 4,300 acres or 50 to 60 million board feet per year on both forests combined.

Most of this timber production occurs within the roaded front, while roadless rule areas receive limited timber harvest, and designated wilderness does not allow timber harvest. Even when allowed, timber harvest is limited within Idaho Roadless Rule areas. For example, the Final Environmental Impact Statement for the Idaho Roadless rule projected that less than 0.01 percent of roadless area per year of the lands managed under the Idaho Roadless Rule would be affected by timber removal or road construction in the first 15-years. For the nearly 1,500,000 acres of roadless areas on the Nez Perce-Clearwater, this would total 1,500 acres over the 15-year period, or approximately 100 acres per year (U.S. Department of Agriculture 2008e). Per the Idaho Roadless Rule, timber harvest activities must be conducted from existing roads or aerial harvest systems. In the 10-year period from October 2008 to September 2018, approximately 1,800 acres statewide have been affected through community protection zone fuels reduction, constructed fuel breaks during wildfires, and removal of post-fire roadside hazard trees. Timber harvest in the Idaho Roadless Rule areas usually must occur from existing roads. This trend and rate of timber harvest in Idaho Roadless Rule areas is expected to continue.

The acres of total vegetation treatments under the Preferred Alternative ranges between 53,000 and 64,500 acres. These acres include prescribed fire, wildland fire use, timber production, fuels treatments, wildlife habitat enhancement, and vegetation treatments designed to restore vegetation characteristics found in the Forest Plan desired conditions. These acres include treatments that would occur forestwide.

Forests are naturally dynamic and experience periodic disturbances like wildfire, insects and disease, and regrowth. Grizzly bears evolved within these dynamic landscapes and use different successional stages to meet their nutritional needs. They use mature forest for hiding, resting, and use early seral stages to forage. Diversity in successional stages provides diverse foods, cover, denning habitat, and space for this wide-ranging species. Vegetation conditions provide a variety of coniferous forests, deciduous forests, wetland and riparian areas, and grass/forb/shrub patches found in areas such as meadows, avalanche chutes, burned areas, and logged areas. Timber harvest, wildfire, prescribed fire, and other vegetation management activities also alter the seral stage, the amount and arrangement of cover, and forage. Vegetation management can increase the quantity and quality of grizzly bear foods through increased growth of grasses, forbs, and berry-producing shrubs (Kerns et al. 2004, Zager et al. 1983).

Fifty-eight studies, published from 1983 to 2020 evaluated the effects of timber harvest on grizzly bear habitat use (Colton et al. 2021). They found that all studies reported grizzly bear use of forest cut blocks, with several reporting grizzly bear selection of cut blocks, although with substantial variation in selection across seasons and ecoregions. (Colton et al. 2021) identified seven underlying factors that influence grizzly bear responses to forest harvest including natural forest openings, cut block design, silvicultural techniques, age since harvest, grizzly bear food availability, human activity, and grizzly bear sex and age. Furthermore, they suggested that grizzly bears may frequently use forestry cut blocks when forage is present, especially if human activity is minimal and natural forest openings are limited.

Forage Resources

The plan area likely has sufficient food resources to provide for a future population of grizzly bears. The plan area contains food sources such as ungulate populations, berries, insects, mast from trees such as whitebark pine seeds, vegetation, and fish including cutthroat trout, steelhead, and salmon. Food sources have changed over the last century due to a variety of factors and will continue to change. For example, whitebark pine has experienced a decline due to blister rust. Similarly, elk populations have fluctuated over time. Elk numbers are currently lower than they were in the past two decades but are much higher than they were in the early 1900s when elk were scarce (Space 1981, Cochrell 1970). Elk were also uncommon when Lewis and Clark came over the Lolo Trail in 1805. They never killed an elk in the entire Clearwater Valley, nor do they mention having seen one (Space 1981). Fruit resources such as berries fluctuate from season to season due to weather and precipitation, but also over longer periods with forest disturbance and succession.

Big Game Hunting

The Idaho Department of Fish and Game regulates hunting and hunting practices. Big game hunting is allowed on National Forest System lands and has in other areas led to grizzly bear-human conflicts when grizzly bears are attracted to big game carcass or encountered while hunting. Schwartz et al. (2010) found that bears that spent more time in areas open to hunting had lower survival than those that spent time in areas closed to hunting. Fifty-three outfitter and guides are permitted on the Nez Perce-Clearwater. Hunting occurs on the national forest by both guided and unguided hunters for big game. The use of bait for the purpose of taking resident game on National Forest System lands is a hunting practice. Where states permit the use of bait for attracting resident game, this activity is allowed on National Forest System lands, subject to state hunting laws and regulation, unless the authorized officer determines on a site-specific basis that there is a need to prohibit or restrict the practice (FSM 2640). Bear baiting for the purpose of hunting black bears is allowed by the State of Idaho. The state also allows black bear hunting with hounds, and hunters hunt black bears during the black bear season without the use of bait or hounds. Baiting can unintentionally draw in grizzly bears as happened in 2007 where a male grizzly bear was accidentally killed by a hunter near Kelly Creek within the Nez Perce-Clearwater National Forest.

Climate Change

The Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains (Halofsky, Peterson, et al. 2018a, b) is the best available science on climate change and its effects on forested ecosystems in the Northern Rockies. Halofsky et al. (2018) asserts that global climate models project that the Earth's current warming trend will continue throughout the 21st century in the Northern Rockies. The Northern Rockies Adaptation Partnership region covers 183 million acres, spanning northern Idaho, Montana, northwestern Wyoming, North Dakota, and northern South Dakota, and includes 15 national forests and 3 national parks across the U.S. Forest Service Northern Region and adjacent Greater Yellowstone Area. Compared to observed historical temperature, average warming across the five Northern Rockies Adaptation Partnership subregions is projected to be about 4 to 5 degrees Fahrenheit by 2050, depending on greenhouse gas emissions. Precipitation may increase slightly in the winter, and slightly lower in summer than during the historical period of record, although the magnitude is uncertain. This document predicts that droughts of increasing frequency and magnitude are expected in the future, promoting an increase in wildfires, insect outbreaks, and nonnative species. These periodic disturbances will rapidly alter productivity and structure of vegetation, potentially altering the distribution and abundance of dominant plant species and animal habitat (Halofsky, Andrews-Key, et al. 2018). Some of these changes could already be occurring on the Nez Perce-Clearwater National Forest.

The most likely ways in which climate change may potentially affect grizzly bears are a reduction in snowpack levels, shifts in the denning season, shifts in the abundance and distribution of some natural food sources, and changes in fire regimes due to summer drought. The potential effects would likely be variable and are difficult to predict. Grizzly bears are habitat generalists and opportunistic omnivores, which may make them less susceptible to changes in plant communities than some other wildlife species.

Pigeon et al. (2016) studied the influence of ambient temperature on habitat selection patterns of grizzly bears in the managed landscape of Alberta, Canada. Grizzly bear habitat selection followed a daily and seasonal pattern that was influenced by ambient temperature, with adult males showing stronger responses than females to warm temperatures. The study demonstrated that ambient temperatures, and therefore thermal requirements, play a significant role in habitat selection patterns and behavior of grizzly bears.

Roberts et al. (2014) estimated the impact of warmer future climate on grizzly bears in the southern Canadian Rocky Mountains. They used presence-absence information to estimate ecological niches of food plants and projected changes in future distributions of each species. Many food items persisted or even increased, although several species were found to be vulnerable based on declines or geographic shifts in suitable habitat. Roberts et al. (2014) concluded that, a wide diet breadth of grizzly bears, as well as wide environmental niches of most food items, make climate change a much lower threat to grizzly bears than other bear species.

Analysis of Effects

Methods for Analysis of Effects

It is important to note that the Land Management Plan does not authorize, fund, or carry out site-specific allowances, prohibitions, or activities, rather it establishes overarching direction for future land management actions. Management direction in the Land Management Plan will go into effect once the final record of decision is signed by the forest supervisor and is expected to guide management and decision-making processes for approximately 15 years. Therefore, the effects of the plan components and land allocations on grizzly bears are indirect effects which could occur from activities conducted under the direction of the Land Management Plan in the future.

The primary focus of this analysis is the effects on connectivity and future potential occupancy of the Bitterroot Recovery Zone by grizzly bears. The key indicator is the spatial overlap and consequences of plan direction on secure habitat as a surrogate for effects to grizzly bears. The spatial overlap of land allocations and associated plan direction in many ways determines the effects. Loss of secure habitat could affect grizzly bear presence, survival, dispersal, and connectivity. The effects are comparative in that the analysis is evaluating the change in existing plan direction and conditions compared with direction in the alternatives. The analysis evaluates allocations of recommended wilderness, suitable wild and scenic rivers, timber suitability, suitability of lands for summer and winter motorized uses, suitability for various levels of recreation, allocation of management area, and associated direction. The analysis also evaluates plan direction for domestic livestock grazing, recreation, vegetation management, minerals and energy, and grizzly bear-human interactions. It also evaluates the effects of plan components and objectives identified in the plan. The analysis focuses on the effects of existing conditions and potential implementation of the Forest Plan on any grizzly bears that may be present, as well as considering the ability of the area to contribute to connectivity between grizzly bear recovery zones. The analysis assumes that grizzly bears would eventually establish a population within the plan area through natural dispersal. Grizzly bear presence within the plan area currently is sporadic and is composed of dispersing males. Therefore, the key indicators are how the Preferred Alternative would affect secure habitat that would be required in the event female grizzly bears migrate into the plan area. Lastly, the analysis indicates plan direction that might increase or decrease the probability of bear mortality of bears that may be present or grizzly bears that might move into the national forest in the future.

The analysis first evaluates how the alternatives, including the Preferred Alternative, would affect the potential for the Bitterroot Recovery Zone to host a future population of grizzly bears. The alternatives identify recommended wilderness, the amount of various classes of summer and winter recreation opportunity settings, the suitability of wild and scenic rivers and the associated one-quarter mile river corridor, the area suitable for timber production, and the acres of disturbance or restoration of forest vegetation per year. Thus, timber production amounts will not be analyzed spatially except where timber harvest is suitable. There is a high degree of uncertainty with the effects analysis because it is unknown where grizzly bears will come into the national forest, where they will reside once they arrive, and whether they will stay within the Bitterroot Recovery Zone.

Secure habitat was delineated spatially for use in analysis by excluding areas within 0.31 miles from a motorized route and those blocks larger than 10 acres as outlined in Schwartz et al. (2010). As explained above, this metric was chosen because it was selected in other grizzly bear ecosystems with the rational that secure habitats smaller than 10 acres could contribute to grizzly bear habitat. However, recognizing that larger secure areas probably have more value to grizzly bears, we report the amount of secure habitat larger than 1,280 acres consistent with findings of Wakkinen and Kasworm (1997) that suggested that areas this size and larger were used more by grizzly bears than smaller blocks. The analysis presents a range of sizes of secure habitats for analysis purposes that range from 10 acres to more than a million acres. Routes were included if they were closed to the public but would still allow administrative uses. Routes used for administrative uses could be roads or motorized trails that are gated but still in a useable state, or those in storage, without culverts, brushed in, and not usable without substantial improvements. It is also unknown whether the routes are passable by the public during illegal use. While illegal, use of closed routes does sometimes occur; however, the extent and frequency of use is unknown. Nez Perce-Clearwater spatial data for the travel system is currently unable to distinguish between these on the ground conditions, thereby excluding all of them from secure habitat. The amount of secure habitat used in analysis overestimates the actual usability of these features and, thus, a conservative estimate of secure habitat.

The 2012 Planning Rule adopted a coarse filter-fine filter approach to contribute to recovery of federally listed species. This analysis evaluates whether the plan and plan components provide the ecological conditions to contribute to the recovery of grizzly bears. It does so by first evaluating whether coarse filter ecosystem plan components provide for grizzly bear needs. Coarse filter ecological conditions provide for ecosystem integrity. This includes structure, function, composition, and connectivity. Structure is defined as the organization and physical arrangement of biological elements, such as snags, down woody debris, vertical and horizontal distribution of vegetation, stream habitat complexity, landscape pattern, and connectivity. Function is defined as ecological processes that sustain composition and structure, such as energy flow, nutrient cycling and retention, soil development and retention, predation and herbivory, and natural disturbances like wind, fire, and floods. Connectivity is defined as ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change. These definitions originate from the 2012 Planning Rule. The analysis in the Diversity and Abundance of Wildlife Section 3.2.3.2 evaluates whether the plan components provide ecosystem integrity.

The analysis evaluates grizzly bear ecology and the spatial overlap of factors or conditions known to affect habitat quality and survival. In particular, this analysis analyzes the spatial overlap of existing "secure" habitat or areas that free from the impact of motorized vehicles (for example, cars, trucks, ATVs, motorcycles, electric bicycles) with the various land allocations in the plan, alternatives, and plan direction within the plan area. This analysis addresses known threats and stressors and whether the allocation of management areas and suitability of uses would address the threats to contribute to grizzly bear recovery.

This analysis evaluates the effects of alternatives and plan components on grizzly bear that may be present and the effects on connectivity and future potential occupancy of the Bitterroot Recovery Zone. For this analysis, the Nez Perce-Clearwater analyzed plan direction for areas suitable for motorized uses, secure habitat, domestic livestock grazing, management of food and attractants, developed recreation sites, vegetation management, minerals and energy, cover and grizzly bear habitat, denning-specific habitat, grizzly bear food availability, and interactions between grizzly bears and humans. The analysis focuses on the effects of existing conditions and potential implementation of the Forest Plan on any grizzly bears that may be present, as well as considering the ability of the area to contribute to connectivity between grizzly bear recovery zones.

The key indicators are how the spatial overlaps of forest plan alternatives would affect grizzly bear dispersal or connectivity and how the alternatives would affect the potential for the Bitterroot Recovery Zone to host a future population of grizzly bears. The analysis relies on the spatial overlap of various alternatives as a surrogate for the effects to grizzly bears. The plan alternatives vary in the amount of recommended wilderness, the number of various classes of summer and winter recreation opportunity settings, the area of wild and scenic river suitability, and the acres of disturbance or restoration of forest vegetation per year. Timber suitability is a decision in the Forest Plan but does not vary by alternative and, while timber production does vary, there is not a spatial layer for overlays. Timber suitability is analyzed spatially by overlaying lands suitable for timber production, timber harvest, and lands not suitable. After the spatial overlays are analyzed, the document then analyzes the effects of plan direction for various resources areas and their consequences to grizzly bears and how they would affect the potential for future occupancy. Lastly, the analysis indicates plan direction or alternatives that might increase the probability of mortality of bears that may be present or grizzly bears that might move into the national forest in the future. There is a high degree of uncertainty with the effects analysis because it is unknown where grizzly bears will come into the Nez Perce-Clearwater, where they will reside once they arrive, and whether they will actually stay within the Bitterroot Recovery Zone.

The period considered for the analysis of indirect effects of the alternatives is the anticipated life of the Forest Plan, which is about 15 to 20 years. However, the decisions made under the Forest Plan can have effects for much longer. For example, old growth may take centuries to reach the same age or size once lost. Travel planning decisions to authorize or construct roads or motorized trails can become permanent. The analysis area for indirect effects of the Forest Plan is the areas encompassed by the administrative boundary of the Nez Perce-Clearwater. Because grizzly bears are wide-ranging, the analysis of cumulative effects is discussed in the context of the Bitterroot Ecosystem.

Effects of the Plan on the Ecological Conditions Within the Bitterroot Recovery Zone

The Land Management Plan under all alternatives will not change the boundaries or characteristics of the Bitterroot Recovery Zone in how it contributes to the recovery of the grizzly bear because it is composed of congressionally designated wilderness, which will not be changing in the revised plan. Suitability plan components in the Recommended Wilderness Section of the Plan find the following activities unsuitable in wilderness: timber production, timber harvest, permanent road construction, temporary road construction, locatable minerals, leasable minerals, new facilities, motorize recreation, over-snow motorized recreation, and mechanical transport. Grazing may be suitable in allotments established before the wilderness was designated, depending upon the enabling legislation. Direction in designated wilderness does not vary by alternative.

The Designated Wilderness Section of the Plan includes direction for the management of designated wilderness areas that make up the Bitterroot Recovery Zone. MA1-DC-WILD-01 is a desired condition that states that management shall preserve and protect wilderness character as required by the Wilderness Act and enabling legislation. MA1-DC-WILD-02 is a desired condition for natural ecological processes and disturbance to be the primary forces affecting vegetation. Standards MA1-STD-WILD-01 and MA1-GDL-WILD-01 require management activities to be in accordance with Wilderness Management Plans and preserve wilderness character. Plan directions for suitability restrict several activities mentioned above. These plan components would maintain the ecological conditions to contribute to recovery. Plan direction does allow prescribed fire and some livestock grazing within the wilderness areas. Of course, as with all projects carried forth under the guidance of the Land Management Plan, these actions would still undergo National Environmental Policy Act analysis and Endangered Species Act consultation prior to authorization. Grazing is an ongoing activity that would undergo analysis and consultation before a reauthorization. These activities would also be required to be consistent with enabling legislation which allowed existing grazing to continue but constrained new authorizations.

Even though wilderness management keeps habitats intact, it does not protect bears from human-bear conflicts. There is no plan direction that requires storage of food or attractants. Such an order can be instituted outside the forest plan though a special order. Efforts to institute a special order are currently being considered. The lack of an order may place any bears that may be present at risk until a food storage order is implemented. However, FW-DC-WL-07, FW-DC-WL-08 seek to educate the public about bear safety measures and direction to provide infrastructure at developed recreation sites. Additionally, there are management approaches as other plan content to adapt to conditions as grizzly bears become established that suggest implementing measures like food storage orders as appropriate.

The Bitterroot Recovery Zone on the Nez Perce-Clearwater is largely ungrazed by domestic livestock, save for about 380 acres of one allotment that overlaps the recovery zone near the Big Mallard Creek trailhead within the Frank Church-River of No Return Wilderness. The allotment is currently vacant and not currently grazed. There is some risk to grizzly bears associated with livestock grazing within the Bitterroot Recovery Zone. Conflicts with livestock could lead to some bear removals or deaths. Because the livestock grazing allotment in the Recovery Zone permits cattle (not domestic sheep) and is currently vacant, the risk of adverse impacts on grizzly bears due to forage competition, displacement, or livestock-related mortality is lower than for other livestock types. The overlap and proximity to the Bitterroot Recovery Zone could lead to livestock depredation in the event the allotment resumes grazing and, in the event grizzly bears become present.

The Bitterroot Recovery Zone is mostly coincident with the Selway-Bitterroot and Frank Church-River of No Return Wilderness areas but does include some portions of the Magruder Corridor, which was excluded from wilderness in the Central Idaho Wilderness Act (1980). There are also some small areas that are not wilderness that were included in the Bitterroot Recovery Zone. The largest block of secure habitat in the plan area is a contiguous block of secure habitat of approximately 1,103,922 acres without any roads nor motorized trails and is centered over and around lands surrounding the Bitterroot Recovery Zone. The Nez Perce-Clearwater has 935,715 acres of the Bitterroot Recovery Zone, of which 926,732 acres are secure habitat by our definition. That is, the Bitterroot Recovery Zone is 99 percent secure habitat. The Bitterroot Recovery Zone within the Nez Perce-Clearwater only has one road, the Magruder Road or Forest Service 468, which passes through about six miles of the recovery zone before it passes into the Bitterroot National Forest. Some other roads along the border of the Recovery Zone affect secure habitat, but the roads do not cross into it. Resulting road density is 0.004 miles per square mile within the Recovery Zone. There is little to no possibility of new roads nor motorized trails being constructed in the future in the wilderness because these are prohibited by the wilderness act. These areas alone provide the ecological conditions to contribute to grizzly bear recovery so long as bears can disperse there. Only 9,002 acres (less than 1 percent) within the Bitterroot Recovery Zone is not secure habitat. The loss of some secure habitat is mostly due to the Magruder Road but also because of some other roads provide access points up to the wilderness boundary. Thus, the number of roads within the Recovery Zone is very low and are expected to remain low.

Timber harvest, silviculture treatments, fuels projects, and other vegetation management projects are generally not allowed within designated wilderness areas. Neither timber harvest nor timber production are suitable within wilderness areas and thus are prohibited under the Preferred Alternative. The plan components contain some direction to encourage treatment of noxious weeds in wilderness areas. The plan also allows prescribed fire as a suitable use in wilderness. These components and activities would have negligible effects or beneficial effects on grizzly bears. Prescribed fire treatments may create early seral conditions that can improve forage opportunities for grizzly bears. They may also form thick stands of shrub that could contribute to hiding cover. The Forest Plan does not authorize any of these activities, it only identifies these as suitable uses. In all cases, federal actions conducted under the guidance of the Forest Plan would be required to be consistent with the plan and undergo additional site-specific analysis and Endangered Species Act consultation prior to authorization.

New developed recreation sites are not allowed within designated wilderness. There are a few campgrounds near the boundary of the Bitterroot Recovery Zone. There are two developed recreation camp sites along the Magruder Road, which are on the boundary of the recovery zone near the Frank Church-River of No Return Wilderness. There are two other developed campgrounds near the Selway Bitterroot Wilderness, one near Elk Summit and another near Big Fog Saddle. These developed sites are outside of the recovery zone but near the boundary. Farther away are nine developed campgrounds along the Lochsa River that could potentially attract grizzlies outside of the Recovery Zone. When bears become established, these sites may attract bears from within the Recovery Zone and lead to human conflict and bear death. Measures to educate the public and provide food storage infrastructure, as in FW-DC-WL-07 and FW-DC-WL-08, would direct management to address these concerns if, and when necessary. The Nez Perce-Clearwater is currently engaging in efforts to educate the public about bear safety. There are several outfitter and guide operations that operate camp locations within designated wilderness areas, and most are issued special use permits to authorize their uses. The permits often contain information addressing resource concerns and provide direction for their operation. These permits often include information about bear safety to help prevent bear-human conflicts and encourage safe storage practices for attractants.

New minerals and energy developments are not allowed in designated wilderness, and most mineral rights were withdrawn with exceptions in enabling legislation. These would continue to be prohibited under the revised plan in the Bitterroot Recovery Zone in the future.

Essentially the Bitterroot Ecosystem Recovery Zone will continue to provide the ecological conditions to contribute to the recovery of the grizzly bear under all alternatives. However, because grizzly bears must disperse naturally into the Recovery Zone to become established, the way the plan provides for connectivity for grizzly bears is a key consideration for how the revised plan will contribute to the recovery of the grizzly bear and is evaluated below. Bears traveling into the Recovery Zone from other ecosystems face more threats and stressors.

Effects of Land Management Plan Direction and Alternatives on Grizzly Bear Connectivity

The analysis throughout the rest of the grizzly bear section is evaluating whether the plan provides for the ecological conditions for grizzly bear dispersal through the Nez Perce-Clearwater into the Bitterroot Recovery Zone and whether the areas outside the recovery zone are capable to support grizzly bears. The Revised Forest Plan establishes a framework with three overarching management areas referred to as Management Area 1, Management Area 2, and Management Area 3. The distribution of the three management areas varies only by an almost insignificant amount, which varies only because of additions to eligible or suitable wild and scenic rivers, which would change some Management Area 3 lands to Management Area 2 lands.

A description of these areas is included in Chapter 1 of the revised Forest Plan. To summarize, Management Area 1 includes designated areas such as designated wilderness and designated wild and scenic rivers. Management Area 2 includes areas recommended under the plan and the Idaho Roadless Rule Areas. Management Area 2 would include research natural areas, recommended wilderness areas, and suitable Wild and Scenic Rivers for example. Management Area 3 are lands for multiple uses. Management Area 3 occur within approximately 1,217,683 acres of the Nez Perce-Clearwater under the existing condition but is 1,240,340 acres under the Preferred Alternative. Management Area 3 would include areas that currently have more roads, most campgrounds and infrastructure, more human use, and are managed for timber production. While the plan does not authorize any of these uses, these types of activities would continue under the broad direction of the plan. Management Area 3 is identified in the plan to emphasize these uses. As such, most of these activities generally would be suitable within

Management Area 3 save for restrictions specified within plan components. For example, several activities are unsuitable or restricted within Riparian Management Zones.

In general, Management Area 3 has few restrictions on management activities. Objectives for a variety of activities are identified in the plan. Examples include timber production, fire or fuels objectives, vegetation restoration, restoration of hardwood species, aspen restoration, soil restoration, aquatic or riparian restoration, invasive species treatments, recreation maintenance, and road maintenance. It should be anticipated that projects and management would be moving towards or achieving desired conditions and that management would fulfill objectives.

This analysis evaluates how ecological conditions for grizzly bears provide for dispersal through these areas into the Bitterroot Recovery Zones. In many ways, these management areas and land allocations provide the ecological conditions to provide for dispersal and habitation outside of the Recovery Zone because they provide broad areas where many activities that could affect grizzly bears are prohibited or restricted through suitability plan components tied to the distribution of these land allocations.

Dispersal between disjunct populations can play an important role in the persistence of a species by increasing genetic diversity in the receiving population, facilitating colonization and recolonization of unoccupied habitats, and augmenting the numbers of small populations (Hanski and Gilpin 1997, Mattson and Merrill 2002). In the rest of the analysis below, the effect of the Nez Perce-Clearwater Revised Forest Plan is evaluated in this larger context for connectivity.

The Bitterroot Recovery Zone lies between populations of grizzly bears in other ecosystems. Thus, dispersing bears from one or more of the ecosystems is important to the establishment of bears into the Bitterroot Ecosystem. The plan area contributes to this dispersal from grizzly bear ecosystems north or east of the Nez Perce-Clearwater, namely the North Continental Divide, Cabinet-Yaak, and Selkirk Ecosystems. The Nez Perce-Clearwater could contribute to connectivity for grizzly bears between the Greater Yellowstone Ecosystem and the other Ecosystems, however connectivity is more likely through other routes than the Nez Perce-Clearwater. For the Bitterroot Ecosystem to have a population of grizzly bears, female grizzly bears would need to become established. Thus, the ability of the Nez Perce-Clearwater to provide connectivity both into and between the ecosystems for female grizzly bears is a key indicator for this analysis.

Table 256 shows the location of the Bitterroot Recovery Zone in relation to areas occupied by grizzly bears and the other recovery zones. The nearest areas occupied by grizzly bears are from the Northern Continental Divide Ecosystem where grizzly bears have become established outside the boundaries of the Northern Continental Divide Ecosystem. The edge of this occupied polygon is about 15 miles from the nearest Bitterroot Ecosystem boundary and about 13.5 miles from the boundary of the Nez Perce-Clearwater at the nearest locations, as measured in ArcGIS. This distance is near the maximum dispersal distance recorded by McLellan and others for female grizzly bears (McLellan and Hovey 2001b). Based upon these distances, the most likely source of female bears to show up in the Bitterroot Ecosystem by natural dispersal may be those from the Northern Continental Divide, the Cabinet-Yaak, or Selkirk Ecosystems. Despite the proximity, bears face significant barriers coming from Northern Continental Divide Ecosystem into the Nez Perce-Clearwater because of human development along the I-90 corridor (Servheen, Waller, and Sandstrom 2003).

The boundary of the Cabinet-Yaak Recovery Zone is about 35.8 miles from the northern boundary of the Nez Perce-Clearwater and about 69 miles from the nearest boundary from the Bitterroot Recovery Zone. The Selkirk Recovery Zone is about 86.9 miles from the nearest Nez Perce-Clearwater boundary and 172 miles from the nearest Bitterroot Recovery Zone boundary, as measured in ArcGIS. However, the incidences noted above from male bears that were observed in or near the Nez Perce-Clearwater have come from the Cabinet-Yaak (2019), Selkirk (2007), and Northern Continental Divide ecosystem (2018) populations and entered the northern or northeastern area of the Nez Perce-Clearwater. The arrival pattern is expected to continue, though some bears may make it into the Bitterroot Recovery Zone south of Stevensville, Montana.

While perhaps less likely, grizzly bears could also come from the Greater Yellowstone Ecosystem (GYE). The closest straight-line distance from the GYE recovery zone and the Bitterroot Recovery Zone is approximately 132 miles as measured in ArcGIS, though the arrangement of terrain and anthropogenic factors might require a grizzly bear to travel a farther distance between the two ecosystems. If we assume that grizzly bears would be more likely to travel along a mountainous path, then a potential travel corridor could exist from the GYE near the Eastern Centennial mountains through the mountainous area along the Idaho-Montana border through the Beaverhead range and into the Bitterroot Recovery Zone on the Bitterroot National Forest. A bear traveling this path would potentially cross the Caribou-Targhee, Salmon-Challis, Beaverhead Deer Lodge, and Bitterroot National Forest, passing North of Salmon Idaho and south of Hamilton Montana. Such a path would require a grizzly bear to cross I-15 and Highway 93 and travel approximately 200 miles. A second, more direct but more fragmented path might include a path from the Madison Range in the GYE north to the Tobacco Root Range, to the highland range, passing south of Butte Montana into the Sapphire Range and then crossing through the mountainous areas between Hamilton Montana and Salmon Idaho into the Bitterroot Ecosystem on the Bitterroot National Forest. This course would require a bear to travel about 150 miles and cross both I-15 and Highway 93.

Table 256. Distance between Nez Perce-Clearwater and Bitterroot Ecosystem Recovery Zone from areas occupied by grizzly bears

Grizzly Bear Recovery Zone or Ecosystem	Distance in miles from the Nez Perce-Clearwater boundary to nearest area occupied by grizzly bears	Approximate Distance in miles from the Bitterroot Ecosystem Boundary from nearest area occupied by grizzly bears
North Continental Divide Ecosystem	13.5	15
Selkirk Ecosystem	86.9	172
Cabinet-Yaak Ecosystem	35.8	69

Most of the area of the Nez Perce-Clearwater north of the Bitterroot Recovery Zone boundaries are composed of either recommended wilderness or Idaho Roadless Rule areas. Provided grizzly bears advance into the Nez Perce-Clearwater, Idaho Roadless Rule Areas, recommended wilderness areas and designated wilderness areas provide high levels of secure habitat and allow for connectivity to the Bitterroot Ecosystem. These areas are composed of HUC 10 watersheds that have more than 55 percent secure habitat, which should allow for survival and passage.

Areas in Management Area 3 have low amounts of secure habitat and reduce connectivity through some areas. The area near Lolo Pass that has checkerboard ownership has substantial acreage of private land and many miles of private roads. Private lands within the checkerboard area are outside of Forest Service control. Similarly, the general forest management areas of Deception Point and south of the Mallard Larkin area around Indian Henry Ridge has lower amounts of secure habitat. However, grizzly bears may be able to navigate around or even pass through these areas as Bear 927 did. Grizzly bears that enter the Nez Perce-Clearwater from the north or east would most likely enter recommended wilderness or Idaho

Roadless Rule areas. Figure 104 below shows the Bitterroot Ecosystem in relation to the Nez Perce-Clearwater recommended wilderness, Idaho Roadless Rule areas, and designated wilderness.

The Nez Perce-Clearwater is bordered on the north, east, and south by other National Forest System lands. Few Forest Service activities disrupt animal movements across the landscape. The landscape feature most important to the disruption of connectivity for grizzly bears is the road system, motorized trail system, and some recreation facilities.

Note that the use of motorized vehicles off existing designated roads and trails is not permitted on the Clearwater portion of the national forest, except for travel to dispersed campsites within 300 feet of an open route (U.S. Department of Agriculture 2017f). Roads and trails closed to public motorized use sometimes remain available to Forest Service personnel for administrative purposes, including wildfire suppression, search and rescue, medical emergencies, permit administration, data collection, noxious weed treatments, general management, and other activities (U.S. Department of Agriculture 2017f). However, they are not used often.

Grizzly bears may modify their behavior temporally in response to road use intensity. Northrup et al. (2012) found that grizzly bears in southwestern Alberta increased their use of areas near roads and moved across roads during the nighttime hours when traffic use was low. During the day, bears crossed and used the areas near roads that had low use (less than 20 vehicles per day) but avoided roads with moderate (20 to 100 vehicles per day) and high (greater than 100 vehicles per day) traffic volumes. Mace et al. (1996) evaluated seasonal use by grizzly bears of areas within a 0.3-mile buffer of surrounding roads in the Swan Mountains, Montana. Most grizzly bears exhibited either neutral or positive selection for buffers surrounding closed roads and roads receiving less than 10 vehicles per day but avoided buffers surrounding roads having greater than 10 vehicles per day. Ruby (2014) found that grizzly bear activity near open motorized routes and human developments in Swan Valley, Montana peaked during time periods when humans were likely to be less active. Because motorized trails are unlikely to be used at nighttime, there might be less impact on bears from the network of motorized trails than would be suggested by the Boulanger and Stenhouse (Boulanger and Stenhouse 2014) thresholds. The amount of use on most of the roads bordering the Nez Perce-Clearwater National Forest's Idaho Roadless Rule areas are assumed to be low but exact numbers are not available.

The forest plan does not make travel management decisions at a site-specific level. Instead, it sets the broad direction under which travel management decisions would occur in future projects under the plan. Plan direction that can influence travel management decisions include management area direction, Idaho Roadless Rule direction, wilderness designations, recreation opportunity spectrum settings, individual plan components, and suitability determinations.

The Idaho Roadless Rule area boundaries will not change during forest plan decisions. Idaho Roadless Rule area themes generally will not change in the plan unless the Idaho Roadless Rule area is selected as recommended wilderness. In that case, the Idaho Roadless Rule area theme would be managed as a Wildland Recreation Area. Idaho Roadless Rule areas do not allow new permanent road construction but do allow motorized trails to be constructed.

Secondly, the recreation opportunity spectrum classifications dictate the types of access allowed. The summer recreation opportunity spectrum is most relevant to grizzly bears while the winter recreation opportunity spectrum would not likely have effects on dispersing bears because they would be hibernating during winter travel. However, there are some possibilities that winter recreation may disturb hibernating grizzly bears. The effects of winter recreation on denning grizzly bears are evaluated below. However, wilderness areas and recommended wilderness areas are not suitable for winter motorized recreation and thus would not be allowed under the plan. The summer recreation opportunity spectrum varies by alternative, primarily because selection of recommended wilderness areas would change the recreation opportunity spectrum setting. These factors are analyzed in more detail below.

Demographic connectivity areas were considered during the development of the Final Environmental Impact Statement. Demographic connectivity areas are not needed at this time because of the existing regulations that occur as a natural result of roadless rule regulations and wilderness laws, which already provide this connectivity. Some non-motorized summer recreation opportunity spectrum settings in the Preferred Alternative were identified to help provide for grizzly bear connectivity (Figure 106). These are non-motorized settings near the Hoodoo recommended wilderness area.

Effects That Do Not Vary by Alternative

Effects of Suitability Plan Components

Suitability plan components are new type of plan components introduced in the 2012 Planning Rule. They identify the appropriateness of various uses or activities within a plan area. Identifying the suitability of lands for a use in the Forest Plan indicates that the use may be appropriate but does not make a specific commitment to authorize that use. Where uses are identified as not suitable, the specified activity would not be allowed in those areas. Therefore, the effects of suitability plan components are programmatic in nature and provide sweeping direction for broad areas within land allocations. Some land allocations do not vary by alternative (for example like designated wilderness, designated wild and scenic river corridors, Idaho Roadless Rule Areas, established research natural areas, and the National Historic Landmark) and the suitability plan components apply to these lands and also do not vary by alternative. Other land allocations vary in extent by alternative (for example, recommended wilderness, eligible and suitable wild and scenic rivers, proposed Research Natural Areas, Summer Recreation Opportunity Spectrum, Winter Recreation Opportunity Spectrum settings, or Timber Suitability), but the suitability plan components that apply to these do not vary by alternative. There is one exception; the suitability of some activities within recommended wilderness vary by alternative and are evaluated in the Recommended Wilderness analysis below. The alternatives that vary the extent of suitability are evaluated below and include the suitability of motorized uses which varies by alternative with the Summer and Winter Recreation Opportunity Spectrum settings, and timber suitability varies by alternative. This section discusses the suitability plan components that do not vary by alternative.

Suitability plan components are often associated with land allocations such as uses suitable within wilderness, Idaho Roadless Rule Areas, Wild and Scenic Rivers, Research Natural Areas, or areas set aside for general forest management that emphasizes multiple uses. However, they can also apply to areas such as Riparian Management Zones that are not a management area. Categories of activities addressed by suitability plan components include timber production, timber harvest, permanent road construction, temporary road construction, prescribed fire, livestock grazing, locatable minerals, saleable minerals, leasable minerals, new facilities, motorized uses, over-snow motorized recreation, and mechanical transport recreation travel, such as bicycling. Suitability plan components provide broad direction across the landscape for these activities. Each of these activities has the potential to affect grizzly bears.

Timber production is suitable in portions of Management Area 3. It is excluded everywhere else. Lands suitable for timber productions are areas where timber production is the primary mechanism to treat vegetation and can be conducted for the purpose of producing lumber for market. Timber production is associated with increased roads, which detract from secure habitat. Timber production is not suitable outside of Management Area 3. Timber harvest is tree cutting for purposes other than producing lumber. This may include activities to achieve vegetation desired conditions, fuels reduction, wildlife habitat improvement, or other similar activities. It can be less impactful than production because the purpose for the treatments can differ from production which can alter the methods used. It would usually be conducted from existing roads but can also be associated with temporary or permanent road construction. This is less common and may only occur where temporary or permanent roads are also suitable. Roads can alter habitat and detract from secure habitat. While all lands suitable for timber production is also suitable for timber harvest, lands suitable only for timber harvest are much more widely distributed compared to timber production. It is suitable everywhere except wilderness, the National Historic Landmark, and Idaho Roadless Rule wildland recreation theme areas, however, other roadless rule themes place very strict rules on when timber harvest could be done and generally require regional forester approval.

Temporary roads are not suitable within designated wilderness, the National Historic Landmark, suitable wild and scenic rivers wild classification areas, Idaho Roadless Rule themes of wildland recreation primitive, special areas of historic or tribal significance, backcountry recreation themes, primitive recreation opportunity spectrum settings, semi-primitive non-motorized settings, riparian management zones, and mass movement areas. They are suitable everywhere else. Temporary roads are used for timber harvest, production, vegetation management, or other activities but are closed after operations and have short-term effects. They are generally closed to the public when in use. They are decommissioned using a variety of techniques, once operations are finished. They can increase foot travel into forested areas until they are brushed in. While the plan has no time limit identified for when temporary roads should be closed, this generally occurs immediately after operations are finished, but at most within 5 years.

Prescribed fire is suitable across the whole forest. It can change seral conditions for vegetation, but bears use a variety of forested and non-forested conditions that provide different life requirements. While prescribed fire can reduce forest cover used by bears, it can also generate nutrition as well. Effects can occur during implementation by displacing bears. Fire also increases diversity in forest structure, function, composition, and density which provides for a broad variety of other wildlife and plants that provide for bear nutrition.

Livestock grazing is suitable within allotments everywhere except developed recreation sites and administrative sites. Grizzly bears may depredate livestock, which can lead to human bear conflicts, bear removal, or death. While livestock grazing is suitable across broad areas, it is managed within allotments that are generally located where there is sufficient forage. Livestock grazing under the plan may be available on a temporary basis on transitory forage made available following the reduction in conifer overstory from fire and timber harvest. Again, only allotments existing prior to wilderness designation are allowed within designated wilderness areas such as the Selway Bitterroot, Gospel-Hump, and Frank Church-River of No Return wilderness areas. No new allotments would be allowed within these wilderness areas.

The three types of mineral extraction are suitable across most of the planning area unless withdrawn. Withdrawal has occurred in designated wilderness and the National Historic Landmark and is not suitable in administrative or developed recreation sites. Some Idaho Roadless Rule themes, riparian management zones, and mass movement areas are not suitable for leasable or saleable mineral activities. The Forest Service must allow exploration and reasonable access to mining activities but may regulate surface occupancy to some extent and require plans of operation. The Forest Service has more regulatory discretion over saleable minerals. Mining can destroy habitat when surface is occupied and can produce contaminants. Mining activities may increase the probability of human-bear conflicts during operations. While suitable across wide areas, mining activities are often localized, and no large-scale commercial mining operations are present or proposed on the Nez Perce-Clearwater.

Motorized recreation is well documented in scientific literature to have effects on grizzly bears. Effects include displacement and decreased survival. Motorized suitability is determined by the Winter and Summer Recreation Opportunity Spectrum Settings and is also consistent with land management allocations such as Wilderness, Idaho Roadless Rule, and recommended wilderness. The revised Forest Plan does not make travel management decisions, instead it identifies where motorized travel is suitable. Motorized travel is not suitable in primitive and semi-primitive non-motorized settings and within recommended and designated wilderness areas under the Preferred Alternative. It is suitable in rural, roaded natural, and semi-primitive motorized settings. There are few other plan components that restrict new motorized travel. These are analyzed in detail below.

Motorized recreation usually occurs on open roads and motorized trails, though users sometimes create illegal trails by driving cross country or drive around gates and barriers on closed roads. On the Clearwater National Forest, the travel plan designated open roads and trails and changed management from an open until closed to a closed unless designated open system. On the Nez Perce National Forest, there is no travel plan that is finalized under the travel management act. Therefore, travel is open across the Nez Perce National Forest unless closed by a site-specific decision. Travel planning on the Nez Perce National Forest would occur under the direction of the Revised Forest Plan.

Over-snow winter motorized travel is not suitable within primitive and semi-primitive nonmotorized winter recreation opportunity spectrum settings and within recommended and designated wilderness. It is suitable in other settings. Because of hibernation, winter travel generally does not affect grizzly bears except for potential disturbance or when they emerge from their hibernacula. Winter recreation is analyzed in detail below.

Mechanical transport or recreation includes bicycling and the use of game carts. Mountain biking has led to bear-human conflicts and human deaths in some cases in areas occupied by grizzly bears. Mountain biking could also displace bears. Mechanized transportation of game carcasses has virtually no direct effect on grizzly bears other than it may allow hunters to transport their game from longer distances into backcountry areas. Hunting has been known to increase human-bear conflicts when hunting results in surprise encounters or while defending carcasses. Mechanized travel is not suitable in designated nor within recommended wilderness areas but is suitable everywhere else.

Permanent road construction is suitable in Management Area 3 without many constraints. Within Idaho Roadless Rule Areas, permanent roads under the plan are suitable only to the extent they are allowed within the roadless rule (see summary in above describing the Idaho Roadless Rule Direction above). Permanent roads are not suitable or allowed within Recommended Wilderness only to the extent allowed under the roadless rule. These areas would be managed like Wildland Recreation and Primitive theme areas. Roads are prohibited by law in Designated wilderness areas. Within designated wild and scenic rivers roads are allowed to the extent allowed by law and enabling legislation. Permanent roads are typically disallowed within Wild River corridors but allowed within Scenic and Recreation classes of wild and scenic rivers. To summarize, roads are generally unrestricted within Management Area 3, mostly restricted within Management Area 2, and even more restricted within Management Area 1 with the exception of some classifications of wild and scenic river areas. The suitability plan components were designed to be consistent with existing laws and regulations (for example, Idaho Roadless Rule, Wilderness Act), which supersede the plan, and is why many suitability plan components have exceptions that tier to the allowed exceptions in those laws. The plan cannot be inconsistent with those laws and regulations. The primary mechanism to establish motorized suitability is the summer and winter recreation opportunity spectrum settings that are analyzed in more detail below.

Suitability plan components are the primary mechanisms that will provide the ecological conditions for grizzly bear connectivity and recovery because they will maintain secure habitats, prevent actions identified above across broad areas that could affect dispersing bears, and maintain conditions within the Bitterroot Recovery Zone. Several sections of the grizzly bear analysis below detail effects from suitability associated with management area allocation including the Effects of Recommended Wilderness section, the Effects of Designated and Suitable Wild and Scenic Rivers section, the Timber Suitability, Production, Harvest, and Vegetation Restoration section, the Effects of Motorized Suitability and Summer Recreation Opportunity Spectrum section, the Effects of Winter Recreation Opportunity Spectrum section and more. Suitability plan components are found in several tables within the Revised Forest Plan.

Effects of Designated Wilderness Management

The plan will not change the distribution or amount of Designated Wilderness as these areas are designated by Congress and cannot be changed by the plan. However, the plan will establish how Designated wilderness areas are managed. The prevailing management direction within Designated wilderness areas are to manage these lands to maintain wilderness character, consistent with the Wilderness Act, as well as each wilderness area's enabling legislation and its specific management plan. Natural ecological processes and disturbances (for example, succession, wildfire, avalanches, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation.

Several activities are not suitable within wilderness areas (see suitability Table 26 of the Forest Plan). The plan finds wilderness areas unsuitable for timber production, timber harvest, permanent road construction, temporary road construction, mineral extraction, construction of new buildings or facilities, over-snow vehicle travel, motorized travel, mechanized travel and more. Because these uses are unsuitable in wilderness, these activities would not be allowed. Livestock grazing is limited to allotments existing only before designation, and allotments are mostly absent from wilderness areas (see Figure 100Figure 100 for the distribution of Range allotments in relation to grizzly bear secure habitat, wilderness and the recovery zone). See suitability plan components within the Designated Wilderness Section of the plan.

The three designated wilderness areas are a total of 1,139,059 acres in size combined. The fact that the majority of the Bitterroot Recovery Zone is within designated wilderness protects these habitats from most actions that could impact grizzly bears or their habitat. Human presence is generally by foot or horse packing and human presence is generally lower than in the other management areas.

Under the plan, the amount of secure habitat would be expected to remain the same or change only slightly in Management Area 1. Schwartz et al. (2010) studied grizzly bear survival in the Greater Yellowstone Ecosystem and found predicted survival was highest in wilderness, followed by national parks, multiple-use land, and nonfederal land when comparing whether there were differences in survival within different jurisdictions in univariate comparisons, suggesting that these lands are capable of providing conditions for recovery.

Designated Wild and Scenic River Management

Congress passed the National Wild and Scenic Rivers System Act in 1968 (Pub. L. 90-542; 16 U.S.C. 1271 et seq.) for the purpose of preserving rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The act promotes river management across political boundaries and public participation in developing goals for river protection. Management of the existing Wild and Scenic Rivers enhances and protects habitats for future grizzly bear occupancy within wild and scenic river corridors. Designated wild and scenic river distribution will not change in the revised Forest Plan. Instead, the plan will set management direction for these rivers and their corridors.

The Nez Perce-Clearwater has three designated Wild and Scenic Rivers: Middle Fork Clearwater River, Salmon River, and Rapid River. The Middle Fork Clearwater includes portions of the Lochsa and Selway Rivers. On the Nez Perce-Clearwater, designated rivers include 64 miles of the Lochsa River from the Powell Ranger Station to Lowell, Idaho; 58 miles of the Selway River from the Nez Perce National Forest boundary with the Bitterroot National Forest near Goat Creek to Lowell, Idaho; and 23 miles of the Middle Fork Clearwater River from Lowell, Idaho to the Upper Kooskia Bridge in Kooskia, Idaho. Portions of the Selway and Salmon rivers flow through the Bitterroot Recovery Zone.

The lands surrounding the designated Wild and Scenic Rivers were included as Wild and Scenic River corridors and are managed consistent with the Wild and Scenic Rivers Act . The Nez Perce-Clearwater National Forest contains approximately 57,891 acres of Designated Wild and Scenic River corridors within the administrative boundary.

Management of wild and scenic rivers is governed by the Wild and Scenic Rivers Act of October 2, 1968 (Pub. L. 90-542, 82 Stat. 906, as amended). This act established the National Wild and Scenic Rivers System with three classes of river systems: wild, scenic, and recreational. The purpose of the act is to protect the river "for the benefit and enjoyment of present and future generations."

For management purposes, river segments are classified as wild, scenic, or recreational.

- Wild River: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- Scenic River: Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.
- Recreational River: Those rivers or sections of rivers that are readily accessible by road or railroad that may have some development along their shorelines and that may have undergone some impoundment or diversion in the past.

When designated, the five river segments were defined and classified as either wild or recreational segments. No segments were classified as scenic. Those river segments with adjacent roads were designated recreational and the others wild. The different classifications are associated with a variety of restrictions on activities such as timber harvest, the development of facilities and motorized routes. The acres of designated wild and scenic river corridors are shown in Table 257. Of the total five segments, four lie within the Nez Perce-Clearwater. Those segments are described in Table 258.

Table 257. Classification of Middle Fork Clearwater Wild and Scenic River within Nez Perce-Clearwater

River	Segment	Miles	Classification	Designating Legislation
Lochs	Powell Ranger Station to Lowell	64	Recreational	Wild and Scenic Rivers Act, 1968
Middle Fork Clearwater	Lowell to Kooskia	23	Recreational	Wild and Scenic Rivers Act
Selway	Lowell to Selway-Bitterroot Wilderness boundary	22	Recreational	Wild and Scenic Rivers Act
Selway[1]	Selway-Bitterroot Wilderness boundary to the Bitterroot National Forest boundary	36	Wild	Wild and Scenic Rivers Act
Rapid River	Segment located on the Nez Perce-Clearwater	13	Wild	Hells Canyon National Recreation Area Act, 1975

River	Segment	Miles	Classification	Designating Legislation
Salmon	Salmon Falls to Long Tom Bar	56	Wild	Central Idaho Wilderness Act, 1980

1 - This river system contains additional miles within the administrative boundaries of the Bitterroot National Forest.

Table 258. The acres within designated Wild and Scenic River corridors by classification within the Nez Perce-Clearwater National Forest

River Name	Acres Recreational	Acres Scenic	Acres Wild	Total
Middle Fork Clearwater (includes the Lochsa, Selway, and Middle Fork Clearwater Rivers)	32,751	0	11,631	44,382
Middle Fork Clearwater (includes the Lochsa, Selway, and Middle Fork Clearwater Rivers)	32,751	0	11,631	44,382
Rapid River	4,341	0	0	4,341
Salmon	0	0	9,164	9,164

Note, additional acres of designated wild and scenic river corridors extent outside the plan area.

Section (section 3(d)(1)) of the Wild and Scenic Rivers Act requires federal agency charged with the administration of each component of the national wild and scenic rivers system (designated wild and scenic rivers) to prepare a comprehensive management plan to provide for the protection of the river's outstandingly remarkable values. Thus, designated wild and scenic rivers have a comprehensive management plan that provides direction for its management. These plans provide guidance similar to plan components that guide management of the Wild and Scenic Rivers to protect outstandingly remarkable values.

Under the Wild and Scenic River Act, outstandingly remarkable values were assigned to all segments of the Middle Fork Clearwater River. In 2002, as part of the Snake River Basin water rights adjudication, the outstanding remarkable values were validated for all segments of the river. During the validation process in 2002, the determination was made that all the original outstandingly remarkable values should still be defined for the Middle Fork Clearwater, with one exception. Geology was not defined as an outstandingly remarkable value in 2002 but was in 1968. The other outstandingly remarkable values were defined in both 1968 and 2002. These values include scenery; recreation; fish; wildlife; prehistory, history, and, potentially, traditional, and cultural use; water quality; and vegetation and botany.

The Middle Fork Clearwater River and its tributaries play a vital role in the Nez Perce-Clearwater management of sensitive, threatened, and endangered fish species. The Middle Fork Clearwater subbasin is considered a core area for recovery of at-risk salmonids in the upper Columbia River basin. The river and its tributaries provide crucial habitat for threatened and endangered species listed on the Endangered Species Act, including steelhead trout and bull trout, which have also been identified as having outstanding remarkable value in this drainage. Additionally, hatchery spring Chinook salmon have been reintroduced to the river system and are currently listed as a U.S. Forest Service Northern Region Species of Conservation Concern, as is pacific lamprey. The Middle Fork Clearwater River functions as a critical migration corridor, connecting the Lochsa and Selway populations of listed fish within the South Fork Clearwater and Lower Clearwater River and tributaries. It affords relatively contiguous distribution of populations and suitable habitat so that the biological needs of these species can be met (U.S. Department of Agriculture 2002c). Designated Wild and Scenic River management benefit federally listed species either indirectly or directly.

The river corridor provides a diversity of high-quality habitat for wildlife of national and regional significance, and these were identified as outstandingly remarkable values. The 2002 assessment of Endangered Species Act listed species included the bald eagle, gray wolf, lynx, and grizzly bears (U.S. Department of Agriculture 2002c). The river corridor and adjacent areas continue to provide habitat for these species. Designated Wild and Scenic rivers will not change in the revised Forest Plan. Instead, the plan will set management direction for these rivers and their corridors.

The acres of designated wild and scenic river corridors and the acres of secure habitat contained within those corridors are shown in Table 259. These areas will not change under the plan and are already established by congress, but their management would be determined in the plan and would be consistent with applicable regulations.

Additional management direction is also provided in Wild and Scenic River Plans. Wild and Scenic River management plans are documents established either after designation that provide additional guidance to manage the river and its corridor. Wild and Scenic River plans typically consist of direction to protect outstandingly remarkable values of the river. The Wild and Scenic River plans will still be in effect when the revised Forest Plan is completed but could be revised under the guidance of the Revised Forest Plan in the future. Wild and Scenic Rivers are managed to maintain their free-flowing character, water quality and outstandingly remarkable values for which the river was designated. This management is generally beneficial to grizzly bears and would serve to maintain grizzly bear habitat because of the restrictive nature of wild and scenic river management. Also see analysis of suitability for restrictions and allowances in the plan in wild and scenic rivers. The plan includes components specific to designated Wild and Scenic Rivers under direction for Management Area 1 and through suitability of uses included in Table 28 of the revised Forest Plan. Allowed activities vary whether a river is identified as wild, scenic, or recreational, with wild rivers restricting more activities than scenic and recreational rivers. Wild and scenic river management contributes to populations of anadromous fish which could serve as a food source for grizzly bears.

Table 259. Acres of secure habitat within existing designated wild and scenic rivers

Designated Wild and Scenic River	Total Acres	Acres of Secure Habitat
Middle Fork Clearwater, Idaho	44,383	14,685
Rapid, Idaho	4,341	4,227
Saint Joe, Idaho	2	2
Salmon, Idaho	9164	8,313
Totals	**57,890**	**27,227**

Forest Service Handbook 1909.12 outlines the activities allowed within the different wild and scenic river classifications. Wild rivers restrict timber cutting, new mineral leases, roads, motorized travel, and allows only minimal recreation developments. The plan under all alternatives included direction consistent with these restrictions into the plan components for designated wild and scenic rivers, including appropriate suitability plan components (see the Designated Wild and Scenic River section of the plan). Management of Designated wild and scenic rivers would generally have beneficial effects on grizzly bears. However, some activities that could affect grizzly bears could occur in some classes of wild and scenic rivers. For example, the plan would find the following use suitable: permanent road construction, construction of new buildings, minerals, motorized travel, or other uses (see suitability table within the Designated Wild and Scenic River Section of the Plan). These activities would require site specific project analysis before being undertaken. Management of designated wild and scenic rivers protects the outstandingly remarkable values for which they were designated and maintains their free flow characteristics which are protective of riparian habitat for grizzly bears. Some designated Wild and Scenic River corridors overlap other land allocations such as designated wilderness, and the National Historic Landmark, research natural areas and Idaho Roadless Rule Areas. In these cases, all direction for the different land management allocations would apply. Overlap occurs on 46,544 acres of which 24,969 acres are secure habitat. About 11,336 acres are only designated wild and scenic river without any other overlapping land allocation and has 2,257 acres secure habitat. Designated Wild and Scenic Rivers contribute to protections of secure habitat and connectivity. Management of designated wild and scenic rivers protects the outstandingly remarkable values for which they were designated and maintains their free-flowing characteristics, which are protective of riparian habitat for grizzly bears.

Effects of Direction within the Lolo Trail National Historic Landmark

The Lolo Trail, a National Historic Landmark, administered in cooperation with the National Park Service, is part of the Nez Perce National Historical Park. It includes the trail and lands surrounding the trail. The trail consists of the remnants of the original trails used by indigenous peoples and Lewis and Clark, but also the Lolo Motorway which is a road that follows parts of the original trail. The plan will not change the national historic landmark because it was designated by congress, but it will set direction for the management of the landmark. The National Historic Landmark was set aside in the plan as Management Area 1 lands and have protective land management plan components associated with it. It is also designated as Idaho Roadless Rule Areas and is managed under the Special Areas of Historic and Tribal Significance theme. Therefore, all restrictions under that theme in the Idaho Roadless Rule would apply as well as any plan components. While it is limited in size and is a long narrow feature on the landscape, it will contribute to the conservation of ecological conditions for grizzly bears.

The prevailing management direction in the plan is that the landmark is managed so that the National Register integrity of the Lolo Trail National Historic Landmark is considered *high.* Natural processes are the primary drivers of change to, and composition of, vegetative communities. The plan contains a desired condition that roads and trails persist in a manner that do not detract from the National Register integrity of the landmark while providing for reasonably safe passage by the public consistent with designated uses. Another desired condition for these lands is that non-system roads are not present. Standard GA-STD-NHL-01 establishes that trees shall only be felled within the landmark corridor if they pose a hazard or safety threat. All other tree felling is prohibited. Guideline GA-GDL-NHL-05 establishes that new temporary or permanent road and trail construction should not be permitted within the Landmark unless the integrity of the National Historic Landmark is maintained, and the purpose of the action is to benefit the National Register integrity of the Landmark. This guideline only allows new motorized roads and trails when these conditions are met, which would be infrequent if at all.

The plan is explicit about actions that are and are not suitable within the Landmark. The suitability of management actions within the National Historic Landmark are found in the Lolo trail National Historic Landmark section of the plan. The National Historic Landmark is relatively small, consisting of 55,760, but the plan's direction would help these lands contribute to grizzly bear habitat. See the Suitability table in the National Historic Landmark section of the plan.

Effects of Plan Direction for Idaho Roadless Rule Areas

The Idaho Roadless Rule areas are primarily managed under Management Area 2 and have area specific plan components that apply to these lands. There are 34 separate mapped Idaho Roadless Rule areas that vary greatly in size, elevation, and habitat. In total, the Idaho Roadless Areas comprise approximately 1,481,565 acres across the Nez Perce-Clearwater. Note that some Idaho Roadless Rule Areas are in

Management Area 1 because they overlap with the National Historic Landmark, and some designated wild and scenic river corridors, and so the total amount of Idaho Roadless Rule Area is larger than Management Area 2.

Each Idaho Roadless Rule area is assigned one or more management themes as outlined in the Idaho Roadless Rule. The Idaho Roadless Rule themes assign various permissions and prohibitions regarding road building, timber cutting, and discretionary mineral activities.

The Revised Forest Plan specifies that Idaho Roadless Rule areas in the plan are managed in a manner that is consistent with the appropriate theme, as defined by the final rule outlined in 36 CFR Part 294 (Special Areas; Roadless Area Conservation; Applicability to the National Forests in Idaho; Final Rule). Each theme specifies permitted and prohibited actions for timber cutting, roads, and minerals. A summary of permitted and prohibited actions in Idaho Roadless Rule Areas are summarized above. Idaho Roadless Rule areas contribute greatly to the conservation of habitats that can contribute to grizzly bear recovery and connectivity. The plan will not change the boundaries nor the themes of the Idaho Roadless Rule areas as these were established and codified in the Idaho Roadless rule. The revised Forest Plan will however, set direction for the management of these areas and this direction was explicitly designed to be consistent with the prohibition and permitted activities specified by the Idaho Roadless Rule within their respective themes. The acres of area and secure habitats of the different Idaho Roadless Rule themes are shown in Table 260.

Desired conditions for Idaho Roadless Rule Areas emphasis maintaining the roadless characteristics and themes assigned to them in the Idaho Roadless Rule. The desired conditions specify that the composition, structure, and pattern of vegetation reflect natural disturbances and follow Idaho Roadless Rule themes, as assigned. The plan has specific desired conditions for Roadless areas to contribute to habitats for wide ranging species and connectivity for movement of wildlife and that these areas provide foraging, security, denning, and nesting habitat for wildlife. The plan's desired conditions also state that Roadless areas provide recreational opportunities for both motorized and non-motorized users all year long and is reflected in the appropriate recreation opportunity spectrum classes of primitive, semi-primitive non-motorized, and semi-primitive motorized opportunities. These desired conditions provide the prevailing direction towards which management of Idaho Roadless Rule lands are directed. The Idaho Roadless Rule defines Roadless characteristics as:

- High-quality or undisturbed soil, water, or air
- Sources of public drinking water
- Diversity of plant and animal communities
- Habitat for threatened, endangered, proposed, candidate, and sensitive species and for species dependent on large, undisturbed areas of land
- Primitive, semi-primitive nonmotorized, and semi-primitive motorized classes of dispersed recreation
- Reference landscapes
- Natural appearing landscapes with high scenic quality
- Traditional cultural properties and sacred sites
- Other locally identified unique characteristics

One standard and a set of suitability plan components provide the restrictions within Idaho Roadless Rule lands. Standard MA2-STD-IRA-01 states "The provisions in the Idaho Roadless Rule (36 CFR 294

Subpart C) shall take precedence over any inconsistent land management plan component unless and until the rule is amended. Land management plan components that are not inconsistent with the Idaho Roadless Rule will continue to provide guidance for projects and activities within Idaho Roadless Areas and those related to protection of threatened and endangered species (36 CFR 294.28(d)).” This direction enforces the prohibitions and allowances of the Idaho Roadless Rule as codified and will maintain ecological conditions for grizzly bear dispersal and occupancy because they will constrain a variety of activities within these areas that could affect grizzly bear habitat or increase the probability of human-bear conflicts.

Suitability plan components that determine which actions are and are not suitable in Idaho Roadless Rule areas are outlined in the description of the existing condition for Idaho Roadless Rule above. A broad range of actions are prohibited or allowed by suitability plan components and are consistent with Idaho Roadless Rule prohibitions and permissions within the themes. They primarily constrain road building, vegetation management, and mineral activities to various extents depending on roadless rule theme. The prohibitions or allowances are tiered to the Idaho Roadless Rule themes. A map of the Idaho Roadless Rule themes is provided in Figure 96 and a summary of restrictions and allowances in the Idaho Roadless Rule by theme are provided above in (see Other Management Direction—Idaho Roadless Rule). These suitability plan components will protect these lands from actions that could impact secure habitat or create conditions that have the potential to increase the probability of human bear conflicts. Actions constrained by suitability plan components and the Idaho Roadless Rule include timber production, timber harvest, permanent road construction, temporary road construction, mineral materials, construction of new buildings, and motorized travel, though exceptions are allowed in some areas depending upon theme. Note that community protection zones within Idaho Roadless Rule areas allow temporary roads which includes about 36,200 acres (2.4 percent of land within an Idaho Roadless Area on the Nez Perce-Clearwater).

The different themes provide different sets of restrictions which result in some variation in the level of protection the Idaho Roadless Rule and associated plan direction offers. The different themes offer different levels of restrictions and allowances that provide variation in the degree of protections that they offer. The “Other Management Direction” above provides a summary of the different protections and allowances found in the Idaho Roadless Rule; however, the full suite of activities can be found in the Roadless Rule itself (36 CFR 294.28(d)).

The U.S Forest Service consulted on the effects of the Idaho Roadless Rule on federally listed species, including on grizzly bears. In 2008, the U.S. Fish and Wildlife Service issued a biological opinion on the effects of the Idaho Roadless Rule on federally listed species including grizzly bears (U.S. Department of the Interior 2008). The biological opinion evaluated the effects of activities that could be allowed as a result of the Rule and evaluated the effects on grizzly bears from the suite of permissible and prohibited actions including timber harvest, sale, or removal; road construction and reconstruction; and mineral activities. It also evaluated helicopter logging, fire, fire suppression and prescribed fire. It concluded that as the Bitterroot Recovery Zone was currently unoccupied, the Idaho Roadless Rule will have no effect on the status of the Bitterroot Recovery Zone.

As mentioned above, the Idaho Roadless Rule contributes to secure habitats for grizzly bears. The amount of area and the amount of secure habitat by theme is shown in Table 260 below. Many of these areas were maintained without roads by elk habitat effectiveness objectives direction in the 1987 Forest Plans, they were maintained thereafter by the 2001 National Roadless Area Conservation Rule (36 CFR Part 294 Special Areas; Roadless Area Conservation; Final Rule) and since 2008 by the Idaho Roadless Rule. This management history has served to conserve these lands and the Idaho Roadless Rule and Revised Forest Plan Direction will continue that trend into the future.

Table 260. The total acres, acres of secure habitat, and percent secure habitat within Idaho Roadless Rule Themes

Idaho Roadless Rule Area Theme	Acres with the Plan Area	Acres of Secure Habitat Within Each Theme	Percent Secure Habitat
Backcountry Restoration	835,649	588,705	70.4
Primitive	311,154	254,227	81.7
Forest Plan Special Areas	38,287	16,025	41.9
Special Areas of Historic or Tribal Significance	49,341	24,432	49.5
Wildland Recreation	247,133	228,251	92.4
Totals	**1,481,565**	**1,111,642**	**75**

A number of other land allocations overlap Idaho Roadless Rule Areas, providing additional guidance and restrictions above those required by the Idaho Roadless Rule. They include the National Historic Landmark, Recommended Wilderness Areas, some designated wild and scenic river corridors, some of the suitable and eligible wild and scenic river corridors, some designated and proposed research natural areas. For example, there are some lands that are both Idaho Roadless Rule and Designated Wild and Scenic River. In some cases, there are more than two land designations. In cases where there are overlapping land management allocations, actions would have to follow Idaho Roadless Rule direction and the direction for any overlapping land allocations. The plan specifies that the more restrictive direction would prevail in cases where there is conflict. Similarly, the plan specifies that where the plan is inconsistent with the Idaho Roadless Rule, direction in the rule prevails. The lands that have overlapping land allocations are further protected and would contribute to conservation of secure habitat and connectivity. These areas overlap Idaho Roadless Rule Areas and provide additional protections on about 366,900 acres or about 24.8 percent of Idaho Roadless Rule lands. Overlapping areas contain about 288,758 acres of secure habitat.

Most of the Idaho Roadless Rule Areas are managed under Management Area 2 direction, but there is also Idaho Roadless Rule areas within Management Area 1 because of overlapping designations such as the National Historic Landmark and Designated Wild and Scenic Rivers which are both under Management Area 1. In some cases, more than two land designations occur. For example, there are places that are Idaho Roadless Rule areas, designated wild and scenic river, and a research natural area (Table 261). The additional designations and land allocations that overlap Idaho Roadless Rule Areas are shown in table 261. Designated wilderness areas do not overlap with Idaho Roadless Rule Areas.

Table 261. The acres of Idaho Roadless Rule Areas overlapped by other land area allocations or designations

Designation or Allocations	Acres
Designated Wild and Scenic River Corridor	26,115
Suitable Wild and Scenic River Corridor	53,490
Designated National Historic Landmark	28,391
Designated Research Natural Area	14,338
Proposed or Candidate Research Natural Areas	1,685
Eligible Wild and Scenic River Corridor	711
Recommended Wilderness	258,197

Note that because some areas have more than two overlapping management areas, the area of protection is less than the total overlapping acres

Plan direction for Idaho Roadless Rule areas constrain activities that could impact secure habitat and will provide the ecological conditions to provide connectivity and even host a population of grizzly bears.

Consequences from Research Natural Areas

Research Natural Areas (RNAs) are areas that the Forest Service has designated to be permanently protected and maintained in natural conditions. The plan area contains several designated and proposed research natural areas under the 1987 Forest Plans. The plan also identifies and proposes additional research natural areas as part of the Preferred Alternative. The areas identified do not vary by alternative. RNAs are permanently established to maintain areas of natural ecosystems and areas of special ecological significance. These protected natural areas include unique ecosystems or ecological features; rare or sensitive species of plants and animals and their habitat; or high-quality examples of widespread ecosystems. These areas form a long-term network of ecological reserves established as baseline areas for non-manipulative research and the maintenance of biodiversity. Table 262 shows the acres of designated and proposed Research Natural areas and the acres of secure habitat as proposed in the plan.

Table 262 The acres of designated and proposed or Candidate Research Natural Areas in the Existing Condition compared to the Preferred Alternative and the amount of secure habitat contained within designated, proposed, and candidate Natural Research Areas

Research Natural Area	Preferred Alternative Acres	Acres of Secure Habitat
Designated	29,499	21,121
Proposed or Candidate	2,947	2048
Total	**32,446**	**23,169**

Except for RNAs located within Management Area 1 land types, Research Natural Areas are managed as Management Area 2 and have their own set of forest plan components. The management of research natural areas emphasizes maintaining them in a natural condition. The plan manages proposed and designated research natural areas the same. Desired condition MA2-DC-RNA-01 expresses how these areas should be managed. It states that designated and proposed research natural areas maintain a representation of natural systems found on the Nez Perce-Clearwater as a baseline for research, monitoring, and education by the agency, academia, and public interests. Wildfire, insects, and pathogens, along with other processes and disturbances, continue to affect vegetation, reflecting the dynamic nature of the systems they represent. Research Natural Areas contribute to ecological sustainability and biological diversity.

The plan includes two standards and suitability components that dictate the types of activities allowed within these areas. MA2-STD-RNA-01 prohibits the authorization of the collection of forest products for commercial purposes and personal use purposes, including firewood within designated and proposed research natural areas. MA2-STD-RNA-02 prohibits uses that threaten or interfere with the objectives or purposes for which a Research Natural Area is established. Suitability plan components in the Research Natural Areas section of the Plan identify the actions that are suitable and unsuitable within research natural areas. Suitability components find many activities that impact grizzly bear secure habitat as unsuitable including motorized travel, permanent roads, and temporary roads unsuitable.

Research Natural Areas combine for only 32,446 acres, and consist of small, scattered areas, so their contribution to grizzly bear habitat is relatively small but they do add protections to maintain some habitats and contribute to connectivity. They contribute to the protection of 23,169 acres of secure habitat and secure habitats make up 71 percent of Research Natural Areas. They often overlap with other land allocations and plan direction for research natural areas provides additional protection to those areas.

Consequences That Vary by Alternative

The distribution of management areas and overarching direction within each would strongly influence the ecological conditions for grizzly bears across broad areas related to developments and human-bear conflicts. The revised Forest Plan framework allocates the entire national forest into one of three management areas that would have distinctive management. As described in the existing condition section above, this is a substantial change compared to the 1987 plans developed under the 1982 Planning Rule where there were many management areas each with distinct emphasis. Under the Preferred Alternative, the Nez Perce-Clearwater lands are divided into three broad management areas identified as Management Area 1, Management Area 2, and Management Area 3. These broad management areas are arranged from a suite of designated, proposed, and non-designated lands. Each management area follows a broad theme with lands in Management Area 1 being composed of areas designated by congress. Management Area 2 lands are composed of lands set aside by the Idaho Roadless Areas and lands recommended for congressional designation or other designations, while Management Area 3 is made up of lands managed sustainably for multiple uses. However, some lands have more than one designated or proposed area where more than one set of management direction would apply. In cases where multiple designated or proposed land allocations overlap, management direction for all land types applies. According to the plan, where management direction of the different management areas conflicts, the more restrictive direction prevails. The acres of each management area and sub-management area, as well as the acres of secure habitat are shown in Table 263.

Table 263. The acres of area and secure habitat within each Management Area and land allocation in the forest plan*

Management and Sub-management Areas	Acres Within Each Management and Sub-management Area	Acres of Secure Habitat Within Each Management Area and Sub-management Area
1A Designated Wilderness	1,107,131	1,094,558
1A2C: Suitable Wild and Scenic River (WSR) within Designated Wilderness	2,996	2,996
1A2E: Designated Research Natural Area (RNA) within designated wilderness	8,081	7,925
1A2F Candidate Research Natural Area within Designated Wilderness	603	603
1A2I Eligible Wild and Scenic River within Designated Wilderness Area	531	47

Management and Sub-management Areas	Acres Within Each Management and Sub-management Area	Acres of Secure Habitat Within Each Management Area and Sub-management Area
1AB: designated wild and scenic river within designated wilderness	19,029	17,248
1AB2E: established RNA within WSR within designated wilderness	689	689
1B—Designated Wild and Scenic River	11,336	2,257
1B2A: Idaho Roadless Rule area within designated wild and scenic river	24,838	6,872
1B2AE: Idaho Roadless Rule area within designated Research Natural Area within designated Wild and Scenic River	644	32
1BC: WSR within National Historic Landmark (NHL)	721	0
1BC2A: Idaho Roadless Rule (IRR) area within designated Wild and Scenic River and the National Historic Landmark	633	128
1C: National Historic Landmark (Lolo Trail)	25,887	1,325
1C2A: Idaho Roadless Rule area within National Historic Landmark	24,050	7,727
1C2AC: Suitable Wild and Scenic River within Idaho Roadless Rule area within National Historic Landmark	3,504	2,694
1C2AE: Idaho Roadless Rule area within a Designated Research Natural Area within the National Historic Landmark	74	0
1C2AG Candidate Research Natural Area within the National Historic Landmark within Idaho Roadless Rule.	130	0
1C2C: Suitable Wild and Scenic River within the National Historic Landmark	539	5
1C2E: Designated Research Natural Area within the National Historic Landmark	222	35
2A: Idaho Roadless Rule Area without any other overlapping designated or proposed areas	1,114,736	822,955
2AB: Recommended Wilderness within Idaho Roadless Rule Areas	243,773	225,094
2ABC: Suitable Wild and Scenic River within recommended wilderness and within Idaho Roadless Rule area	13,580	12,157
2ABCF: Suitable WSR within recommended wilderness within a Proposed Research Natural Area and within an Idaho Roadless Rule area	122	122
2ABE: Recommended wilderness within a Designated Research Natural Area within an Idaho Roadless Rule area	537	537
2ABF: Recommended wilderness within a proposed Research Natural Area and within an Idaho Roadless Rule area	185	185
2AC: Suitable Wild and Scenic River within an Idaho Roadless Rule area	39,788	22,307

Management and Sub-management Areas	Acres Within Each Management and Sub-management Area	Acres of Secure Habitat Within Each Management Area and Sub-management Area
2AE: Designated Research Natural Area within an Idaho Roadless Rule area	13,083	9,399
2AG Proposed Research Natural within Idaho Roadless Rule area	1,248	793
2AI Eligible Wild and Scenic River within Idaho Roadless Rule area	711	711
2B: Recommended wilderness without any other designation or proposed area.	13	0
2C: Suitable Wild and Scenic River Corridor without any other proposed or designated area	1,319	138
2D: Gospel-Hump Multi-Purpose Area 2 lands within MA2	28,498	25,871
2E: Designated Research Natural Areas outside of any other proposed or designated areas	6,169	2,504
2G Proposed Research Natural Area outside of any other designated or proposed areas	658	345
2I Eligible Wild and Scenic River outside of any other proposed or designated area.	2,658	15
3A All Other Areas	1,182,903	166,300
3B Gospel-Hump Multi-Purpose Area Geographic Area within Management Area 3	57,437	28,505
Subtotal 1A Lands—Designated Wilderness including those with other designated and proposed areas	1,139,059	1,124,066
Subtotal 1B Lands-Designated as Wild and Scenic Rivers outside of designated wilderness but including those with other overlapping designated or proposed areas.	38,173	9,290
Subtotal 1C Lands—National Historic Landmark including those with other overlapping designated or proposed areas	54,406	11,786
Subtotal 2A Lands—(2A through 2AI) Primary Idaho Roadless Rule Areas but includes lands with other overlapping designated or proposed areas.	1,427,763	1,094,259
Subtotal 2B through 2I- Other designated or proposed MA2 lands outside of Idaho Roadless Rule Areas.	39,316	28,875
3A- General Forest Areas	1,182,903	166,300
3B Gospel-Hump Multi-Purpose Areas	57,437	28,505
Total MA1 Lands	**1,231,638**	**1,145,141**
Total MA2 Lands	**1,467,078**	**1,123,133**
Total MA3 Lands	**1,240,340**	**194,805**
Grand Total	**3,939,056**	**2,463,080**

*Management areas are indicated by the first number in the alphanumeric codes and begin with 1, 2, or 3 to indicate the Management Area. In some areas, more than one designation or proposed designation can be found and are indicated by the labels. Each unique combination of land allocation is separated out. Alphanumeric codes that start with 1A are designated Wilderness, if they start with 1B they are designated Wild and Scenic River but not wilderness, if they start with 1C they are Lolo Trail National Historic Landmark and not wilderness nor wild and scenic rivers. Alphanumeric codes that start with 2A are Idaho Roadless Rule areas and may include other overlapping designations. If they start with 2B, 2C, 2D, 2E, 2G, or 2I they are

Management Area 2 lands outside of Idaho Roadless Rule Areas. Management Area 3 consists of lands with alphanumeric codes of 3A and 3B.

There is little flexibility in changing the distribution of these three broad management areas because they are identified by already established boundaries such as Designated Areas and Roadless Rule Areas. While the distribution of the three management areas is relatively static, the suitability of uses and intensity of allowed uses are discretionary. For example, suitability, Recreation Opportunity Spectrum designations, pace of vegetation restoration, wild and scenic suitability, amount of fuel treatments, objectives, and intensity of use are established in the plan and vary between the different management areas. They differ slightly because of alternatives for Suitable Wild and Scenic Rivers where some are located in areas in the Managed Front, and if found suitable, would be managed as Management Area 2 rather than Management Area 3. The differences in acres are shown in Table 264. Alternatives that have more land within Management Area 1 and 2 would be better from a grizzly bear conservation perspective. The No Action Alternative in is an estimate to compare against alternatives, but the 1987 plans had dozens of management areas with different emphasis. The action alternative would be Alternative Y from a grizzly bear perspective.

Table 264. The allocation of management areas in acres by alternative

Management Area (MA)	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
MA1	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638
MA2	1,489,736	1,468,505	1,463,081	1,487,434	1,472,364	1,467,078
MA3	1,217,683	1,238,913	1,244,337	1,219,984	1,235,055	1,240,340

There is little flexibility in changing the distribution of these three broad management areas because they are identified by already established boundaries such as Designated Areas and Roadless Rule Areas. While the distribution of the three management areas is relatively static, the suitability of uses and intensity of allowed uses are discretionary. For example, suitability, Recreation Opportunity Spectrum designations, pace of vegetation restoration, wild and scenic suitability, amount of fuel treatments, objectives, and intensity of use are established in the plan and vary between the different management areas.

The effects of management area allocation combined with their respective restrictions on suitability of uses, and management area specific plan components forms the basis for broad protections across the much of landscape for grizzly bear habitat. The effects of management area allocation are described here and analyzed to provide a big picture overview of the effects of management area allocations. Additional detailed analysis specific to each type of land allocation are presented individually and in detail in the analysis of the individual land allocations.

Management Area 1 is composed of three areas designated by congress for specific uses and that have restrictions or special management direction prescribed by law. These include designated wilderness, designated wild and scenic rivers, and the congressionally designated Lolo Trail National Historic Landmark. These designations offer high levels of land protections against developments. Plan components or direction specific to these areas in the plan are labeled with Management Area 1. The effects of the direction in these areas were analyzed above. Plan direction within Management Area 1 includes specific areas of the plan with plan components directing the management of designated wilderness, designated wild and scenic rivers, and the National Historic Landmark. There are also management area specific plan components scattered throughout the plan that also apply to these management areas. They include desired conditions, standards, guidelines, and suitability of uses that would maintain and protect these areas in a condition for connectivity and even a future population of grizzly bears in these areas. Under the plan, the amount of secure habitat would be expected to change only slightly in Management Area 1.

The Bitterroot Recovery Zone is nearly all Management Area 1 lands. Existing roads in these areas can be seen in Figure 102 and Figure 103 below. Management Area 1 provides high levels of protection against the loss of secure habitat with the limited exceptions of areas within Designated Wild and Scenic Rivers where motorized uses are suitable, and within the National Historic Landmark. Designated wild and scenic rivers and the National Historic Landmark areas make up about 92,579 acres or about 7.5 percent (1B and 1C lands in Table 263) of Management Area 1.

These areas are almost all secure habitats and will largely remain secure into the foreseeable future. The result of this management direction is that the 1,231,638 acres of Management Area 1 lands are highly protected for the future establishment and recovery of grizzly bears. Management Area 1 lands are currently composed of 1,145,141 acres or 93 percent secure habitat and wilderness management in the plan will continue to maintain these secure habitats into the future. The bulk of Management Area 1 is designated wilderness at 1,139,059 acres, thus 92.4 percent of Management Area 1 lands are managed and protected as designated wilderness areas. A total of approximately 1,124,066 acres of wilderness or 98.6 percent is secure habitat.

Management Area 2 consists of lands composed of backcountry areas with moderately restrictive management because they are either proposed for designation, roadless areas, or were set aside legislatively as restrictive land management types. Management Area 2 consists of Idaho Roadless Rule Areas; proposed areas such as recommended wilderness, or rivers proposed as suitable or eligible for congressional consideration as wild and scenic rivers; designated and proposed Research Natural Areas, and the Gospel-Hump Multi-Purpose area. The Gospel-Hump Multi-Purpose Area was established by legislation for specific management when the Gospel-Hump Wilderness was established. Management Area 2 is composed mostly of lands within Idaho Roadless Areas, but also includes significant acreage of recommended wilderness areas, and smaller amounts of eligible and suitable wild and scenic rivers, proposed and designated research natural areas, and the Gospel-Hump Geographic Area. This management area is made up of relatively large areas, generally without roads, few motorized trails, and provides a variety of recreation opportunities. Existing roads and motorized trails in Management Area 2 can be viewed in Figure 102 and Figure 103. In many cases the different land allocation types overlap each other. Table 263 shows the acres of land allocations within Management Area 2 including those with overlapping land allocations.

Revised Forest Plan direction for Management Area 2 would apply to projects within any and all land allocation types they occurred in. In many areas, more than one set of set of plan direction would apply. For example, if a project fell within a sub-management area that had Idaho Roadless Rule areas, suitable Wild and Scenic River corridor and Research Natural Area, then all of the plan direction including suitability from each sub-management area would apply to that project. In recommended wilderness, both Idaho Roadless Rule Area restrictions apply, and recommended wilderness area restrictions apply. If conflicting plan guidance is discovered, the direction from the more restrictive management area would apply. Generally, the following order is presumed to be in order from most restrictive to least and generally will be used to determine which plan components shall be applied, though the final decision will be made during project level analysis:

- Designated Wilderness and Designated Wild and Scenic Areas—Management Area 1

- Lolo National Historic Trail
- Designated Research Natural Areas
- Proposed Research Natural Areas, Suitable Wild and Scenic Rivers, and Recommended Wilderness
- Idaho Roadless Rule, unless directed by the rule itself, which supersedes a Land Management Plan
- Geographic Area Plan Components
- Management Area Plan Components for Management Area 3
- Forestwide Plan Components

Plan direction for Management Area 2 is found in Section 6.6 of the revised Forest Plan and includes broad direction for recommended wilderness, eligible and suitable wild and scenic rivers, Idaho Roadless Rule areas, proposed natural research areas, and designated natural research areas. Specific direction includes desired conditions, guidelines, standards, and suitability that would mostly conserve these areas for the future use of grizzly bears. Additional management area specific plan components are also scattered throughout the plan and would also apply in this management area. In the revised Forest Plan, components specific to this management area begin with Management Area 2. Generally, plan components would direct managers to maintain wilderness character within recommended wilderness areas, maintain roadless characteristics in roadless rule areas, and maintain outstandingly remarkable values within suitable within wild and scenic rivers.

Activities are restricted to various degrees in Idaho Roadless Rule Areas, consistent with the Idaho Roadless Rule. The plan components that restrict various activities across broad areas are primarily the suitability plan components specified for each Management Area 2 land allocation, though there are also standards and guidelines that also restrict activities. Depending on location, activities that are constrained to various extents include timber production, timber harvest, permanent road construction, temporary road construction, some mineral extraction activities, construction of new buildings or facilities, over-snow vehicle travel, motorized travel, and mechanized travel. Vegetation management emphasis is to restore and provide variety in size classes, dominance types and density as informed by the natural range of variation for vegetation conditions under natural disturbance regimes. While timber production is generally prohibited, timber harvest can be used to treat vegetation for restoration purposes but must generally be conducted from existing roads. Additional analysis of how plan components contribute to recovery of grizzly bears can be found within the section of this analysis below called “Plan components that contribute to ecological conditions for grizzly bear recovery.”

Management Area 2 has mechanisms to restrict loss of secure habitat. First, in recommended wilderness, road and motorized trails are not suitable uses and are prohibited. Second, the plan restricts road building with only limited exceptions consistent with the Idaho Roadless Rule, but motorized trails are allowed. However, the plan also contains plan components for elk and grizzly bear in MA2-GDL-WL-05 would provide restrictions on the amount and location of motorized trail construction that would be allowed. For example, this guideline requires there to be areas of 5,000 acres without motorized access remaining when constructing motorized trails. These measures help ensure that areas of potential dispersal would largely be maintained because they greatly restrict the construction of new roads and constrains construction of motorized trails. Additionally, it would ensure that grizzly bears could pass through these areas and even occupy them because these minimum sized areas are larger than areas identified by Wakkinen and Kasworm (1997) who suggested that areas 1,280 acres and larger were used more by grizzly bears than smaller blocks.

The direction for these areas would provide connectivity and while there are more roads and motorized trails than in Management Area 1, these areas also provide abundant secure habitats. The amount of secure habitat in this management area would be expected to decline some due to development of future motorized trails, though the amount and location is unknown at this time. Grizzly bears in this management areas would find habitat conditions that support female survival but a higher probability of human-bear conflicts than in Management Area 1. This is because most of this management area is composed of secure habitat that would largely be retained under the plan. While use by the public is expected to increase over time. The probability of human-bear conflict would be far lower than in Management Area 3. This direction would help to maintain ecological conditions to support a future grizzly bear population within Management Area 2 and support connectivity into the Bitterroot Recovery Zone from other ecosystems. This direction would help to maintain ecological conditions to support a future grizzly bear population.

Collectively, Management Areas 2 lands result in a block of land 1,467,078 acres where the plan direction constrains roads and motorized trails, of which 1,124,882 acres or approximately 76.6 percent is currently secure habitat. Most of this management area would remain as secure habitats into the future due to the collective constraints mentioned above. However, they are not completely protected against new motorized roads and trails as some Management Area 2 lands are suitable for motorized uses and have the potential to be impacted by new motorized trails. A map of existing roads and motorized trails are shown in Figure 102 and Figure 103. These areas provide conditions to facilitate connectivity and even occupancy of grizzly bears outside of the recovery zone.

The combined effects of Management Area 1 and 2 direction is that 2,698,716 acres of habitat is either fully protected or partially protected by either the highly restrictive plan direction for Management Area 1 lands or the constraining direction of Management Area 2. Combined these lands have 2,268,274 acres of secure habitat currently or are 84 percent secure. The size and the amount of secure habitats protected by the combined amount of secure habitat, and the percent of the landscape that is secure habitat (or secure core) is comparable to those within other grizzly bear ecosystems Table 265. The condition of the Nez Perce-Clearwater compares favorably to other ecosystems and will remain that way because of constraints in the plan in wilderness and roadless rule management area direction.

Table 265. A comparison of the Nez Perce-Clearwater acres, amount of secure habitat, and percent secure habitat compared to other grizzly bear ecosystems

Grizzly Bear Ecosystem	Total Acres	Secure Core	Percent Secure
Selkirk Ecosystem[1]	1,307,525 total 688,642 in US	298,176	43%
Cabinet Yak[1]	1,693,248	628,543	37%
GYE[2]	3,413,000	2,827,000	83%
NCDE[3]	5,712,862	3,941,874	69%
Nez Perce-Clearwater Protected Lands Alone (MA1 and MA2 Combined)	2,698,716	2,268,274	84%
Nez Perce-Clearwater Plus Rest of BE recovery Zone	5,465,401	Not Available	Not Available

1 Source: Allen 2011. 2. USFS 2006 Forest Plan Amendment for Grizzly bear Habitat Conservation for the Greater Yellowstone Ecosystem. 3. FEIS for the Forest Plan amendment for the NCDE.

Areas outside of designated and proposed areas are managed for multiple uses and are identified as Management Area 3. These are lands that have no other restrictions or special management imposed by designation or regulation and are not identified as areas recommended for congressional designation. These areas are commonly referred to as the managed front or front country. They are managed to provide for integrated social, economic, and ecological sustainability, and ecosystem integrity and diversity while providing for ecosystem services and multiple uses. The managed front typically includes more roads, most of the campgrounds and infrastructure, more human use, and in many cases are managed for timber production.

Management Area 3 includes lands managed for multiple uses, with emphasis on vegetation management, timber production, road, or motorized access, developed recreation, and wildfire prevention, especially within the Wildland Urban Interface, among other uses. This management area currently has more intensive recreational use, many roads and little secure habitat. There are very few constraints on activities within Management Area 3 in the plan. Existing roads in relation to Management Area 3 are shown in Figure 102 and Figure 103 below.

Grizzly bears in this management area would be expected to have lower survival and a higher probability for human-bear conflicts. The amount of secure habitat by management area is shown in Table 266 below. The road system accesses most of this management area currently and it is anticipated that additional roads would be developed to provide for recreation opportunities and to harvest timber. Therefore, the already low amounts of secure habitat could decline some. Only 16 percent of the secure habitats in the plan area occur in this management area, and secure habitats total only 194,805 acres in this management area. Of note, most of the roads closed to the public but open to administrative uses occur in this management area and as was mentioned above in the existing condition if administrative roads were not counted towards secure habitat, an additional 258,525 acres would be secure, most of which would be within Management Area 3. Management Area 3 is not biologically suitable for grizzly bear occupancy because it represents a risk to grizzly bear survival because if grizzly bears move into this management area, they would experience a higher probability of human-bear conflict because of conditions there.

Table 266. The amount in acres and percentage (rounded) of secure habitat within each management area (MA)

Management Area	Total Acres of Secure Habitat	Percent Secure Habitat Within MA
Management Area 1	1,145,141	93%
Management Area 2	1,123,133	76%
Management Area 3	194,805	16%

Management Area 3 contains some lands where management direction was established by the Endangered American Wilderness Act (1978) which created the Gospel-Hump Wilderness Area. Three areas totaling 92,000 acres were established for multiple resource development and is referred to as the Gospel-Hump Multi-Purpose Area. A portion of these areas occurs within Management Area 2 and another portion occurs within Management Area 3. The plan established these areas as The Gospel-Hump Multipurpose geographic area. The plan contains specific plan components for the geographic area including desired conditions, objectives, and guidelines. The desired condition is for the area to provide quality fish and wildlife habitat, motorized and non-motorized recreation opportunities, areas available for timber harvest to meet social and economic demand, and opportunities for research. The areas within Management Area 3 are emphasized for multiple uses.

The grizzly observations near Whitebird, Fish Creek, and Newsome Creek were within this future Management Area 3 without incident. Bear 927 passed through portions of Management Area 3 in the Lolo Pass area. Bear 927 even used the area of checkerboard ownership within Management Area 3 during his time here. However, these observations suggest that these areas may still be permeable to grizzly bears to some extent. These areas are not managed to emphasize grizzly bears. Management Area 3 would still be somewhat permeable to dispersing bears because even though it has more motorized access, most roads are low speed, gravel forest roads with comparably low amounts of traffic compared to highways. These conditions should not prevent grizzly bears from passage. Of note is the checkerboard ownership near Lolo Pass, which has mixed Forest Service and private ownership and many roads. While that area has more roads, the private lands are owned and managed by a commercial timber company and thus are managed in mostly an undeveloped state that still provides passage for dispersing grizzly bears.

The greatest impacts or changes to secure habitat would most likely occur within the 16 percent of secure habitats in Management Area 3 and to a lesser extent in some secure habitat in Management Area 2. The secure habitat within Management Area 1 is expected to change very little under the Preferred Alternative.

Roads and motorized trails within each management area are shown in Figure 102 and Figure 103 below. These maps illustrate that Management Area 1 has very few roads and motorized trails, Management Area 2 has more than Management Area 1 but fewer than Management Area 3, while Management Area 3 has high amounts of road and motorized trails. This is why most of the secure habitat currently present is within Management Areas 1 and 2 while little exists in Management Area 3. The plan direction for Management Areas 1 and 2 and associated suitability plan components reinforce roadless rule regulations and the Wilderness Act restrictions that have protected, and will continue to protect, these lands from motorized uses. Suitability plan components restrict many activities associated with these management areas across broad areas of the Nez Perce-Clearwater as outlined in other sections below.

The breakdown of the management area allocation in the Preferred Alternative is shown in Figure 101 below. It should be noted that several protective land allocations overlap in a substantial portion of the plan area. The figure also shows the amount of secure habitat present in the management areas.

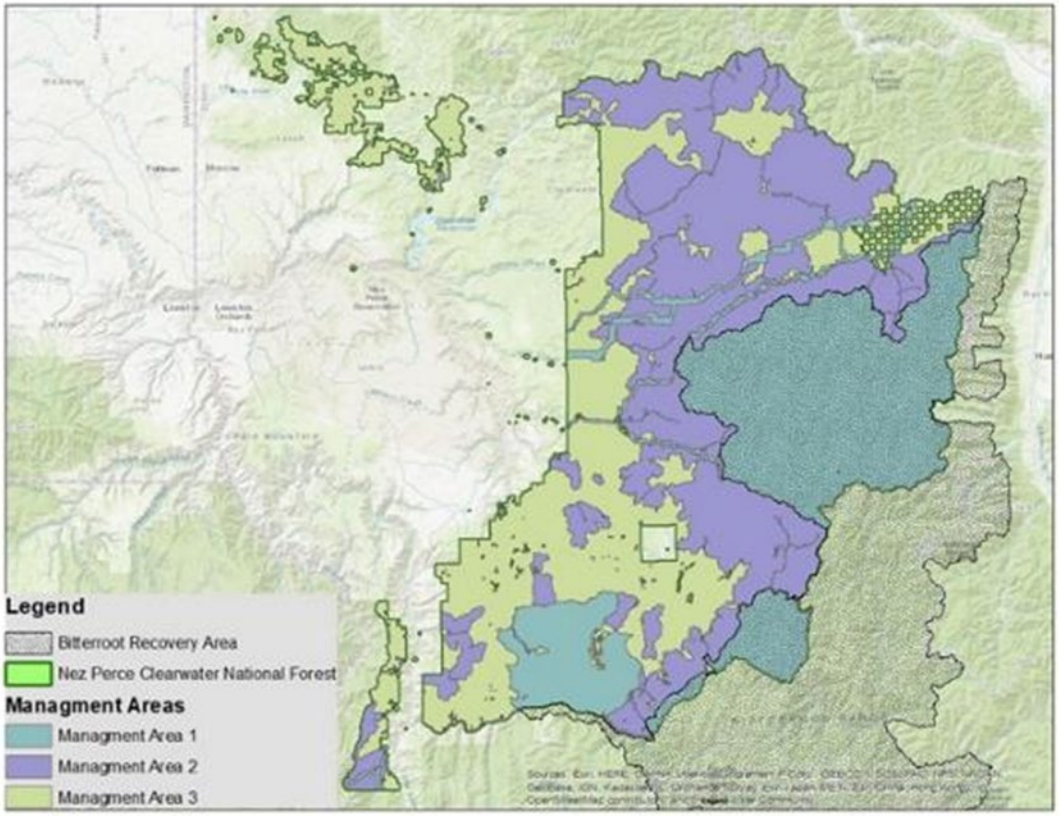


Figure 101. The management areas under the Preferred Alternative

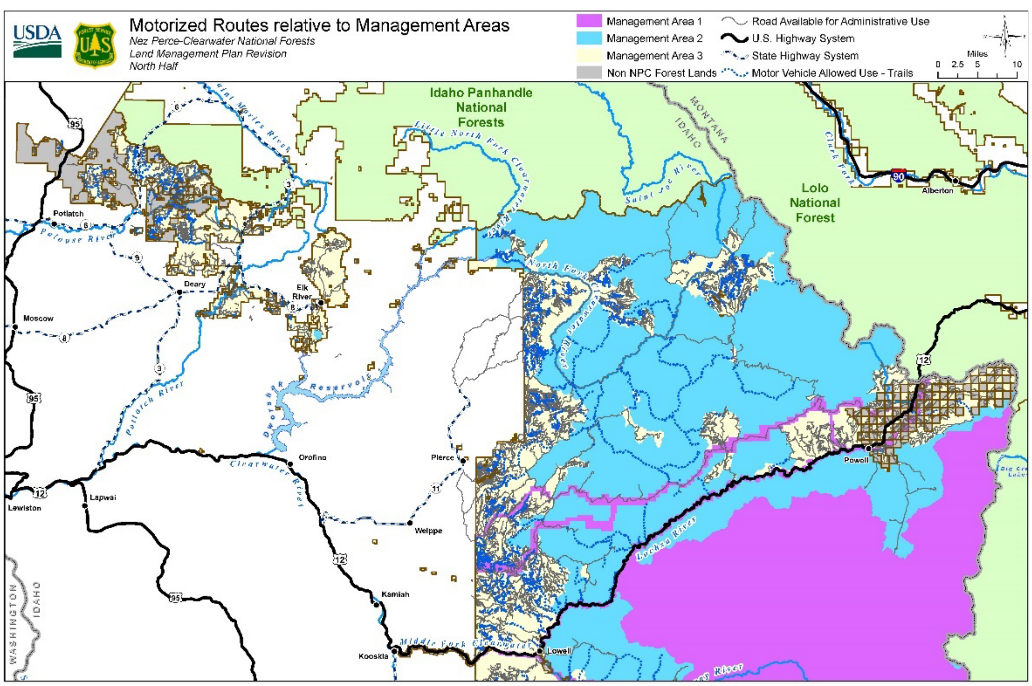


Figure 102. Current motorized roads (gray) and motorized trails (shown in dotted dark blue) in relation to the three management areas of the Preferred Alternative in the northern portion of the plan area

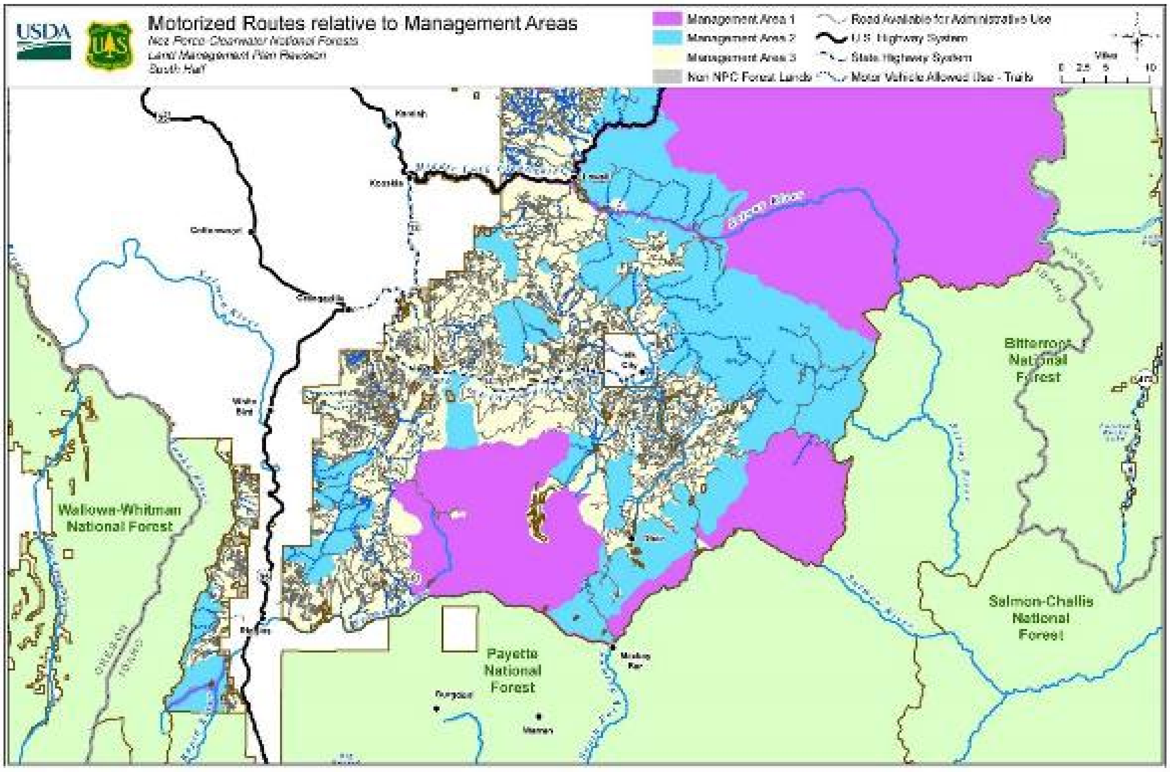


Figure 103. Current motorized roads (gray) and motorized trails (shown in dotted dark blue) in relation to the three management areas of the Preferred Alternative in the southern portion of the plan area

Consequences for Recommended Wilderness Allocation

For dispersing grizzly bears, the amount and location of recommended wilderness may have a beneficial effect on connectivity from the other grizzly bear recovery zones. The recommended wilderness areas in the northern portion of the Nez Perce-Clearwater would contribute to connectivity for dispersing bears heading for the Bitterroot Recovery Zone from the Cabinet Yak, Selkirk, or Northern Continental Divide ecosystem recovery zones.

The existing condition includes recommended wildernesses as described in the 1987 Clearwater Forest Plan and includes 197,693 acres. Recommended wilderness under the 1987 Forest Plan contributes to grizzly bear connectivity which includes the Hoodoo, Mallard-Larkins, and portions of North Fork Spruce-White Sand, and Sneakfoot Meadows.

The alternatives propose various amounts of recommended wilderness. The No Action Alternative would retain the recommended wilderness as described in the 1987 Clearwater Forest Plan. The action alternatives vary the amount of recommended wilderness. Alternative W provides the most acres of recommended wilderness while Alternative X proposes no recommended wilderness and instead all current recommended wilderness areas would be managed as Idaho Roadless Rule areas. Alternative Y proposes similar amounts as the No Action Alternative but modifies and reduces some of those areas currently recommended as wilderness under the No Action Alternative. Alternative Z proposes some of the same areas as recommended wilderness as the No Action Alternative but adds Pot Mountain, Meadow Creek-Upper North Fork, and Rawhide. Regardless of alternative, recommended wilderness areas that best provide for grizzly bear connectivity include Mallard-Larkin, Meadow Creek North-Upper North Fork, Rawhide, Hoodoo, Sneakfoot, and Northfork Spruces White Sand. These areas would provide opportunities for bears to travel from the north into the Bitterroot Ecosystem. From a grizzly bear conservation perspective, the best alternative would be the one that proposes the most recommended wilderness which would be Alternative W. The Preferred Alternative would include Hoodoo, the Mallard Larkin, and Meadow Creek as a new recommended wilderness area but with boundary changes compared to the No Action Alternative.

The Preferred Alternative retains the Mallard Larkin and Hoodoo area albeit with modified boundaries and drops the North Fork Spruce-White Sands and Sneakfoot Meadows. Two of these areas, the Hoodoo and Mallard Larkin areas, are currently managed as recommended wilderness. It includes a newly created Meadow Creek Recommended Wilderness Area, which would be a new Recommended Wilderness Area compared to the previous plan and is located adjacent to the Bitterroot Recovery Zone (Figure 104). The modified boundaries of the Hoodoo recommended wilderness area included both additions and a few areas that will not be recommended wilderness in the Preferred Alternative. The overall results is a reduction in area of that recommended wilderness of about 3,712 acres (Table 268),, however it also resulted in slightly more secure habitat of about 5,401 acres being included in recommended wilderness because of the additions (Table 268). Note that the 3,712 acres will remain unsuitable for summer motorized uses but will be suitable for winter motorized uses. The change in the boundaries of the Mallard Larkin recommended wilderness area results in an increase of about 10,762 acres in that recommended wilderness area (Table 267). The addition of the Meadow Creek recommended wilderness area adds additional new recommended wilderness. The total amount in the Preferred Alternative increases to 258,210 acres (Table 267), an increase of about 60,517 acres. The beneficial effects of this would be to ensure additional area of secure habitat adjacent to the Bitterroot Recovery Zone. The Hoodoo and Mallard Larkin areas would contribute to opportunities for bears to travel from the north into the Bitterroot Recovery Zone and land within a recommended wilderness area. Bears coming from the north or east could arrive within these recommended wilderness areas, providing a gateway into the plan area.

The extent to which recommended wilderness improves or maintains ecological conditions for grizzly bear use and connectivity over Idaho Roadless Rule management depends upon suitability of uses allowed, plan direction for recommended wilderness and, and the roadless rule theme. The wildland recreation theme is the most restrictive while the Primitive theme is slightly less restrictive, and the Backcountry Restoration Theme is the least restrictive. A description of activities allowed and prohibited within roadless rule themes is presented above.

Under the Idaho Roadless Rule, the Hoodoo area is managed as Wildland Recreation Theme, and most of the Mallard Larkin is managed Wildland Recreation but a small portion is managed as Primitive theme. The third, the Meadow Creek Area, is managed as Idaho Roadless Rule Area in part under the Primitive theme and in part and under the Backcountry Restoration them. It is foreseeable that the roadless rule may be amended through the rule making process to align recommended wilderness with the Wildland Recreation theme, however, that process would be outside of revision. Generally, speaking recommended wilderness management is only slightly more restrictive than Idaho Roadless Rule Themes. One primary change that would most affect grizzly bears is the use of summer motorized travel which is restricted in recommended wilderness. Though road building is also restricted within the Idaho Roadless Rule area management, motorized trails are allowed. Under the Preferred Alternative, motorized travel, mechanized travel, motorized and mechanized tools for public use, and aircraft landing for recreational use are prohibited in recommended wilderness. Motorized and mechanized tools may be used administratively and aircraft landing for administrative uses would be allowed. Within the Idaho Roadless Rule areas in the Wildland Recreation Theme, the cutting, sale, or removal of timber is prohibited, except for personal or administrative use, as provided for in 36 CFR Part 223 or where incidental to the implementation of a management activity not otherwise prohibited by the Idaho Roadless Rule.

Areas that were formerly recommended wilderness, and that will no longer be recommended wilderness such as the areas formerly in the Hoodoo recommended wilderness area, will still be managed as Idaho Roadless Rule areas within the Wildland recreation theme. MA2-SUIT-IRA-03 specifies that roads are suitable in these areas only under strict conditions specified in the Idaho Roadless Rule. Furthermore, these areas are mapped as Semi-Primitive Non-motorized in the Summer Recreation Opportunity Spectrum settings so summer motorized uses would not be suitable in these formerly recommended wilderness areas. The primary difference between recommended wilderness and Idaho Roadless Rule wildland recreation theme areas is suitability of winter motorized uses wherein some formerly recommended wilderness areas would be suitable for winter motorized uses where they are mapped as semi-primitive motorized for winter recreational opportunity spectrum. Specific effects from this change are that future potential grizzly bear dens may be disturbed by winter recreation in limited circumstances. Furthermore, allowing winter motorized access in these areas potentially increases the chance of illegal winter motorized uses in adjacent recommended wilderness by the public. However, the public use of adjacent recommended wilderness areas these areas is not authorized and restrictions on this illegal use will be reduced through law enforcement.

The primitive theme includes very limited permissions and exceptions for timber cutting, sale or removal, road construction or reconstruction, and mineral activities. Exceptions include to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition, structure, and processes; and to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply system. Management is primarily to maintain roadless characteristics.

The Backcountry Restoration theme allows limited permissions and exceptions for timber cutting, sale, or removal; road construction and reconstruction; and mineral activities. This includes the following exceptions: to reduce hazardous fuel conditions within or outside of a community protection zone with conditions; to reduce the risk of uncharacteristic wildland fire effects; to improve threatened, endangered, proposed, or sensitive species habitat; and to maintain or restore the characteristics of ecosystem composition, structure, and processes.

Table 268 shows the amount of secure habitat within recommended wilderness areas among alternatives compared to the Preferred Alternative. The Preferred Alternative would add additional secure habitat of about 50,088 acres that will be protected by recommended wilderness compared to the No Action Alternative. Alternatives that have more area in recommended wilderness would be better for grizzly bears. It should be noted that the areas that were previously recommended wilderness would still be secure habitat even if it is not recommended wilderness. Future management of these former recommended wilderness areas would be determined by their new management area direction and because they are also Idaho Roadless Rule areas, road construction, as well as other restricted activities, would continue to be prohibited by regulation. They would retain the most restrictive Idaho Roadless Rule Wildland Recreation Theme. The Preferred Alternative for recommended wilderness provides protections to maintain areas of potential dispersal in the Hoodoo and Mallard-Larkin for bears arriving from the North or East, and the Meadow Creek for bears moving southeast as they spread through the Bitterroot Recovery Zone. The Preferred Alternative would add 60,517 total acres and 50,088 acres of secure habitat to recommended wilderness.

An important note is that about 85.4 miles of existing roads or motorized trails will be unsuitable as a result of the change in recommended wilderness in the Preferred Alternative and will need to be closed in a future travel management decision as a result of the change. This will result in additional secure habitat once this happens. Also, about 80.9 miles of trail open to mechanical travel, such as bicycles, will also be unsuitable as a result of the change in recommended wilderness under the Preferred Alternative.

Suitability of some uses within recommended wilderness also varies by alternative. Suitability of uses considered included whether or not to allow winter motorized travel, mechanized and motorized tools allowed for the public, mechanized and motorized tools allowed to be used administratively, aircraft landings for recreation allowed, and aircraft landings for administrative uses allowed. Of these uses, the winter motorized travel allowed in Alternative Z would have regular and repeated occurrences in recommended wilderness which could disturb or displace grizzly bears during denning season. An in-depth discussion on the effects of winter motorized uses is included in the evaluation of the winter recreation opportunity spectrum alternatives presented below. Aircraft landings have been reported as a disturbance effect. Recreational aircraft landing would have greater potential for effects because it would be more regular and repeated aircraft use that could result in disturbance. While administrative aircraft use could also disturb grizzly bears, this use would be uncommon, and only used for special purposes like wildfire operations, or wildlife related activities of State Agencies. Mechanized travel would be suitable in Alternative Z. Mechanized travel, such as on bicycles, could disturb grizzly bears, and could also result in human bear conflicts if grizzly bears perceive cyclists as a threat or as prey. Mechanized and motorized tools for admin use would be allowed in alternative is allowed in the No Action Alternative and would be allowed in Alternative Z. These would be used to administer land management like clearing trails or maintaining structures. This use could have minor, uncommon, and limited disturbances on grizzly bears. Mechanized and motorized tools are suitable in Alternative Z, and handheld motorized tools would be suitable within Alternative W. This use would be a more common and potentially used more widely than administrative uses and could lead to disturbance effects. Alternative X has no recommended wilderness so all these activities could occur and result in the most disturbance effects. The Preferred Alternative would allow motorized and mechanized tool use for administrative uses and aircraft landings for administrative uses. These would have minor and limited disturbance effects.

Table 267. Acres of recommended wilderness by alternative.

Recommended Wilderness	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Bighorn - Weitas	n/a	254,901	n/a	n/a	n/a	n/a
East Meadow Creek	n/a	96,856	n/a	96,856	96,278	n/a
Hoodoo	111,988	151,874	n/a	100,680	147,039	108,276
Mallard-Larkins	66,377	90,849	n/a	90,855	79,011	77,139
Meadow Creek - Upper North Fork	n/a	43,075	n/a	n/a	41,941	n/a
Moose Mountain	n/a	22,023	n/a	n/a	n/a	n/a
North Fork Spruce - White Sand	9,865	35,424	n/a	n/a	13,816	n/a
North Lochsa Slope	n/a	117,659	n/a	n/a	n/a	n/a
Pot Mountain	n/a		n/a	n/a	51,070	n/a
Rapid River	n/a	20,941	n/a	20,941	19,510	n/a
Rawhide	n/a		n/a	n/a	5681	n/a
Sneakfoot Meadows	9,465	23,330	n/a	n/a	19,609	n/a
West Meadow Creek	n/a	n/a	n/a	n/a	95800	n/a
Meadow Creek	n/a	n/a	n/a	n/a		72795

Recommended Wilderness	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Total	**197,695**	**856,932**	**n/a**	**309,332**	**569,755**	**258,210**

Table 268. Acres of secure habitat by wilderness area under the alternatives

Recommended Wilderness Area	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Bighorn - Weitas	n/a	n/a	185,262	n/a	n/a	n/a
East Meadow Creek	n/a	n/a	80,972	80,972	80,972	
Hoodoo	107,824	n/a	138,574	93,396	137,237	102,423
Mallard-Larkins	64,302	n/a	82,533	82,533	75,010	72,250
Meadow Creek	n/a	n/a	n/a	n/a		63,422
Meadow Creek - Upper North Fork	n/a	n/a	35,757	n/a	35,732	n/a
Moose Mountain	n/a	n/a	17,168	n/a	n/a	n/a
North Fork Spruce - White Sand	8,003	n/a	26,858	n/a	11,425	n/a
North Lochsa Slope	n/a	n/a	77,190	n/a	n/a	n/a
Pot Mountain	n/a	n/a	n/a	n/a	37,723	n/a
Rapid River	n/a	n/a	19,269	19,269	18,420	n/a
Rawhide	n/a	n/a	n/a	n/a	3,275	n/a
Sneakfoot Meadows	7,886	n/a	18,694	n/a	16,896	n/a
West Meadow Creek	n/a	n/a	n/a	n/a	64,921	n/a

Table 269. Proposed uses allowed in recommended wilderness

Proposed Activities in Recommended Wilderness Areas	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
Motorized Travel	No	No	n/a	No	Yes-Winter Motorized	No
Mechanized Travel	No	No	n/a	No	Yes	No
Motorized and mechanized tools for public use	No	Hand-Held Motorized allowed	n/a	No	Yes	No
Motorized and mechanized tools for administrative use	Yes	Hand-Held Motorized allowed	n/a	No	Yes	Yes
Aircraft landing for recreational use	No	No	n/a	No	Yes	No
Aircraft landing for administrative use	Yes	Yes	n/a	Yes	Yes	Yes

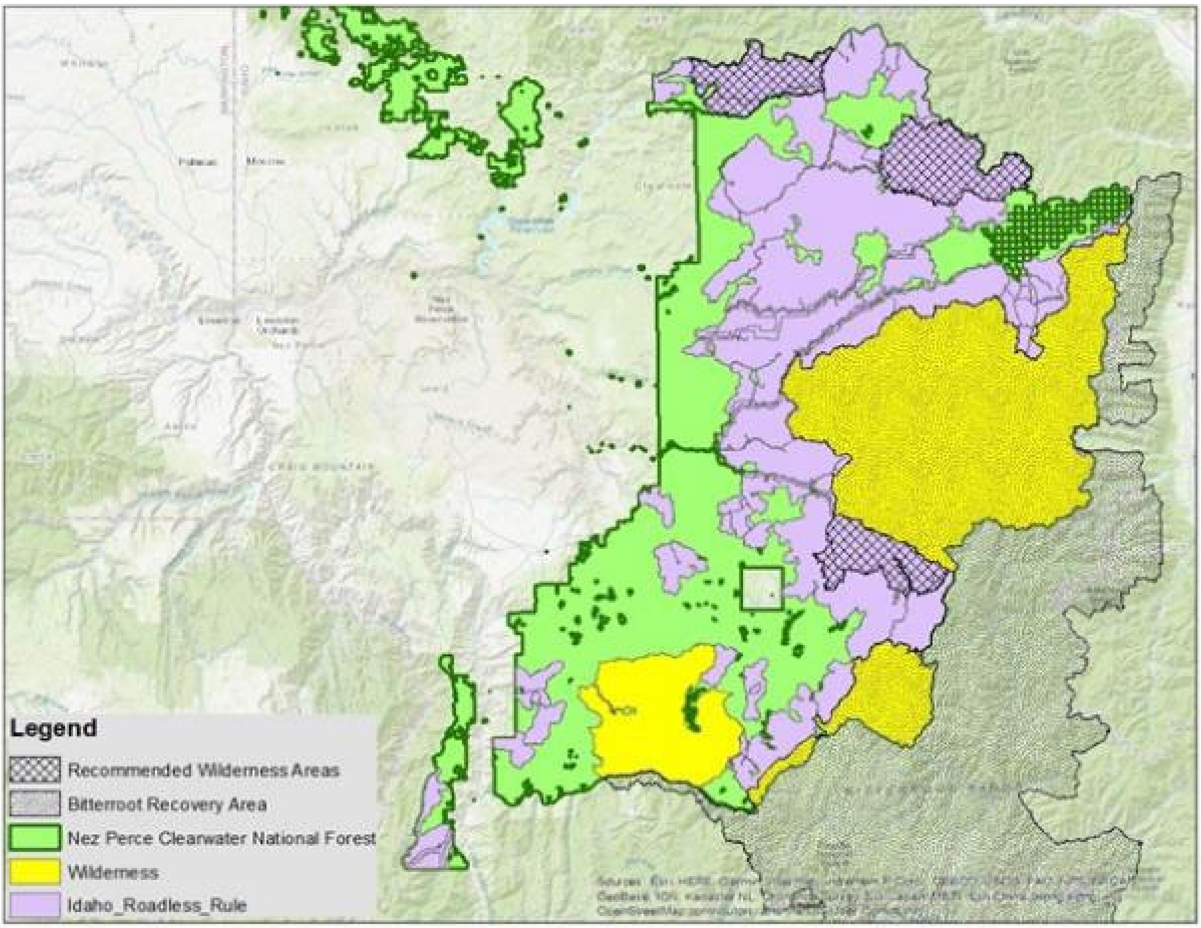


Figure 104. The location of recommended wilderness areas for the Preferred Alternative in relation to Idaho Roadless Rule Areas, and designated wilderness areas, and the Bitterroot Recovery Zone

Eligible and Suitable Wild and Scenic Rivers

In the 1987 Forest Plans, rivers were identified as eligible based on their outstandingly remarkable values and management direction is to maintain those values until congressional designation. Forest Service policy requires the protection of the outstandingly remarkable values within a one-quarter mile distance from the river called the river corridor. A decision made while revising a Forest Plan is whether other rivers would be identified as suitable or eligible to be considered for future wild and scenic river designation. Grizzly bears are not identified as outstandingly remarkable values for any river identified in the Preferred Alternative because they were not identified as river dependent species.

The plan varies whether various rivers with outstandingly remarkable values are suitable for wild and scenic designation. The plan must protect the outstandingly remarkable values, which would help protect grizzly bear habitat use of these rivers. The general management areas in Management Area 3 do not change between alternatives, except for where wild and scenic rivers are found suitable. Suitable wild and scenic rivers would provide only slight benefits to grizzly bear connectivity. Those rivers that provide the most connectivity for grizzly bears are the North Fork Clearwater River, Lake Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Crooked Fork, and Colt Killed Creek. These rivers are identified because they are located near where grizzly bears may cross into the Nez Perce-Clearwater and some of them run either away from or towards the Bitterroot Ecosystem which may provide some corridors towards the Bitterroot Ecosystem. Crooked Fork is perhaps the most important proposed suitable wild and scenic river for grizzly bears because it crosses the checkerboard area near Lolo Pass, which could potentially be the most challenging place for grizzly bear passage because of the amount of private land and roads in that area. Alternatives W and Z would select many of these rivers as suitable to be wild and scenic rivers. The Preferred Alternative identified 10 rivers as suitable for wild and scenic consideration. Suitable rivers under the Preferred Alternative include Cayuse Creek, Fish Creek, Hungery Creek, Weitas Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Colt Killed Creek, and Meadow Creek. Most of these rivers are found within roadless rule, recommended wilderness, or designated wilderness and would already be relatively protected as provided by that management. Overall, wild and scenic river management would have minor or discountable effects.

The acres of wild and scenic rivers that are either suitable or eligible by alternative are shown below. Alternative Z would have the most acres of secure habitat within suitable wild and scenic river corridors, while the No Action Alternative has the most as eligible. The Preferred Alternative retains some rivers as eligible and identifies some as suitable. The suitable wild and scenic rivers under Alternative W and Alternative Y are similar or slightly higher than the Preferred Alternative. While grizzly bears are not identified as outstandingly remarkable values, suitable wild and scenic river identification would benefit grizzly bear habitat. Some wild and scenic river classifications restrict actions, like road and trail building within the quarter mile river corridor. The amount of secure habitat within each of the wild and scenic river types are shown below. The No Action Alternative has the most acres within the wild classification compared to the other alternatives. The Preferred Alternative has the most acres under the action alternatives.

Under the action alternatives, rivers were identified as eligible based on a new evaluation of outstandingly Remarkable Values and then, in the final decision, would be determined to be suitable for congressional designation based on a variety of factors. Therefore, the alternatives would change whether rivers with outstandingly remarkable values are suitable for wild and scenic designation or remain eligible.

The acres of secure habitat within eligible or suitable wild and scenic river in the No Action Alternative and the action alternatives are shown in Table 270. The existing condition has many eligible rivers and none that are suitable, while the Preferred Alternative identifies some as suitable. The acres of secure habitat within eligible or suitable wild and scenic river in the existing condition and the Preferred Alternative are shown in Table 271.

Table 270. Acres of grizzly bear secure habitat within the wild and scenic river (WSR) classifications by alternative

Secure Habitat within Suitable/Eligible WSR	No Action Alternative	Alternative W	Alternative Y	Alternative Z	Preferred Alternative
Eligible - Total Secure Habitat	103,465	n/a	n/a	n/a	773
Recreational	3,726	n/a	n/a	n/a	62
Scenic	7,684	n/a	n/a	n/a	711
Wild	92,054	n/a	n/a	n/a	n/a
Suitable - Total Secure Habitat	n/a	n/a	n/a	n/a	40,419
Recreational	n/a	40,512	43,501	115,316	3
Scenic	n/a	40,512	43,501	115,316	11,884
Wild	n/a	65	567	541	28,532

Table 271. Acres of secure grizzly bear habitat within suitable and eligible wild and scenic river corridors by alternative[1]

Wild and Scenic Rivers Type	No Action Alternative	Alternative W	Alternative Y	Alternative Z	Preferred Alternative
Eligible	103,465	n/a	n/a	n/a	773
Suitable	n/a	40,512	43,501	115,316	40,419
Grand Total	103,465	40,512	43,501	115,316	41,192

1 - Alternative X does not have any suitable wild and scenic rivers, so it not included in the table

The revised Forest Plan will set management direction for suitable rivers and their corridors, through plan components and suitability of uses. Like designated wild and scenic rivers, eligible and suitable wild and scenic rivers are classified as either wild, recreational, or scenic and are managed accordingly. Effects of plan components and suitability of uses are included in Table 272 and Table 273. The management of these rivers is to maintain their free-flowing characteristics and outstandingly remarkable values until a designation decision is reached by congress.

Table 272. The new additions as suitable wild and scenic rivers along with the acres of secure habitat within the river corridor

New Rivers Added via Suitability	Acres of Secure Habitat
Middle Fork Kelly Creek	1,423
North Fork Kelly Creek	1,746
South Fork Kelly Creek	1,769
Weitas Creek	309
Total	**5,247**

Table 273. The rivers that will not be eligible wild and scenic rivers under the Preferred Alternative, the acres of secure habitat and whether there is potential to reduce secure habitat because of the change in eligibility

Formerly Eligible River Name	Location and New land allocation	Acres of Secure Habitat	Potential to Reduce Secure Habitat Because of the Change from Eligible?
Bargamin Creek	MA[1] 1-Frank Church-River of No Return Wilderness and MA 2 Meadow Creek recommended Wilderness Area	5,805	No

Formerly Eligible River Name	Location and New land allocation	Acres of Secure Habitat	Potential to Reduce Secure Habitat Because of the Change from Eligible?
Bear Creek	MA 1- Selway Bitterroot Wilderness	6,949	No
Brushy Fork Creek	MA 1 - Selway Bitterroot Wilderness	2,443	No
Cub Creek	MA1- Selway Bitterroot Wilderness	4,964	No
East Fork Moose Creek	MA1- Selway Bitterroot Wilderness	10,578	No
Johns Creek	MA1-Gospel-Hump Wilderness, MA2 -Gospel-Hump Multi-Purpose Area, and MA3	5,497	Yes- Some portions of the river corridor are within Recreation Opportunity Spectrum Settings that allow motorized uses.
Lake Creek	MA 3 and MA 1 - Gospel-Hump Wilderness	3,192	Yes—While the majority of the stream passes through the Gospel-Hump Wilderness, approximately 3.6 miles of the headwaters pass through private lands and portions of MA3 where motorized uses are suitable. These areas are mostly within areas that are not secure habitat.
Moose Creek	MA 1 - Selway Bitterroot Wilderness	1,008	No
North Fork Moose Creek	MA 1 - Selway Bitterroot Wilderness	67	No
Paradise Creek	MA 1 - Selway Bitterroot Wilderness	4,190	No
Rhoda Creek	MA 1 - Selway Bitterroot Wilderness	4,637	No
Running Creek	Mostly MA 2 Meadow Creek Recommended Wilderness Area/IRR-Wildland Recreation, and some MA1- Selway Bitterroot Wilderness	4,439	No, the river corridor falls entirely within non-motorized ROS settings.
Slate Creek	MA1 Gospel-Hump Wilderness Area, MA2 - IRR Backcountry Restoration, and MA3	1,973	Yes, some of the river corridor flows through the areas that are suitable for motorized uses. However, most of the secure habitat within this river corridor falls within the Gospel-Hump Wilderness and would still be unsuitable for motorized uses.
South Fork Clearwater River	MA3	3	Yes because it would all be suitable for motorized uses, but results in little change to secure habitat because there is little secure habitat in the river corridor.
Three Links Creek	MA1 Selway Bitterroot Wilderness	4,269	No, would be managed as designated wilderness.

Formerly Eligible River Name	Location and New land allocation	Acres of Secure Habitat	Potential to Reduce Secure Habitat Because of the Change from Eligible?
Wahoo Creek	MA1 - Selway Bitterroot Wilderness	2,920	No, would be managed as designated wilderness.
West Fork Gedney Creek	MA1-Selway-Bitteroot Wilderness, and MA2 -IRR Backcountry Restoration	1,507	Yes, about half the river corridor would be in an area suitable for motorized uses so could have motorized trails constructed.
West Fork Three Links Creek	MA1- Selway Bitterroot Wilderness	1,689	No, would be managed as designated wilderness.
West Moose Creek	MA1 - Selway Bitterroot Wilderness	2,623	No, would be managed as designated wilderness.
North Fork Clearwater	MA 3, MA2—IRR Primitive, and Backcountry Restoration. River corridor also occurs in semi-primitive non-motorized, roaded natural, and semi-primitive motorized.	67	Yes- occurs in several management areas, roadless rule themes and motorized ROS settings. While this is one of the longer rivers in the plan area, there is currently little secure habitat within the corridor.

1 - MA = management area

The plan components for suitable or eligible wild and scenic rivers are found in direction for Management Area 2 in the revised Forest Plan. The plan components emphasize retaining free-flowing condition, preliminary classification, and the outstandingly remarkable values. MA2-STD-E&SWSR-01 prohibits actions that would change their classification. Other plan direction emphasizes maintain their scenic character.

Activities are also restricted by suitability of uses based on their classification. The plan identifies suitability of uses for Eligible and Suitable wild and scenic rivers which are shown in Table 32 of the revised Forest Plan. Some wild and scenic river classifications restrict actions like road and trail building within the one-quarter mile river corridor. Restrictions in suitability of uses would help maintain grizzly bear habitat and habitat security. The amount of secure habitat within each of the eligible and suitable wild and scenic river classification types are shown in Table 270 and Table 271. The existing condition has the most acres within the wild classification compared to the Preferred Alternative.

Forest Service Handbook (FSH) 1909.12 outlines the activities allowed within the different wild and scenic river classifications. Wild rivers restrict timber cutting, new mineral leases, roads, motorized travel and allows only minimal recreation developments. Scenic Rivers allow timber activities provided there is no substantial impact on the river and its immediate environment but with an emphasis in maintaining visual quality. Mineral operations must minimize surface disturbance, sediment and pollution, and visual impairment. Roads may occasionally bridge the river and short stretches of screened roads may be permitted. Public use facilities are permitted within the river corridor if screened from the river. Motorized travel may be permitted, restricted, or prohibited to protect river values. For recreational rivers timber harvest is permitted but the immediate river environment will be protected and emphasizes maintaining visual quality. New mining claims and new mineral leases must minimize surface disturbance, sedimentation, pollution, and visual impairments. Paralleling roads may be constructed along the river, and there may be several bridges and access points to the river. Campgrounds and recreational facilities may be established. Motorized travel may be permitted, restricted, or prohibited to protect river values. These measures afford some levels of protection for the rivers and may benefit grizzly bears.

Eligible and suitable wild and scenic river management would generally indirectly benefit grizzly bears. Suitable wild and scenic rivers would also provide some benefits to grizzly bear connectivity especially certain rivers that lie between the northern boundary of the Nez Perce-Clearwater and the Bitterroot Recovery Zone. The Preferred Alternative identified 10 rivers as suitable for wild and scenic consideration. Most of these rivers are found within roadless rule, recommended wilderness or designated wilderness and would already be relatively protected by that management. Where land allocations overlap, all plan components would apply, and eligible and suitable wild and scenic river management would add additional protections to these lands. While the total acres of suitable wild and scenic rivers are relatively modest, they will provide some measures for the conservation of secure habitat and contribute to connectivity. This is especially true within the Wild classification which is the most restrictive in terms of suitability plan components and actions that affect secure habitat.

Where land allocations overlap, all plan components would apply, and eligible and suitable wild and scenic river management would add additional protections to these lands. For example, an area might be suitable wild and scenic river and fall within designated wilderness areas. Therefore, plan components guiding management in both areas would apply. The overlap in land allocations of suitable wild and scenic rivers is shown in table 263. While the total acres of suitable wild and scenic rivers are relatively modest, they will provide some measures for the conservation of secure habitat and contribute to connectivity. This is especially true within the Wild classification which is the most restrictive in terms of suitability plan components and actions that affect secure habitat (see Table 32 in the Forest Plan). Wherever they occur, all plan components would apply, and eligible and suitable wild and scenic river management would add additional protections to these lands.

There will be new additions that would be found suitable for inclusion into the wild and scenic river system via suitability (see Eligible and Suitable Wild and Scenic River). These will add a total of 5,247 acres of secure habitat within the wild and scenic river system. The new rivers include the Middle Fork Kelley Creek, North Fork Kelly Creek, and South Fork Kelly Creek are in the northern portion of the plan area which could contribute habitat for dispersing bears coming from the north.

Some rivers that are eligible under the 1987 Forest Plans will no longer be eligible as Wild and Scenic Rivers and would no longer be managed as wild and scenic rivers. Once a suitability determination is made, management to maintain outstandingly remarkable values on eligible rivers is no longer required. Therefore, the Preferred Alternative will result in fewer rivers being managed as eligible for Wild and scenic rivers. In this case, the river corridors would revert to being managed within the land allocation or management area within which they are located. For example, river corridors located within Management Area 3 would be managed for multiple uses. River corridors located in Idaho Roadless Rule areas would be managed consistent with Management Area 2 direct and direct for the Idaho Roadless Rule. Similarly, rivers within designated wilderness would be managed consistent with wilderness and Management Area 1. Most of the rivers that were eligible in the 1987 Forest Plans are located within designated wilderness areas or Idaho Roadless Rule areas as shown in Table 273. In the Preferred Alternative, 21 formerly eligible rivers would no longer be managed as eligible rivers managed to protect outstandingly remarkable values and free flow characteristics. Fifteen of these rivers are located within designated wilderness, recommended wilderness, while six river corridors would be located within Idaho Roadless Rule area or Management Area 3 multiple uses areas.

Those 15 rivers that fall within designated wilderness, recommended wilderness would have low potential for impacts because plan components for management area direction would constrain most management that could affect river corridors. These would not be suitable for motorized uses so they would not be at risk for loss of secure habitat or alteration of free-flowing characteristics. Within these rivers, little would be impacted. Technically speaking, wilderness areas do not prohibit building of dams but in reality, dams are highly unlikely in wilderness areas even though they are not expressly prohibited. While there would be a change in management, it would result in little direct impact to secure habitat or grizzly bears because most of it would remain in areas not suitable for motorized uses.

Six river corridors no longer eligible are located within Idaho Roadless Rule areas or within Management Area 3 managed for multiple uses. These rivers have the potential to have free flow characteristics altered or would no longer protect their outstandingly remarkable values as a result of agency actions. The total amount of secure habitat within these six rivers is 12,172 acres. However, four of these rivers have river corridors located within both wilderness areas and Management Areas 2 or 3. These include John's Creek, Lake Creek, Slate Creek, and West Fork Gedney Creek. Therefore, parts of these rivers are protected with those portions falling within wilderness, recommended wilderness, or areas not suitable for motorized uses. Some sections of these rivers could have future projects that might result in a loss of secure habitat, but most of the areas within Management Area 3 are not secure habitat. There are two large rivers that will not be suitable as Wild and Scenic rivers. These include the North Fork of the Clearwater and the South Fork of the Clearwater. While these rivers have more acres of river corridor, they currently have little existing secure habitat with 67 acres within the North Fork and three acres within the South Fork. Free flowing characteristics would no longer be emphasized on these rivers. While the changes would result in less protective management of the rivers, the rivers themselves will still be managed as important resources, with protections from plan components such as those in the Aquatic Ecosystems section of the plan. Essentially, this change will not result in many future activities that could be impactful to secure habitats.

Timber Suitability

The revised plan contains desired conditions for landscape patterns, size classes, vegetation density, structure, dominance type, and composition that are based on the natural range of variation to provide habitat diversity that should contribute to grizzly bear habitat. Plan components in this section are informed by modeling the natural range of variability and should contribute to ecosystem integrity. Desired conditions would be achieved through a variety of vegetation treatments. Vegetation activities could occur through timber harvest, prescribed fires, fuels treatments, planting, wildfire, other forestry or restoration methods, or other mechanical treatments. The plan also includes objectives for timber production which, in many cases, would be produced while taking actions to meet desired vegetation conditions. Generally, the consequences of this direction would be beneficial to grizzly bears over the long term but would require habitat alterations over the short term.

Where timber production and harvest are allowed or prohibited depends on land allocations and associated suitability for these uses. Timber production, harvest, and restoration is not restricted within Management Area 3 except where there are resource concerns such as within riparian habitat conservation areas, steep slopes, landslide prone areas, and so forth.

Timber harvest may occur with or without road construction involved. Roads would be restricted by the Idaho Roadless Rule or Wild and Scenic River suitability plan direction when conducting vegetation treatments in Management Area 2. In Idaho Roadless Rule areas, vegetation management would be primarily prescribed fire or harvest from existing roads. The treatments might draw bears into these areas when harvesting from existing roads. Site specific analysis and project decisions would consider measures to prevent drawing grizzly bears into forage resources created by vegetation treatments and address these concerns at the project level.

In Management Area 3, the benefits of vegetation conditions would be offset by the presences of roads and would have greater chances of effects on grizzly bear survival because some roads would be constructed to achieve desired conditions. We can expect better body condition and better survival in bears where vegetation treatments occur in association with lower road densities, such as in wilderness, recommended wilderness, and Idaho Roadless Rule Areas. Intensity of human use of these areas are lower because of limited access. These alternatives are integrated with the objectives for fire and fuels management under the Revised Forest Plan.

The plan alternatives vary the acres harvested for timber production and the number of acres or pace needed to restore vegetation to achieve desired vegetation conditions. For timber production acres, under the No Action Alternative, the acreage conducted annually is 4,300 acres, or 50 to 60 million board feet. Alternative W proposes 12,600 acres, or 221 to 241 million board feet; Alternative X proposes 14,000 acres, or 241 to 261 million board feet; Alternative Y proposes 7,500, or 120 to 140 million board feet; and Alternative Z proposes 3,700 acres, or 60 to 80 million board feet. The Preferred Alternative proposes a range of between 8,825 and 10,000 acres annually, for a production amount of 190 to 210 million board feet. Nearly all of this timber production would occur within Management Area 3, while Management Area 2 would receive limited timber harvest and Management Area 1 would not receive timber harvest, except as allowed by enabling legislation for designated lands.

Similarly, the amount of disturbance needed to restore the Nez Perce-Clearwater to the desired vegetation conditions were set based on the pace it would take to achieve these desired conditions within a specified time frame in years. The acres of treatment needed would be 40,000 acres under the No Action Alternative and 53,000 to 64,500 acres in all other alternatives. The Preferred Alternative proposes between 53,000 and 64,000 acres. These acres include wildland fire, timber production, fuels treatments, wildlife habitat enhancement, and vegetation treatments designed to restore vegetation characteristics found in desired conditions. These acres include treatments that would occur across all management areas. In Management Area 3, these acres would be achieved with active vegetation management such as timber production, fuels reduction activities including prescribed fire, non-commercial thinning, and mastication, while in Management Area 2 they would include a range of methods other than for timber production and in Management Area 1 they would mostly be through wildfire that achieves land management plan objectives and to a lesser extent prescribed fire. These alternatives are integrated with the objectives for fire management under the Land Management Plan.

In Management Area 3, roads or temporary roads would typically be associated with timber production and may draw human use after treatments. Bears attracted to vegetation treatments within Management Area 3 would likely encounter higher probabilities of human-bear conflicts. Associated roads along with human activity can negatively affect grizzly bears by disturbing or displacing bears during logging activities and by increasing mortality risk (Zager et al. 1983). In the warm moist broad potential vegetation type, many areas would be planted to restore western white pine. Western white pine restoration is most effective after an even aged harvest such as a clear cut and then planted with blister rust resistant white pine seedlings. Therefore, the acres of white pine restoration should be assumed to follow this type of treatment. The plan has objectives to treat 34,440 acres of the warm moist broad potential vegetation type every five years, some of which would be to restore western white pine. The plan also has desired conditions where white pine increases across the warm moist and cool moist broad potential vegetation types. Areas harvested for timber production or timber harvest must be restocked with trees within five years of treatment. In contrast, areas burned by prescribed or managed fires are often left to recover naturally. Restoration of white pine could change the seral stage and dominance type of forested vegetation, which could produce improved forage conditions or increase nutritional resources over the short term but remove mature forest.

The plan does not have components to direct management to consider or restrain where potential grizzly bear foods are promoted or produced from vegetation treatments. For vegetation projects, managers could consider how the arrangement of treatments could potentially produce foods that could attract bears to areas where conflicts may occur during project development and could take measures that could reduce this potential conflict. Each project could be analyzed as to whether an individual project would attract bears into a conflict on a case-by-case basis. In any case, each project would have its own environmental analysis and be consulted on with the U.S. Fish and Wildlife Service for effects to federally listed species.

Grizzly bears use a variety of habitat conditions and variety in vegetation size classes, densities and dominance types would contribute to grizzly bear habitat. Vegetation management may alter the amount and arrangement of cover and forage available to bears. Use tends to be more frequent in areas that offer some type of hiding cover nearby, particularly during daylight hours (Aune and Kasworm 1989b, Mace and Waller 1997). Vegetation management may alter the amount and arrangement of cover and forage available to bears. Waller (1992) reported that grizzly bears avoided lower-elevation, more accessible harvested stands, as well as stands less than 30–40 years old where the vegetation had not recovered enough to provide cover. Timber harvest and fire can locally increase bear foods by stimulating the growth of grasses, forbs, and berry-producing shrubs. Bears that used regenerating forest habitats (mostly due to forest harvesting) containing a diversity of age classes were more likely to see gains in their body condition, whereas bears that used older forests were more likely to see reductions in body condition (Boulanger et al. 2013). However, survival rate was reduced by road densities which in turn were positively correlated with regenerating forest habitat (Boulanger et al. 2013). Human activities which promote young regenerating forests, such as forest harvesting, therefore promotes improved health (increased body condition) in bears but are offset by reductions in survival rates because of higher road densities. Grizzly bears in Management Area 3 would have better body condition because of better nutrition but lower survival due to increased human bear conflicts as a result of more motorized access (Boulanger et al. 2013). All alternatives under the revised plan contain desired conditions for vegetative patterns, size classes, vegetation density, structure, and composition that are based on the natural range of variation to provide habitat diversity that should contribute to grizzly bear habitat.

Management Area 3 currently has higher road densities, more human activities, and more developments than Management Area 2 and 1. Management Area 3 is where most of the timber production and associated road development would occur. A geospatial analysis of the Nez Perce-Clearwater road system, under the1987 Forest Plans, indicates that 1,035,819 acres, or 83.5 percent, of the 1,240,340 acres in Management Area 3 is within 1,600 feet of a roadway and could be harvested from existing roads. Therefore, while some timber is not yet accessed and will require some new road construction, there is limited areas within Management 3 where additional roads are required to access the timber, which naturally limits the addition of new roads. However, additional roads may need to be constructed to access the remaining 204,521 acres for vegetation management. There is currently only 194,805 acres of secure habitat in Management Area 3 and composes about 16 percent of this management area, most of which exists in smaller blocks, and these would be most likely the areas that may be impacted under the Preferred Alternative. Although it is currently where and how many roads would be constructed.

Vegetation management in Management Areas 2 and 1 to meet desired vegetation conditions would mostly be treated with prescribed fire or wildfire. These treatments would produce better body conditions because of more nutritional resources and promote higher survival rates. These two management areas account for most of the Nez Perce-Clearwater and the best areas for habitat conditions for grizzly bears. Vegetation management in these two management areas would not require permanent road construction in most cases, however temporary roads may be needed. In some areas of Management Area 2, temporary roads may be build based on allowances in the Idaho Roadless Rule, recreation opportunity spectrum, and suitability. The effects of temporary roads are short term for grizzly bears. Road building would only be allowed to the extent that the Idaho Roadless Rule allows and is not allowed in designated wilderness. Timber harvest is suitable for other resource reasons within Idaho Roadless Rule area but are limited to areas within reach of existing roads or by helicopter. However, much of the Idaho Roadless Rule areas are outside the reach from existing roads and are not suitable for harvest (Figure 105). The entirety of the Bitterroot Recovery Zone is not suitable for timber harvest of any kind.

Not all temporary roads would likely to be constructed at once. Some of the roads would be consolidated in project areas and be constructed and used at the same time, which would concentrate effects on bears into a smaller area. Temporary roads would be separated by space and time across the Nez Perce-Clearwater, which may affect more individual grizzly bears, but have less intense effects. As temporary roads are usually closed immediately after the completion of harvesting activities, they do not have prolonged impacts. In some cases, they can be open for up to five years if projects are implemented over multiple years.

For ease of discussing the effects, there are essentially three types of timber suitability, 1) Suitable for timber production, 2) Suitable for timber harvest for other resource objectives but not for timber production, and 3) Not suitable for production nor harvest. The acres and percent of the Nez Perce-Clearwater that is suitable for the different types of timber suitability are shown in Table 274. Timber production is unsuitable on about 73.5 percent of the national forest and thus prohibited. Timber harvest of any kind is unsuitable on about 59 percent of the national forest. Timber production is only suitable on about 26.5 percent of the national forest. The different types of timber suitability largely follow the distribution of land allocations such as management areas, designated wilderness, recommended wilderness, wild and scenic rivers, and Idaho Roadless Rule Areas. Relatedly, timber activities will not create the need for new motorized features in areas unsuitable for timber production, and timber activities are less likely to be the cause of new motorized routes in areas suitable for timber harvest but unsuitable for timber production.

Secure habitat would need to be treated in Management Area 2 to achieve vegetation desired conditions. Treatment examples include prescribed fire, wildfire, non-commercial tree cutting, commercial harvest or other methods. In Idaho Roadless Rule areas, which make up the majority of Management Area 2, timber harvest is limited by the Idaho Roadless Rule. For example, the Final Environmental Impact Statement for the Idaho Roadless rule projected that less than 0.01 percent of roadless area per year of the lands managed under the Idaho Roadless Rule would be affected by timber removal or road construction in the first 15 years. For the approximately 1,481,636 acres of roadless areas on the Nez Perce-Clearwater, this would total 1,500 acres over the 15-year period, or approximately 100 acres per year (U.S. Department of Agriculture 2008a). Per the Idaho Roadless Rule, timber harvest activities must be conducted from existing roads or aerial harvest systems. In the 10-year period from October 2008 to September 2018, approximately 1,800 acres have been affected through community protection zone fuels reduction, constructed fuel breaks during wildfires, and removal of post-fire roadside hazard trees. This trend of timber harvest in Idaho Roadless Rule areas is expected to continue. In Idaho Roadless Rule areas, vegetation treatments are likely to be implemented as prescribed fire or wildfire managed to achieve land management plan objectives. Some areas within community protection zones could also be treated to reduce hazardous fuels and may include the construction of temporary roads.

Neither timber harvest, nor production are suitable within recommended wilderness nor in designated wilderness areas. Therefore, it will not be allowed there, which would prevent effects from these activities to habitats within the Bitterroot Recovery Zone. While prescribed fire is suitable within wilderness and recommended wilderness, it is more likely to be treated with wildfire managed to achieve land management plan objectives in these areas to maintain wilderness character.

The amount of currently secure habitat that will occur within the three suitability classes for the existing condition and the Preferred Alternative are shown in Table 274. Overall, in the Preferred Alternative, about 81 percent of currently secure habitat is not suitable for either harvest nor production, 12 percent is suitable for harvest for other resource reasons, and only about 7 percent is suitable for timber production. Under the existing condition, about 82 percent of secure habitat is not suitable, 12 percent is suitable for harvest, and 7 percent is suitable for production. Therefore, the difference is only about 1 percent of secure habitat or about 22,725 acres of area not suitable. About 21,522 acres more are suitable for timber harvest in the Preferred Alternative compared to the existing condition. The amount of secure habitat suitable for timber production varies little, 1,202 acres, between the Preferred Alternative and the existing condition. The reason is because most of the area suitable for timber production currently lacks much secure habitat to begin with and because so much of the Nez Perce-Clearwater is not suitable due to Idaho Roadless Rule and Wilderness Restrictions. It can be expected that much of the 7 percent of secure habitat suitable for timber production would be impacted by timber activities including harvest or additional road development. Furthermore, existing secure habitat in areas suitable for timber production are small and fragmented. Areas suitable for timber production mostly occur within Management Areas 3, which is an area not biologically suitable nor socially acceptable for grizzly bears. Bears that move into Management Area 3, where most timber production would occur, would likely have a lower survival rate under both existing conditions and under the Preferred Alternative. Every vegetation project will undergo site specific environmental analysis and Endangered Species Act consultation prior to approval an implementation.

Under the No Action Alternative, the maximum size of regeneration units allowed before requiring regional forester approval was 40 acres. All the other alternatives would allow regeneration harvest up to 207 acres. The size of openings would influence the arrangement of vegetation patches on the landscape. The size of disturbances has changed as a result of the 40-acre limit on regeneration harvest. Under natural disturbance, the size of regenerating forest was much larger as a result of wildfire, where thousands to hundreds of thousands of acres were set to a regenerating state after burning. The 207-acre maximum opening size would allow more flexibility to restore a landscape pattern that existed under natural disturbance.

The plan varies the amount of area suitable for timber production because of decisions on wild and scenic river suitability and recommended wilderness. There are essentially three types of timber suitability: 1) suitable for timber production, 2) suitable for timber harvest for other resource objectives but not for timber production, and 3) not suitable for production nor harvest. The amount of currently secure habitat that will occur within the three suitability classes by alternative are shown in Table 274 below. Overall, in the Preferred Alternative, about 81 percent of currently secure habitat is not suitable for either harvest or production, 12 percent is suitable for harvest for other resource reasons, and only about 7 percent is suitable for timber production. Under the No Action Alternative, about 82 percent of secure habitat is not suitable, 12 percent for harvest, and 7 percent is suitable for production. Rounding accounts for the difference in percent change in the alternatives, though the change can be seen in the acres. Alternative W has the most secure habitat not suitable for either harvest or production, while Alternative X has the least amount. They vary by about 6 percent total between the highest and lowest alternatives.

The Preferred Alternative has about 21,522 acres more of secure habitat suitable for harvest than the No Action Alternative (Table 274). Alternative X has the most acres suitable whereas Alternative W has the least and they vary by about 137,915 acres. It can be expected that secure habitat would undergo treatments to achieve vegetation desired conditions but, in most cases, it would not involve permanent road construction due to Idaho Roadless Rule restrictions. Temporary road construction may occur as permitted by the Idaho Roadless Rule. Harvest, when used, would be mostly from existing roads.

Table 274. Acres and percent of currently secure grizzly habitat in the three timber suitability types for each alternative (Alt)

Secure Suitability Type	No Action Alt Acres	%	Alt W Acres	%	Alt X Acres	%	Alt Y Acres	%	Alt Z Acres	%	Preferred Alt Acres	%
Not suitable	2,015,555	82	2,117,530	86	1,978,573	80	2,004,082	81	2,039,187	83	1,992,830	81
Suitable for Harvest	285,106	12	182,880	7	320,795	13	296,392	12	261,720	11	306,628	12
Suitable for Production	162,419	7	162,669	7	163,711	7	162,606	7	162,172	7	163,621	7

The alternatives vary little in how much secure habitat is suitable for production. They vary by about 1,202 acres because of variation in the wild and scenic river suitability. The differences between the other alternatives are similar, differing between Alternative Z with the lowest and Alternative X with the highest amount, by about 1,539 acres. The differences between alternatives are negligible. The reason is because most of the area suitable for timber production currently lacks much secure habitat to begin with and because so much of the Nez Perce-Clearwater is not suitable due to Idaho Roadless Rule and wilderness restrictions. It can be expected that much of the 7 percent of secure habitat suitable for production would be impacted by timber activities, including harvest or additional road development. Figure 105 shows the timber suitability for the Preferred Alternative. Note that the majority of the Nez Perce-Clearwater is not suitable for timber production nor harvest.

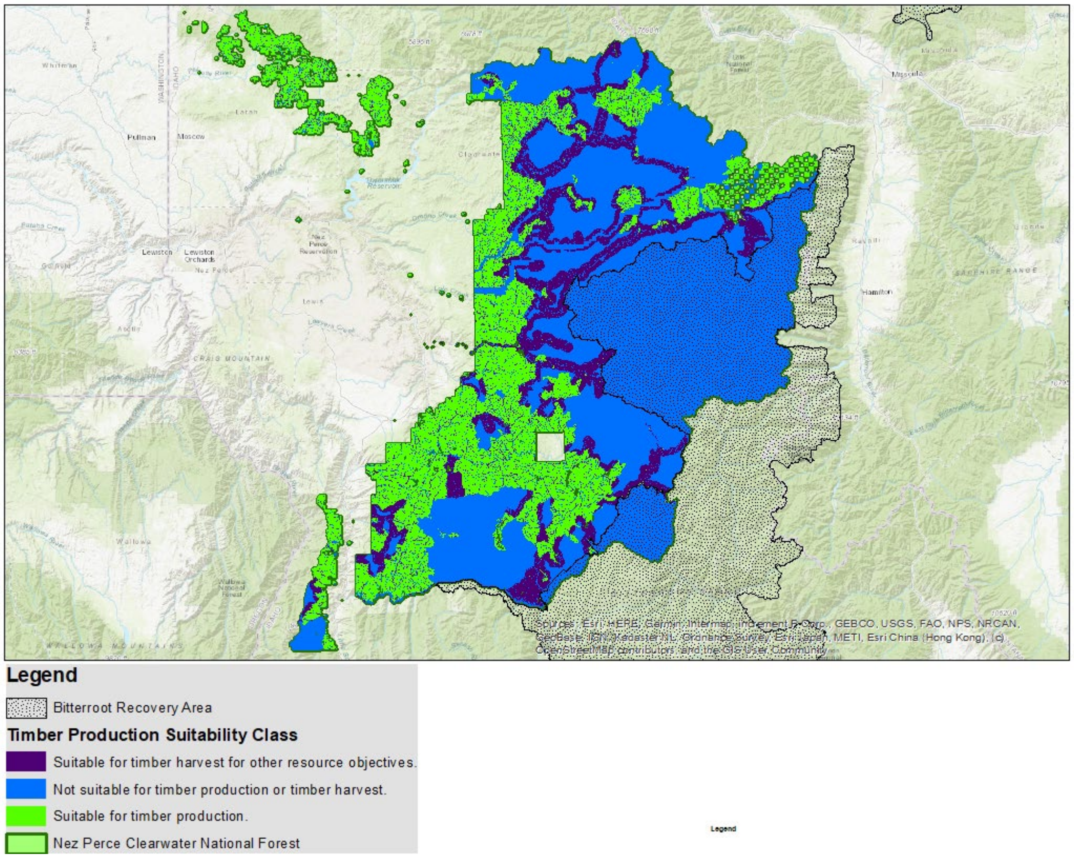


Figure 105. Timber Suitability class distribution in the plan relative to the Bitterroot Recovery Zone. Bright green represents areas suitable for timber production, purple represents areas suitable for harvest to meet other resource objectives such as restoration, and areas in blue are not suitable for harvest nor production.

The National Forest Management Act of 1976 (NFMA) established provisions and limitations on timber harvest activities including limits on the maximum size of regeneration harvest. The 2012 Planning Rule and Forest Service Handbook 1909.12 requires that plan components incorporated into revised plans need to maintain and restore ecosystem integrity. The planning Rule defines Ecosystem Integrity as “the quality or condition of an ecosystem when its dominant ecological characteristics (for example, composition, structure, function, connectivity, and species composition and diversity) occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence.”

The 2012 Planning Rule (36 CFR 219_11 Timber requirements) requires that plan components comply with the 40-acre maximum opening size required under NFMA (4)(d). Exceeding the 40-acre maximum is allowed under the NFMA but to do so, the Forest Service must allow a 60-day comment period and must receive approval from the next level above the deciding official, who is usually the forest supervisor, and the next level up is typically the regional forester.

The 2012 Planning Rule permits Forest Plan Standards for opening sizes that exceed the 40-acre maximum required under National Forest Management Act (NFMA) if the responsible official determines that it is necessary to achieve desired ecological conditions as set-fourth in Section 219.11 (d)(4)(i) as follows:

> Plan standards may allow for openings larger than those specified in paragraph (d)(4) of this section to be cut in one harvest operation where the responsible official determines that larger harvest openings are necessary to help achieve desired ecological conditions in the plan area. If so, standards for exceptions shall include the particular conditions under which the larger size is permitted and must set a maximum size permitted under those conditions.

To that end the plan established a plan standard that establishes the size below which a project does not require regional forester approval and the 60-day comment period. The size of openings of regeneration harvests was identified such that they better replicate the size of openings under natural disturbance with the Natural Range of Variation. Under the 1987 Forest Plans, the 40-acre limit was exceeded periodically with regional forester's approval.

The Natural Range of Variation (NRV) is an ecological concept that seeks to describe the landscape conditions that existed before modern forestry practices were adopted (Wiens et al. 2012). Vegetation patch sizes both affects and is affected by disturbance events including wildland fire, insect infestations and tree diseases. Opening size and pattern of vegetation is a major influence on species composition, forest stand structure, ecosystem function and habitat connectivity (Hagmann et al. 2021). Managing forest vegetation within the context of natural disturbance regimes requires an examination of actions implemented at appropriate spatial and temporal scales to address the ecological characteristics that compromise sustainability. The abundance, average size, and range of sizes of early successional forest patches, or "openings" have been identified as the key ecosystem characteristics to represent landscape pattern because this condition is quantifiable and is meaningful for many wildlife and plant species. Openings in the forest are created after a stand-replacing disturbance like wildfire. They are meaningful to many wildlife species because of their distinctive composition and openness, which affects the growth and survival of plants that some wildlife depends on and represent significant ecological contrast to adjacent mid or late successional forest ("edge"). Furthermore, patch size and distribution affect or influence the distribution and habitat selection of some wildlife species. Examples include elk, fisher, and some migratory birds. They also represent the initiation point in forest development, the foundation upon which rests the pattern of the future forest.

The Terrestrial Ecosystem Plan components are founded upon analysis of ecological composition, structure, function, and connectivity. Forest management that focuses restoration at scales within the Natural Range of Variation may support desired conditions focused on maintaining and enhancing ecosystem integrity. Note that the maximum opening size standard only pertains to the size above which requires regional forester approval. It does not preclude creating openings larger than this size by following the proper approval process and comment period, for example regional forester approval and required comment period. Openings smaller than the standard size may also be appropriate.

To inform the maximum size of regeneration units, the Forest Service used a state and transition model known as the SIMulating Patterns and Processes at Landscape scaLEs (SIMPPLLE model) (Chew, Moeller, and Stalling 2012) to inform the patch size distribution under simulated natural disturbance. The spatially interactive model SIMPPLLE incorporates climate data, fire logic, and vegetation growth pathways to estimate forest growth and disturbance for a period of approximately 1,000 years. The model is calibrated with empirical data, expert knowledge, climate data and relevant scientific studies as a basis for model information and assumptions. Model results were compared to the current patch size distribution currently on the Nez Perce-Clearwater.

Model results suggested that the national forest is currently departed from its patch size distribution wherein current average patch sizes are much smaller than the average size of regenerative disturbance under the Natural Range of Variation. This is the result of fire suppression and a number of small mechanical treatments that are the result of timber harvest in recent decades which followed the 40-acre limitation found in National Forest Management Act (NFMA). Additionally, it severely departed relative to the area weighted mean, meaning that many more acres of open or early seral forest were composed of very large early seral patches driven by wildfire disturbance. In the simulation, patch size of openings ranged from 6 to larger than 457,299 acres, and that 25 percent of all openings were from patches between 6 and 1,785 acres and an estimated 75 percent of patch openings were larger than 1,785 acres.

Patch sizes were aggregated using Jenks breaks to facilitate analysis and were used to group patch size classes into 10 bins. The smallest bin size ranged from zero to six acres and was an artifact of the grain size of the model. The second largest bin size, six to 1,785 acres was identified as the bin size most appropriate to replicate the size at which forest vegetation management was most appropriate. The within bin distribution was large so the average within the bin was estimated from the maximum 90th percentile size patch to identify the appropriate maximum patch size for the plan standard. The average patch size was also estimated within each broad potential vegetation type (PVT) because fire behavior can be different within different PVTs.

The forestwide average patch size within bin 2 estimated by maximum 90th percentile was 350 acres. The average size within broad PVTs are as follows: the warm dry was 77, warm moist was 160 acres, cool moist was 188 acres, and within the cold was 95 acres. If forest management is to better reflect the distribution of early seral conditions under natural disturbance, then the patch size of forest management would need to increase. Mechanical treatments would be used to reflect smaller opening size creation through natural processes such as insect infestations and spot fires, while at the same time puts the onus of larger openings on wildfires. The maximum opening size before regional forester approval is established in FW-STD-TBR-06. The Preferred Alternative would allow regeneration harvest up to 207 acres before regional forester approval is required. This number was the average opening size of the second bin. This standard applies to newly created harvest openings from mechanical vegetation treatments on National Forest System lands only and need not consider existing recently created opening on National Forest System lands, adjacent private lands, or other agency lands. The areas where this standard would apply is forestwide and it would only apply to mechanical treatments that regenerate forests, such as clearcutting, seed tree cutting, shelterwood seed cutting, or other cuts designed to regenerate an even-aged stand of timber in a single harvest operation.

The size of openings would influence the arrangement of vegetation patches on the landscape resulting from timber harvest. This patch size would be used most within Management Area 3 as that is where timber harvest is more often going to occur. Nevertheless, the prevailing driver of the patch distribution within the plan area will still be wildfire disturbance as it would continue to be the prevailing agent of change on the landscape.

The 207-acre maximum opening size would allow more flexibility to restore a landscape pattern that existed under natural disturbance. The smaller maximum opening size in the 1987 plan was too small to replicate the patch size and distribution as would have occurred under natural disturbance. As a result, the patch size and distribution characteristics are departed from their historical size because the patch sizes are too small. The plan desired conditions MA1 and MA2- DC-FOR-05 and MA3-DC-FOR-09 would direct forest vegetation to reflect the landscape pattern of natural disturbances. The larger patch size limit would better allow active management to restore conditions more like the patch size present under natural disturbance. Expanding the maximum size of regeneration harvest would allow the Nez Perce-Clearwater to work towards restoration of a landscape pattern consistent with those that existed under natural disturbance from a patch size standpoint. Under the Preferred Alternative, the maximum opening size set by the standard could still be exceeded following a 60-day comment period and regional forester approval. FW-STD-TBR-06 would not apply to openings resulting from natural conditions such as fire, insect and disease attack, or windstorm as specified in FW-STD-TBR-08.

The effects of this direction would be that the Nez Perce-Clearwater would trend towards a vegetation patch size more like the patch size under natural disturbance. A larger maximum patch size would make larger openings on the landscape. As a result of the larger patch size allowance, more patches of larger size would be produced via timber harvest and other mechanical vegetation treatments. Larger opening sizes in some cases would require less road construction than 40-acre cuts because more area could be accessed from a single road to a larger patch opening versus many roads to access smaller spread-out smaller patches. However, the road system would be determined based on-site specific considerations. There would be more nutritional resources for grizzly bears because in many cases, nutritional resources originate from early seral conditions because these are the conditions that facilitate berries, grasses, and prey species. So larger patches would also maintain and facilitate bear nutrition. Larger patch opening sizes are not expected to impact connectivity for grizzly bears as grizzly bears move easily through both forested and early seral conditions.

Research suggested that grizzly bears actively selected for larger cut blocks in British Columbia (Ciarniello et al. 2015). Ciarniello et al., (2015) used location data on 28 (16 females, 12 males) grizzly bears between 1998 and 2003 to determine how bears would respond to the resulting reduction in mature pine forests and increase in the number and size of cut blocks. Grizzly bears used pine stands less than expected and cut blocks more than expected, selecting for cut blocks in spring and summer but not in fall. Cut block size influenced selection by bears during the spring and summer but not in fall with grizzly bears being four times more likely to select for very large cut blocks (16,308 to 17,297 acres) than smaller blocks. In summer, bears selected for larger cut blocks with higher greenness values at higher elevations and where the risk of human-caused mortality was greater. In fall, bears remained closer to block edges and used younger stands. Bears spent a significantly greater fraction of their time in cut blocks during the night than during the day and during “active” versus “resting” periods in all three seasons. Selection for large blocks suggests that bears may respond positively to a harvest regime that mimics the size of natural disturbances. Ciarniello et al. (2015) concluded that following an ecosystem management (that is, natural disturbance) approach to forest harvesting will foster use by grizzly bears inhabiting working forests. They also concluded that the potential benefit of large cut blocks to bears could be outweighed if larger blocks contribute to higher grizzly bear mortality. Attracting grizzly bears via larger openings could potentially result in mortality if larger openings are also associated with increased roads and human access. However, Ciarniello et al., (2015) suggested that grizzly bears accessed large openings more often at night as a strategy to presumably to avoid humans.

From a practical standpoint, the standard would apply more commonly within Management Area 3 but might also be used less often within Management Area 2 within the framework of timber suitability as explained above. It is reasonable to expect that these larger openings would occur across all of Management Area 3 throughout the life of the plan. The standard would also apply to Management Area 2 as well but mechanical treatments in Management Area 2 would be less common and occur only when treatments would best be achieved through mechanical regeneration harvests. More often prescribed fire would be used in Management Area 2 to create large openings because of the practical limitations on timber harvest imposed by the Idaho Roadless Rule. Harvest (to meet other resource objectives) in Management Area 2 is essentially going to be constrained mostly to existing roads or helicopter. Harvesting larger openings from existing roads could in some cases draw grizzly bears into areas accessible to humans in Management Area 2 which might increase the probability of bear-human conflicts. However, because most of the treatments in Management Area 2 are likely going to be via prescribed fire while harvesting from existing roads would be less common. The Forest Plan standard limiting opening size would not apply to prescribed fires. So large openings created by fires or prescribed fires would create large openings to the benefit of grizzly bear selection without the associated motorized system access.

While the plan standard would apply forestwide, many areas of the Nez Perce-Clearwater are not suitable for timber harvest, and because it only applies to mechanical treatments, there is no effects from this plan components in areas not suitable for timber harvest, such as wilderness, recommended wilderness, and Idaho Roadless Rule within the Wildland recreation theme, the Wild classification of designated and suitable Wild and Scenic Rivers, designated Natural Research Areas, and non-forested lands.

Fire Management

Wildland fire management includes all activities for the management of wildland fires to meet land management objectives. Fire management includes the entire scope of activities from planning, prevention, fuels or vegetation modification, prescribed fire, hazard mitigation, fire response, rehabilitation, monitoring, and evaluation. The management of wildland fire influences whether fire effects have beneficial or non-beneficial impacts on resources, such as air and water quality, wildlife habitat, recreation areas, and communities. Wildland fire management incorporates a spectrum of responses ranging from full suppression to managing for resource objectives. Suppression is a management strategy used to extinguish or confine all or a portion of a wildfire. Fuels management is the practice of controlling flammability and reducing resistance to control wildland fuels through mechanical, chemical, biological, or manual means or by fire in support of land management objectives. Fuels treatments result in a change in the amount, configuration, and spacing of live and dead vegetation, creating conditions that result in more manageable fire behavior and reduced intensity during future wildland fire events.

Plan components within the Fire Management section of the plan provides direction for vegetation treatments for fuels reduction, prescribed fire and through the management of vegetation via unplanned ignitions. The plan components would direct future actions related to both the prescribed fires, and direction on when and how fire suppression would be conducted in the future.

Fire management plan components would encourage natural fire or use prescribed fire across the planning area. Fire is likely to play a dominant role in shaping grizzly bear habitat over the life of the plan. Objectives for total disturbance, including wildfire, only vary between the No Action Alternative and the action alternatives, with the No Action Alternative having approximately 40,000 acres of total disturbance annually. FW-OBJ-FIRE-01 in the fire management section would seek to treat vegetation through a combination of managed wildfire or active burning between 530,000 and 645,000 acres every 10 years or an average of 53,000 to 64,500 per year. This objective applies to all the action alternatives including the Preferred Alternative. The objective for total disturbances was calculated based on the distribution of vegetation types and their fire return intervals from fire regime groups. As part of the total disturbance, FW-OBJ-FIRE-02 sets the objectives for fuels treatments on 227,242 per decade under the Preferred Alternative. FW-OBJ-FIRE-03 would encourage fire to play a natural role to reduce uncharacteristic and undesirable wildfire through the management of natural unplanned ignitions on between 360,258 acres per decade under the Preferred Alternative. The amount of total disturbance in FW-OBJ-FIRE-01 also includes all timber production and harvest amounts. Because the amounts of natural disturbances are unpredictable, they are expressed as an amount per decade in the plan.

The plan is integrated among resource areas such that fire is recognized as an important mechanism to achieve desired ecological and vegetation plan direction. The amount of disturbance identified in the objectives, along with the types of disturbance need to achieve desired vegetation conditions, included and accounting for both prescribed fires and natural ignitions. The amounts were modeled with the SIMPPLLE Model, which modeled the vegetative response to timber harvest treatments and stochastic processes like wildfire. Therefore, the plan's fire objectives and other plan components were informed by the model's outcomes for both timber harvest scenarios in alternatives and incorporate the expected amount of future wildfire. Similarly, the plan's ecosystem components for vegetation desired conditions considered the amount of wildfire needed to achieve those desired conditions. Furthermore, they are established to represent our best estimate of the conditions of vegetation within the natural range of variation under natural disturbance. The SIMPPLLE model was calibrated based on the historical amount of wildfire, weather patterns, and the distribution of fire starts. While we do not know where and when a wildfire will start, the model represents a good estimate of the amount of wildfire that can be expected during the life of the plan. Model outcomes suggest that wildfire will still be the predominant driver and agent of change in the vegetation conditions in the plan area despite the increased intensity of timber harvest objectives proposed. Therefore, the objectives within the plan components for Fire Management are paramount to the outcomes of the revised Forest Plan.

While it is impossible to predict when or where wildfire ignitions would start, the Forest Service has discretion on if, when, where, and how suppression activities would be conducted. However, it is reasonably certain that wildfire starts will occur each summer, the estimates of how much fire there will be on the landscape within the life of the plan are reasonable estimates, and it is reasonably certain that wildfire suppression decisions will be based on the guidance in the plan. The intent in the plan is that fire would play a more natural role on the larger landscape compared to the 1987 plans. Some aspects of the 1987 plans required suppression in many cases and had thresholds that limited the amount of prescribed fire allowed in some management areas. The proposed plan allows for more flexible strategic planning and more flexibility during real time fire management decision making that would allow fire to play its natural role across the landscape. In some cases, wildfire is likely to be beyond the agencies' ability to suppress but these types of disturbances have been factored into our vegetation desired conditions and the fire management objectives.

The consequences of fuels treatments and wildfire could be both positive and negative for grizzly bears. These treatments would alter grizzly bear habitat and reduce cover but may enhance food sources. The effects of fuels treatments would be emphasized within the wildland urban interface. Treatments would also occur within Idaho Roadless Rule areas, recommended wilderness, and designated wilderness. Fire has been the dominant agent of change in grizzly bear habitat under natural disturbances, and bears are assumed to be adapted to these conditions. The location, types, size and distribution of fuels treatments and prescribed fires are not yet known. Prescribed fire and fuels treatments are authorized only after site specific environmental analysis, and Endangered Species Act consultation. Activities for fuels treatments and prescribed fires often include establishment of containment lines, mechanical vegetation treatments, and burning conducted under controlled conditions. Existing roads or trails are often used as containment lines. The effects of these treatments could be a change in seral stage and temporary disturbance in the local area. The plan also encourages allowing fires to play a more natural role in forest disturbance through wildfire managed to achieve land management plan objectives. Some but not all wildfire management activities require firefighter personnel to be present near the fire and includes firefighter camps, people using motorized vehicles to access areas to utilize containment lines by removing fuel and constructing fire lines. Aircraft are often used to move people and equipment, monitor burn conditions, and applying fire retardant or water to control the fire intensity and spread rates of fires. Wildfire is the largest disturbance agent within the Nez Perce-Clearwater and will be the driving force for change to the national forest's vegetation conditions. The fire objectives amounts in the action alternatives are more similar to disturbance under natural conditions and would reduce the magnitude of departure from fire return intervals. The amounts in the No Action Alternative are too low to address the departure from the natural fire return intervals and would result in a continued buildup of fuels, leading to potentially larger and more intense fires in the future. In terms of grizzly bear habitat, the action alternatives would create more nutrition for grizzly bears compared to the No Action Alternative. Long term, the No Action Alternative would result in more severe fires that could alter forest vegetation and grizzly bear habitat to greater degree than if they were addressed with a more progressive schedule of disturbance like those in the action alternatives. The action alternatives are better from a grizzly bear conservation perspective.

Consequences of Summer Recreation Opportunity Spectrum Settings and Motorized Suitability

Public access was identified as a significant issue during scoping. The plan does not make site specific decisions on roads, nor motorized trails, nor does it authorize, fund or carryout actions nor decisions on the travel system. Therefore, the plan has only indirect effects on grizzly bears regarding travel management decisions. Instead, forest plans make decisions on the suitability of uses and broad direction under which future decisions for roads and motorized trails could be made. The plan identifies the suitability of motorized uses across the landscape, the extent and amount of which varies by alternative. It should be recognized that identifying lands as suitable does not necessarily mean that these activities would occur on all portions of suitable lands. It only identifies where motorized uses would be suitable to guide future decisions. Motorized uses would not be allowed on lands identified as not suitable for motorized uses in the plan.

The primary mechanism that determines motorized suitability is the Summer and Winter Recreation Opportunity Spectrum settings (ROS). However, the ROS was developed from consideration of the appropriateness of motorized uses within the various land allocations which fed into the identification of Summer and Winter ROS settings. Each land allocation also has its own suitability plan components that must be followed including the suitability of motorized uses. The Summer and Winter ROS settings are consistent with the suitability plan components within the various land allocation suitability components. Furthermore, the types of motorized uses that could occur in some areas suitable for motorized uses are influenced by management area direction. For example, some Idaho Roadless Rule areas are suitable for motorized uses but suitability plan components within the Idaho Roadless Rule section of the plan also provide guidance that can shape the types of motorized uses that occur, for instance roads are restricted but motorized trails are suitable. In addition, even when suitable, the construction of motorized routes would be required to be consistent with forestwide plan components that address the manner in which roads or motorized trails are authorized and constructed.

The ROS has six distinct classes in a continuum that describe settings ranging from highly modified and developed to primitive and undeveloped (Clark and Stankey 1979, U.S. Department of Agriculture 1982b). Five of the ROS classes apply to the Nez Perce-Clearwater: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, and rural. There are no urban ROS classes on the Nez Perce-Clearwater. Allocations of these settings are decisions within the revised Forest Plan that dictate not only where motorized uses are suitable but also the extent of development or “developedness” that are appropriate for an area. Motorized uses within different ROS classes likely have differences in effects because different ROS settings often have different road maintenance levels, which can affect the types of vehicles that can traverse roads and the rate of speed that can be traveled. Table 275 below defines the ROS classes and definitions. See the Sustainable Recreation section for more information about the ROS.

The summer and winter ROS settings influence the suitability of other various activities, in that it sets the level of development that users may anticipate experiencing on roads and within recreation sites. For example, it would not be appropriate to pave a road in a semi-primitive motorized setting as this would be inconsistent with the recreational experience expected. This also applies to recreation sites, a well-developed campsite with hookups would be appropriate in some settings such as rural or roaded natural settings, but not in other settings like semi-primitive motorized where campsites are expected to be more rustic. The motorized settings are the rural, roaded natural, and semi-primitive motorized settings while the non-motorized settings are the primitive and semi-primitive non-motorized.

Summer Recreation Opportunity Spectrum (ROS) settings take into account the suitability of summer motorized uses across all management areas or land allocations. Under the No Action Alternative, the ROS settings were not used as a mechanism to identify motorized suitability. Instead, they were general guides that applied to recreational experiences. The existing condition for motorized uses was that motorized recreation was open unless closed by a site-specific decision such as the Clearwater Travel Plan or specific decisions on closures such as for designated wilderness areas. Because travel planning has not been established within the Nez Perce National Forest, that portion of the national forest is still open to motorized uses except where specific closures were established. Decisions on authorizing motorized routes are guided by plan components like PACFISH and INFISH measures, constraints imposed by elk habitat effectiveness plan components in the 1987 plans, or considerations for other resources. Thus, the action alternatives for summer ROS settings represent the establishment of a new suitability plan component that would identify areas as suitable or not for motorized uses. For comparative purposes in the Draft Environmental Impact Statement, a ROS setting map was delineated for the No Action Alternative based on policy guidance for establishing the ROS settings based on buffered features like roads, but it does not represent any true constraints on motorized uses like those in the action alternatives. The ROS in baseline condition, as mapped for the No Action Alternative, does not represent a decision made in a planning document due to ROS not being used as a suitability plan component prior to the 2012 Planning Rule. Rather, the existing condition maps are a map based on mapping protocols and reflect how other decisions, such as travel plan decisions, have influenced the user's experiences. The 1987 Forest Plans have no provisions to manage consistent with the ROS classifications, the ROS classifications were an effect of other decisions implemented on the ground.

In this revision, under the 2012 Planning Rule, ROS no longer is a mapped existing condition, but rather is a decision made by the responsible official that is tied to both a desired condition and suitability plan components to implement the decision. Thus, direct comparison of the existing condition ROS to the Preferred Alternative ROS is not always equivalent; the Preferred Alternative ROS is binding while the existing condition ROS is solely based on a mapping protocol that takes into account other decisions that have been made.

Plan components within the sustainable recreation section of the plan contains plan components and suitability of uses that direct the national forest to manage recreation consistent with the definitions Table 275. ROS settings are identified for both winter and summer. Plan components in the Sustainable Recreation section of the plan include desired conditions and standards that require management of these settings consistent with their definition.

Table 275. Recreation Opportunity Spectrum classes and definitions[1]

Recreation Opportunity Spectrum	Definition
Primitive (P)	This setting supports large, remote, wild, and predominantly unmodified landscapes. There is no motorized activity and little probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few, if any, facilities or developments. Most of the primitive settings coincide with designated wilderness boundaries and recommended wilderness areas.
Semi-Primitive Non-motorized (SPNM)	The semi-primitive non-motorized settings include areas of the Nez Perce-Clearwater managed for non-motorized use. Mechanized transport such as mountain bikes are often present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area. These settings are not as vast or remote as the primitive settings, but they also offer opportunities for exploration, challenge, and self-reliance.
Semi-Primitive Motorized (SPM)	This setting is managed for backcountry motorized use on designated routes. Routes are designed for off-highway vehicles and other high-clearance vehicles. This setting offers visitors motorized opportunities for exploration, challenge, and self-reliance. Mountain bikes and other mechanized transport are also sometimes present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area or providing portals to adjacent primitive or semi-primitive non-motorized areas.
Roaded Natural (RN)	This setting is managed as natural appearing with nodes and corridors of development that support higher concentrations of use, user comfort, and social interaction. The road system is generally well defined in this setting and can typically accommodate passenger car travel. System roads also provide access to other recreation opportunity spectrum settings of semi-primitive motorized, semi-primitive non-motorized, and primitive areas.
Rural ®	This setting represents the most developed recreation sites and modified natural settings on the Nez Perce-Clearwater. Facilities are designed primarily for user comfort and convenience.

1 - Plan area does not have any areas in the urban setting

The percent of the plan area in the summer Recreation opportunity spectrum for the different action alternatives are shown in Table 275. The percentage of areas identified as motorized and non-motorized can be found in the Sustainable Recreation section. The roaded natural and primitive settings are similar across alternatives while the amounts of semi-primitive non-motorized and semi-primitive motorized settings vary. The acres of secure habitat within each recreation opportunity spectrum setting is shown in Table 276 while the amount of secure habitat in motorized and non-motorized settings is shown in Table 277. The recreation opportunity spectrum settings for the No Action Alternative provide guidance on recreational experience but did not include motorized suitability.

Alternatives that identify more secure habitat as suitable for motorized uses would have more consequences for dispersing bears and may impact connectivity more than alternatives that have less areas suitable for motorized uses. Alternative X would have the least amount of secure habitat in a non-motorized setting, while Alternative Y would have the most amount. The other alternatives would be intermediate to these two. The Preferred Alternative would include 69 percent of the secure acres in the two non-motorized settings (primitive and semi-primitive non-motorized) and 31 percent of the secure acres in motorized settings. The alternative with the most area suitable for motorized uses is 14.8 percent more suitable than the alternatives with the least amount of motorized suitability. Several areas in the Preferred Alternative were identified and retained in non-motorized settings to provide for grizzly bear connectivity which are shown in Figure 106.

Table 276. Acres and percent of secure habitat in various summer recreation opportunity spectrum (ROS) classes by alternative (Alt)

ROS Setting	No Action Alt[1]	%	Alt W	%	Alt X	%	Alt Y	%	Alt Z	%	Preferred Alt	%
Primitive	869,480	35	1,151,665	47	1,151,665	47	1,165,043	47	1,165,043	47	1,1240,66	46
Rural	291	0	3,495	0	3,495	0	3,495	0	3,495	0	4,315	0
Roaded Natural	92,237	4	93655	4	116,767	5	106,565	4	99,887	4	158,145	6
Semi-Primitive Motorized	257,358	10	481,867	20	718,410	29	256,611	10	228,730	9	605,122	25
Semi-Primitive Non-Motorized	1,243,714	50	732,397	30	472,741	19	931,365	38	965,925	39	571,432	23

1. The recreation opportunity spectrum settings for the No Action Alternative provide guidance on recreational experience but did not include motorized suitability.

Table 277. Percent of currently secure grizzly bear habitat suitable for motorized uses under the alternatives (Alt)

Secure Habitat	No Action Alt	Alt W	Alt X	Alt Y	Alt Z	Preferred Alt
Motorized	15	23	34	15	14	31
Non-motorized	85	77	66	85	86	69

The recreation opportunity spectrum (ROS) settings do not identify where those motorized uses would occur specifically, rather they identify where those activities could occur after a site-specific travel management decision. However, the ROS settings, in combination with areas identified as recommended wilderness, would largely determine where motorized access could occur under the plan. In the Preferred Alternative, the ROS can be characterized as more summer and winter motorized access with important areas for non-motorized access delineated because of resource concerns, including for grizzly bear connectivity compared to other alternatives. From a grizzly bear conservation perspective, alternatives that have less secure habitat suitable for motorized uses would be better than those with more secure habitat suitable for motorized uses. Future road or motorized trail construction would potentially reduce secure habitats.

Grizzly bear conservation in the 1987 plans relied on constraints in the plan associated with elk habitat effectiveness direction to determine the location and density of motorized roads and trails on the Nez Perce-Clearwater. The elk plan components identified discrete areas called elk analysis units where the plan would maintain 100 percent, 75 percent, 50 percent, and 25 percent elk habitat effectiveness. Elk security was based on road density measures, among other factors, to restrict motorized travel. These measures restricted road building on many areas across the national forest. Once the Idaho Roadless Rule was enacted it imposed restrictions on road building on much of the national forest, representing a new constraint on motorized uses, reducing the need for elk habitat effectiveness measures in much of the national forest.

Under most alternatives, Management Area 3 would mostly consist of roaded natural setting with less in the rural setting. The rural setting represents the most developed recreation sites and modified natural settings on the Nez Perce-Clearwater. Facilities are designed primarily for user comfort and convenience. The roaded natural setting is managed to provide nodes and corridors of development that support higher concentrations of use, user comfort, and social interaction. The road system is generally well defined in this setting and can typically accommodate passenger car travel. In the semi-primitive motorized setting, the Nez Perce-Clearwater is managed for backcountry motorized use on designated routes. Routes are designed for off-highway vehicles and other high-clearance vehicles. This setting offers visitors motorized opportunities for exploration, challenge, and self-reliance. Mountain bikes and other mechanized transport are also sometimes present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area or providing portals to adjacent primitive or semi-primitive non-motorized areas. The changes in Management Area 3 in the action alternatives would allow a more comfortable or higher level of development compared to current conditions. Idaho Roadless Rule areas are typically either semi-primitive motorized or semi primitive non-motorized. These areas would remain relatively rustic, with lower maintenance levels of roads.

As the recreation opportunity spectrum settings move from rural to primitive, the amount of human activity is expected to increase, the amounts and types of developments increase, and these factors would incrementally increase the chance for grizzly-human conflicts. The proximity of the recreation opportunity spectrum settings across the Nez Perce-Clearwater are important as well. Grizzly bears entering the national forest from the north or the east would find recreation opportunity spectrum settings such as primitive and semi-primitive non-motorized. As they move west, they would encounter more semi-primitive motorized and roaded natural settings. Changes in settings also influence the types and intensities of developed recreation sites, trending road development and recreation facilities towards a more developed state.

The non-motorized settings would not be suitable for motorized uses and provide other experiences as well. The semi-primitive non-motorized settings include areas of the Nez Perce-Clearwater managed for non-motorized use. Mechanized transport, such as mountain bikes, is often present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area. These settings are not as vast or remote as the primitive settings, but they also offer opportunities for exploration, challenge, and self-reliance. The primitive setting supports large, remote, wild, and predominantly unmodified landscapes. There is no motorized activity and little probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few facilities or developments. Most of the primitive settings coincide with designated wilderness boundaries and recommended wilderness areas. Motorized routes would be prohibited in areas identified as unsuitable for motorized uses.

Several changes would occur in the Preferred Alternative compared to the No Action Alternative. Many areas that were formerly roaded natural in the No Action Alternative, would be identified as rural in the Preferred Alternative. Similarly, many areas currently identified as semi-primitive motorized would become roaded natural under the Preferred Alternative.

Under the Preferred Alternative, secure habitats within motorized settings may experience future road or motorized trail development under the plan after site-specific analysis, though where is yet to be determined. Future new developments would increase the probability of human-grizzly conflict, fragment secure habitat, and could lead to grizzly bear deaths or removal. Roads are allowed in Idaho Roadless Rule Areas in only limited circumstances, but motorized trails are not constrained in these areas and therefore some of them are identified as suitable for these uses. If motorized trails are proposed in the future in Idaho Roadless Rule areas in areas suitable for motorized uses, guideline MA2-GDL-WL-05 apply. Guideline MA2-GDL-WL-05 has three exceptions when the 5,000-acre constraint does not apply as follows:

- Community Protection Zones (CPZs) as defined by the Idaho Roadless Rule.
- Areas with existing motorized access that are currently less than 5,000 acres.

- Existing trails that are relocated or reconstructed to mitigate negative impacts to ecological resources.

According to that guideline, motorized access should not be authorized unless adjacent areas of 5,000 acres or larger can be maintained without motorized access. This guideline would allow limited amounts of motorized trails within secure habitats larger than 10,000 acres within motorized settings within Management Area 2. It would prevent motorized trails from being constructed within secure habitats between 10,000 down to 5,000 acres and then would allow motorized trails within secure habitats smaller than 5,000 acres. This guideline would only apply within Idaho Roadless Rule Areas and that are suitable for motorized uses. It would not apply within areas not suitable for motorized uses because there would not be any motorized trails nor roads allowed. Hypothetically speaking, in secure habitats within Idaho Roadless Rule Areas, only blocks larger than 10,000 acres and those smaller than 5,000 acres could be divided by a motorized road or trail and still meet the conditions of guideline MA2-GDL-WL-05. Blocks of secure habitat larger than 10,000 acres, blocks between 5,000 and 10,000 acres, and blocks smaller than 5,000 acres in Management Area 2 are shown in Figure 108. MA2-GDL-WL-05 would still allow some limited motorized trails to be developed to respond to desires by the public for more access, but it would fragment secure areas, especially those areas of security larger than 10,000 acres. It would not change or fragment habitats within the Bitterroot Recovery Zone as roads are not allowed there, so these are areas outside of the recovery zone.

This guideline would constrain activities that would reduce and fragment secure habitat. The plan area has 27 secure areas that have greater than 10,000 acres each, which includes those in wilderness areas, recommended wilderness areas, and Idaho Roadless Rule areas. There are 20 blocks of secure habitat larger than 10,000 acres that occur outside of wilderness and recommended wilderness areas, ranging in size from 47,849 to 10,250 acres. Most of these large secure areas are located within the Clearwater National Forest in the North Fork of the Clearwater Drainage and all of them have either all or some portion within a motorized setting.

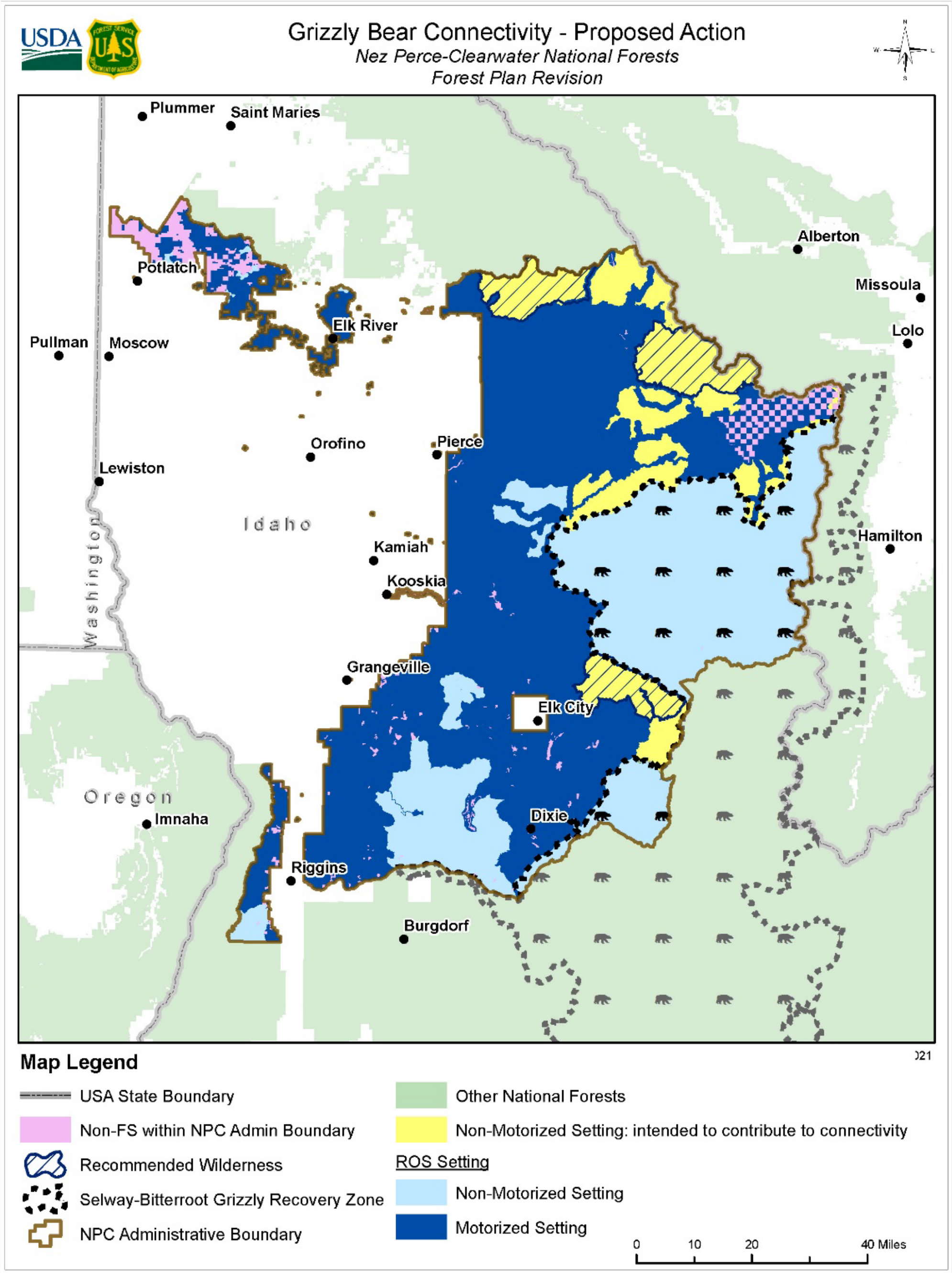


Figure 106. Areas identified as non-motorized in the summer Recreation Opportunity Spectrum Settings in part to provide for grizzly bear connectivity into and through the Bitterroot Recovery Zone

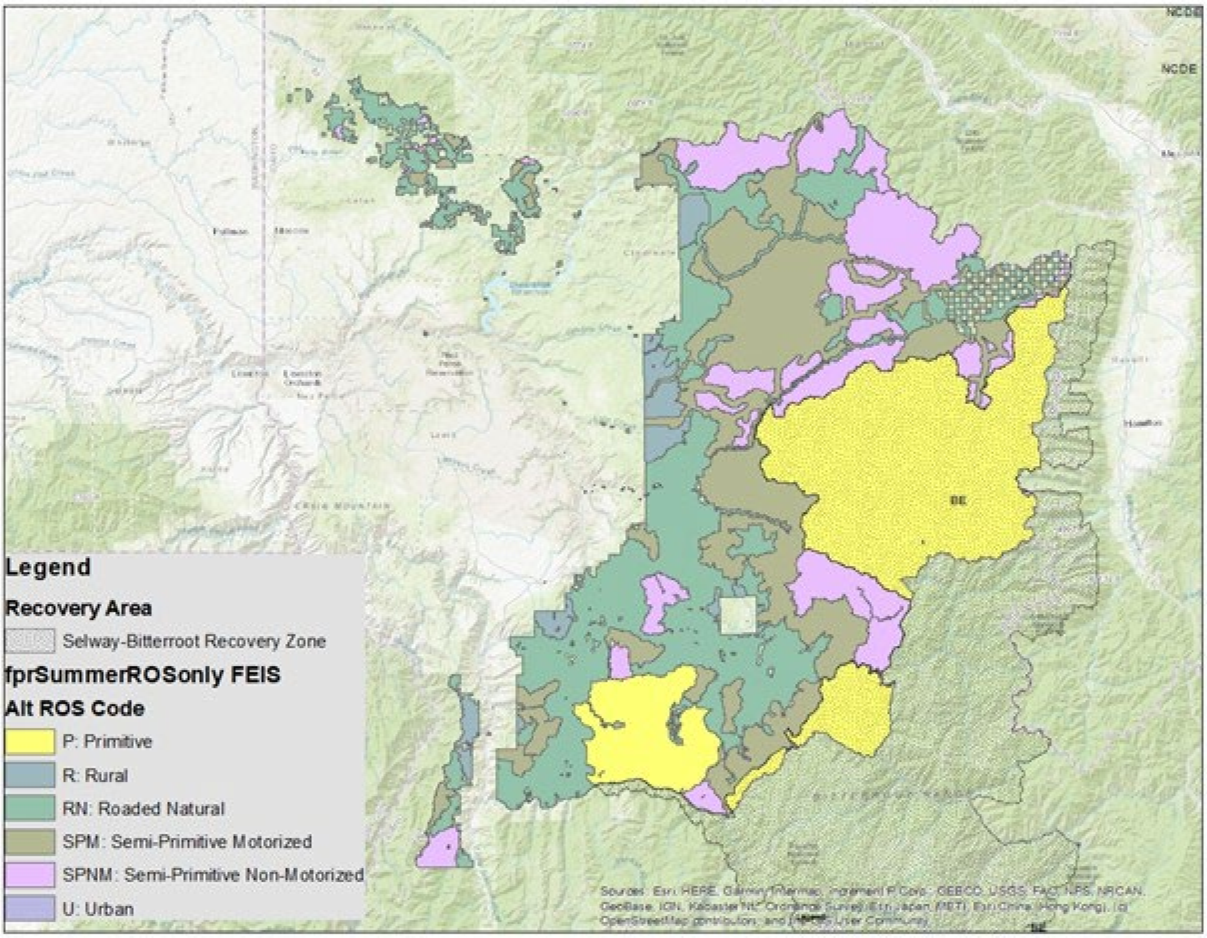


Figure 107. Summer Recreation Opportunity Spectrum under the Preferred Alternative relative to the Bitterroot Recovery Zone. Rural, Roaded Natural, and Semi-Primitive Motorized settings would be suitable for motorized uses while Primitive and Semi-primitive non-motorized are settings not suitable for motorized uses

Table 278. The acres and percent of currently secure grizzly bear habitat suitable for motorized and non-motorized uses in the Preferred Alternative

Secure Habitat	Preferred Alternative acres	Preferred Alternative percent
Motorized	767,582	31%
Non-motorized	1,695,498	69%

A total of approximately 1,111,712 acres of secure habitat are in Idaho Roadless Rule areas. Table 278 shows the acres of secure habitats of different sizes and whether they are suitable for motorized uses or not. Of those, 542,720 acres of secure habitat are totally unsuitable for motorized uses and are protected by suitability plan components. There is a total of 568,992 acres of secure habitat in Idaho Roadless Rule Areas that are in a motorized Recreation Opportunity Spectrum setting. Of those, there are 434,458 acres of secure habitat larger than 10,000 acres, 47,834 acres of secure habitat blocks between 10,000 and 5,000 acres, and 86,699 acres smaller than 5,000 acres to which guideline MA2-GDL-WL-05 would not apply. Therefore, 434,458 acres total blocks of secure habitat larger than 10,000 acres could have a limited number of motorized trails developed, 47,834 would be completely protected, and 86,699 acres that would have no protections under MA2-GDL-WL-05. Unprotected secure habitats smaller than 5,000 acres make up about 3.5 percent of the total secure habitats in the plan area and about 7.7 percent of the secure habitats within Idaho Roadless Rule Areas. Figure 108 shows the areas within Idaho Roadless Rule areas, whether they are in a motorized or non-motorized setting and shows the secure habitats in the various sizes where MA2-GDL-WL-05 apply.

Table 279. The secure habitats within Idaho Roadless Rule Areas that are motorized or non-motorized by secure habitat block size

Secure Habitat in Motorize or Non-Motorized Settings by Block Size	Idaho Roadless Rule that are Not Secure Habitat	Secure Habitat Blocks less than 5000 acres in Idaho Roadless Rule Areas	Secure Habitat Blocks between 5,000 and 10,000 acres in Idaho Roadless Rule Areas	Secure Habitat Blocks greater than 10,000 acres in Idaho Roadless Rule Areas	Total Acres of Secure Habitat	Total Area within Idaho Roadless Rule Areas	Percent of Total Secure Habitat Within Idaho Roadless Rule Areas
Motorized	315,098	86,699	47,834	434,458	568,992	884,090	51.18%
Non-Motorized	54,826	17,273	31,645	493,802	542,720	597,546	48.82%
Grand Total	**369,924**	**103,972**	**79,479**	**928,261**	**1,111,712**	**1,481,636**	**100.00%**

Note, all amounts are estimated by a Geographic Information System and are approximate. The complex overlays involved in calculating secure habitat size, that are within the different

In total, there are 2,463,080 acres of secure habitat, of which 69 percent or 1,695,498 acres of secure habitat are not suitable for motorized uses under the Preferred Alternative and would be protected against motorized uses. A total of approximately 767,582 would be suitable for motorized uses. Approximately 482,292 acres of secure habitat would have constraints imposed by MA2-GDL-WL-05 in Idaho Roadless Rule Areas (Figure 108). A total of 285,290 acres of secure habitat or about 11.5 percent of the total secure habitats are suitable for motorized uses and that would not require the constraints of MA2-GDL-WL-05. Other plan components may exist in those areas to help address motorized uses (see the discussion on how the plan addresses motorized uses below).

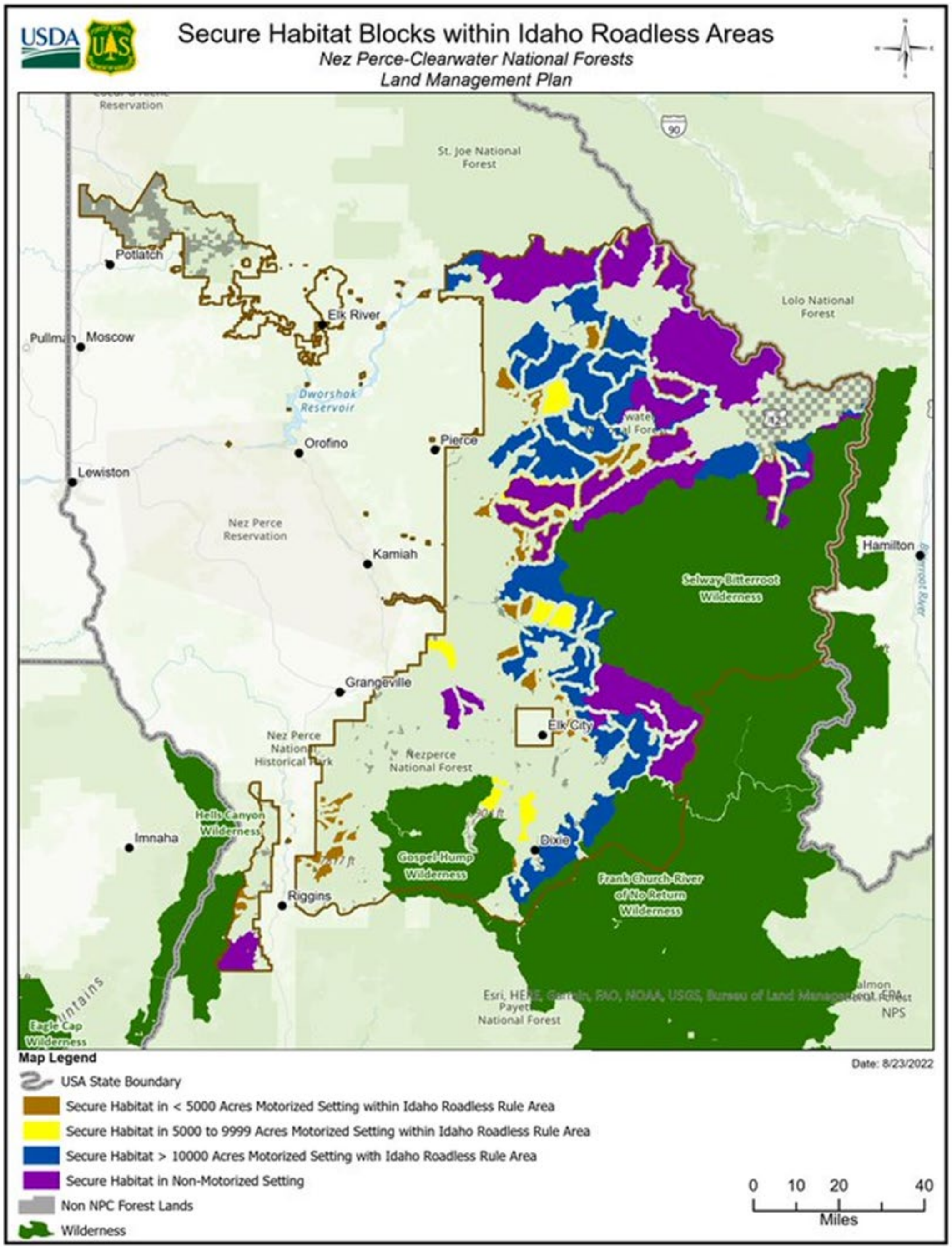


Figure 108. The blocks of secure habitat in Idaho Roadless Rule Areas that are in motorized Recreation Opportunity Settings that are greater than 10,000 acres in blue, between 5000-10000 acres in yellow, and less than 5,000 acres shown as tan. Also shown are Idaho Roadless Rule Areas in non-motorized Recreation Opportunity Spectrum Settings shown in purple. Wilderness areas are shown in dark green. Note, this map does not show secure habitats outside of Idaho Roadless Rule Areas.

The plan area has 26 blocks of secure habitat greater than 10,000 acres (Figure 108). They range in size between 1,102,583 and 10,370 acres and combine for a total of 2,180,362 acres of secure habitat in blocks larger than 10,000 acres. The vast majority of the acres in these large blocks are within Management Area 1 and 2 where there are constraints on new roads and motorized trails.

The four largest blocks of secure habitats are centered over wilderness or recommended wilderness areas and include a block over the Selway Bitterroot Wilderness at 1,102,538 acres and surrounding area, a block over the Gospel-Hump Wilderness and surrounding area at 274,867 acres, one on the Hoodoo Recommended Wilderness Area and surrounding area at 120,423 acres, and one centered over a portion of the Frank Church-River of No Return Wilderness and surrounding area at 108,793 acres for a grand total of 1,606,667 acres. These combined are about 73.6 percent of the secure habitats larger than 10,000 acres. While the majority of these areas are within areas not suitable for motorized uses, some of the secure habitat within these blocks extends over the wilderness boundary into areas suitable for motorized uses. Where they extend is mostly within Idaho Roadless Rule Areas of which some are suitable for motorized uses. This means that, while new roads are not allowed under the Idaho Roadless Rule, these areas could have new motorized trails constructed and still meet MA2-GDL-WL-05 around the periphery of the Wilderness Areas so long as they leave areas 5,000 acres and larger after the construction of the new motorized trails.

A total of 76 percent of secure habitats within blocks over 10,000 acres are in a non-motorized Recreation Opportunity Spectrum Classification. That leaves only 24 percent of secure habitats larger than 10,000 acres suitable for motorized uses. About 2 percent are located partially within Roaded Natural settings within Management Area 3, primarily around the Gospel-Hump Wilderness Area. In these acres, both roads and motorized trails are suitable with no restrictions. Most of the remaining 22 percent suitable for motorized uses are within Idaho Roadless Rule Areas, mostly in the Backcountry Restoration theme, which prohibits roads with only limited exceptions (See description of Idaho Roadless rule themes in the existing condition section above). All of these acres are located within Management Area 2 where MA2-GDL-WL-05 would apply.

The blocks of secure habitat larger than 10,000 acres that occur outside of wilderness and recommended wilderness areas and within areas suitable for motorized uses, range in size from about 32,747 to 10,370 acres. Most of these large secure areas are located within the Clearwater National Forest in the North Fork of the Clearwater drainage, but also occurs within other areas around wilderness areas. In some cases, adding only one or two motorized trails would render them to a size between 5,000 and 10,000 acres wherein they would be unable to accommodate any other motorized trails and still meet MA2-GDL-WL-05, so they would be limited in the total amount of motorized trails that could occur. Figure 108 shows a map of the areas that are suitable for motorized uses in Idaho Roadless Rule where MA2-GDL-WL-05 applies.

Keep in mind that there would still be an additional 47,834 acres more that meet the definition of secure habitat but that are smaller than 10,000 acres but larger than 5,000 acres. These habitats would be protected by MA2-GDL-WL-05. Secure habitats 1,280 acres (or 2 square miles) or larger were identified by Wakkinen and Kasworm (1997) as areas more likely to be used by grizzly bears than smaller areas. Wakkinen and Kasworm (1997) also showed that grizzly bears used areas as small as 141 acres but less frequently. There will be about 70,676 acres of secure habitats less than 5,000 acres but more than 1,280 acres in Management Area 2 that are in a motorized setting and where motorized trails would be allowed. Guideline MA2-GLD-WL-05 would not apply to these secure habitats. This amounts to 2.86 percent of the total secure habitats within the plan area. Guideline MA2-GLD-WL-05 is only required to apply within Management Area 2 and therefore will not protect secure habitats within Management Area 3. Any new motorized roads or trail constructed within 0.31 miles of existing motorized routes would result in a loss of additional secure habitat. Reductions in secure habitat would increase the probability of bear and human conflicts and could increase the probability of bear deaths as they move into the area. While the location, amount and length of new motorized roads and trails are unknown, it is reasonable to expect that new motorized roads and trails would be constructed occasionally throughout the life of the plan. There would likely be new motorized trails constructed within blocks of secure habitat larger than 10,000 acres within motorized Recreation Opportunity Spectrum Settings suitable for motorized uses, but the amount of these would be limited by guideline MA2-GDL-WL-05 in Idaho Roadless Rule Areas. In a worst-case scenario, a portion of the secure habitats in motorized settings in Management Area 2 larger than 10,000 acres could be reduced in size down as small as 5,000 acres. However, these habitats should still remain with low motorized route density overall and would still remain permeable to grizzly bears. Larger secure habitats are more valuable than smaller secure habitats in terms of their ability to provide for grizzly bear dispersal and occupancy and the very largest secure habitats centered around wilderness areas and recommended wilderness areas would mostly remain intact because most of those areas are not suitable for motorized uses.

The location and amount of secure habitat impacted by motorized trails that would be constructed in secure habitats smaller than 5,000 acres in Management Area 2 is not known, and there is no projection as to how much secure habitat would be reduced within the life of the plan. In total the maximum would be determined by the precise alignment and in what manner new motorized trails cross secure habitats. These can only be determined after site specific analysis, which would also include an Endangered Species Act consultation.

While a useful indicator, it should be noted that blocks of secure habitat are delineated based solely on the presence or absence of roads and motorized trails, but are not otherwise delineated as meaningful unit of measure per se. Other factors may also matter to grizzly bears, such the landscape arrangement of blocks of secure habitats, the amount of use and speed of the motorized routes, or habitat conditions such as nutritional resources, or other factors.

It is reasonable to expect that decisions in the plan on motorized suitability will allow a modest potential increase in motorized access and a loss of secure habitat over time within the plan area. Increased motorized access would bring people into proximity with grizzly bears once they move into the plan area. With an increase in people comes an increase in bear attractants that could draw grizzly bears into proximity of people leading to more bear human conflicts as grizzly bears become established. Because grizzly bears avoid motorized routes and smaller secure habitats, a decrease in the size of large secure habitats, and small secure habitats could reduce the permeability of the landscape for grizzly bears to a small degree. However, the distribution of protected secure habitats occurs along the Idaho and Montana border, an area that has been identified as important to grizzly bear connectivity (Peck et al. 2017). The scope of the impacts is within the distribution of secure habitats suitable for motorized uses. Therefore, about 31 percent of the secure habitats within the plan area could be impacted by motorized uses. This represents 767,582 acres of secure habitats. Keep in mind that 1,695,498 acres of secure habitat are protected because they are not suitable for motorized uses.

The addition of a few more motorized trails will still leave these large secure habitats permeable to grizzly bears to provide connectivity. Grizzly bears have been documented moving through and using landscapes with more roads and motorized trails than those in Management Area 2. This guideline, along with the restrictions in the Idaho Roadless Rule would conserve these areas sufficiently to provide connectivity and likely even the ecological conditions to support occupancy of grizzly bears outside of the Recovery Zone. Consider that the total amount of secure habitat in blocks of habitat 10,000 acres and larger (2,180,362 acres) is almost the size of Yellowstone National Park (2,221,766 acres). It is hard to argue that bears could not survive and experience population growth on the Nez Perce-Clearwater landscape with these characteristics, even if more motorized trails are constructed under the constraints of MA2-GDL-WL-05. These areas would clearly allow passage for connectivity. Some might argue that the constraints imposed by this guideline are an overreach because grizzly bears do not currently occupy the Nez Perce-Clearwater, even though some have dispersed through the area.

The Preferred Alternative only identifies where motorized uses are suitable and thus represents only the potential areas where this use could occur. The location, layout, direction, length, and change of secure habitat from new motorized roads or trails is unknown because these decisions have not yet been made and cannot be anticipated. The change in secure habitat from future roads or motorized trails will depend on their layout, where and in which direction they cross the block of secure habitat, their length, and their straightness. Decisions on motorized trails would require site specific analysis on the location, layout, and distribution of future trails, and would undergo site specific National Environmental Policy Act analysis and Endangered Species Act consultation prior to construction.

The effects of motorized trail use on grizzly bears has not been well studied as the focus of most studies are on the effects of roads. There may be differences in effects from motorized trail recreation compared to roads. For example, camping from motorized trails is less common than camping near roads from a full-sized vehicle. Motorized trail users tend to ride loops or paths as the activity of interest itself rather than traveling to a destination as is more common with road use. Therefore, the effects of motorized trails may not have the same impacts as roads from a human-bear conflict standpoint. However, loops are often more attractive to off-highway vehicle (OHV) recreational riders than endpoint destinations because they want to see different scenery across their trek instead of seeing the same landscapes twice. So, loops often become popular attractions for OHV users. In either case, they would still result in displacement and could still potentially result in human-bear conflicts.

A comparison of the elk security measures in the 1987 plans and the suite of suitability plan components coupled with MA2-GDL-WL-05 is needed. Under the 1987 plans, motorized trails and new roads could be constructed so long as they met the requirements of the elk habitat effectiveness measures. So in many areas, they did not prohibit new motorized routes. While the Preferred Alternative does not contain a constraint on road density, it does provide an effective alternative mechanism that would impose considerable constraints on motorized routes. The plan enforces prohibitions on motorized routes within many areas via suitability plan components. Where motorized uses are suitable in management areas, the plan includes a guideline (MA2-GDL-WL-05) designed to maintain secure habitat which places an upper limit on the total amount of motorized trails that could be constructed. So while these are a different mechanism that in the 1987 plans, the suitability plan components in conjunction with guideline MA2-GDL-WL-05 provide a different mechanism to provide the ecological conditions for grizzly bear. The two mechanisms are not directly comparable for a number of reasons:

1. Suitability plan components are a new type of plan component that did not exist in the 1987 Forest Plans. Recreation opportunity spectrum (ROS) was not used as a zoning tool in the 1987 Forest Plans, rather it was a mapping exercise based on other layers of direction, including elk habitat effectiveness and travel plan decisions.
2. The elk habitat effectiveness is based on motorized features within a delineated unit boundary such as an elk analysis unit, while guideline MA2-GDL-WL-05 is unitless and not dependent upon the scale of the delineated unit its measured against. For example, road density is measured as miles of road per square mile within a specified unit like a watershed or bear analysis unit. The calculation results are often dependent on how or where those units are delineated. In contrast, the secure habitat constraints in MA2-GDL-WL-05 is directed at maintaining secure habitat itself as the unit of measure rather than imposing limits on some level of motorized routes within a delineated unit. The secure habitat

guideline does not rely on a delineated unit and is defined only by delineating areas without motorized routes, defined in this case as areas farther than 0.31 miles of a motorized route. Therefore, it is a unitless metric which can be analyzed without somewhat arbitrary delineated units like elk analysis units. The guideline ties instead specifically to the size of the secure habitat rather than being measured relative to a delineated unit. Therefore, is not directly comparable to a unit-based indicator like elk habitat effectiveness.

3. They operate differently. The elk habitat effectiveness standards in the 1987 plans allowed motorized routes so long as at the end of the project, the elk habitat effectiveness within the elk analysis unit remained below the elk habitat effectiveness objective. If the elk habitat effectiveness objective was low enough (25 and 50 percent for example), and the roads were spaced out evenly, it left little to no secure habitat in many cases. A good example of the outcome of this management can be understood by an examination of the current distribution of secure habitat within areas managed for multiple uses wherein Management Area 3 typically had a 25 percent or 50 percent elk habitat effectiveness objective. Baseline conditions in Management Area 3 contain little secure habitat even though most projects would have been required to meet either 25 percent or 50 percent elk habitat effectiveness objectives. In contrast, suitability components completely prohibit motorized routes, and MA2-GDL-WL-05 requires the conserving a specified amount of secure habitat.
4. The two mechanisms operate at different scales. While the elk habitat effectiveness objectives applied across most of the national forest, the requirements for elk habitat effectiveness were applied at the elk analysis unit scale which where delineated to represent area approximately equal to the average size of an elk home range, which were relatively small. For example, the average size of elk analysis units is close to 5,200 acres (based on the elk analysis unit ArcGIS layer).

Comparing the two mechanisms spatially is difficult because they differ in spatial extent, often with different confounding underlying management direction. Management areas direction was more complicated under the 1987 Forest Plan and resource emphasis was different for different areas. The proposed plan simplified the broad management areas into three general types. Furthermore, the boundaries of the land allocations within the Preferred Alternative do not align with the boundaries of the elk habitat effectiveness units. Also, the Idaho Roadless Rule was not established until 2008 which complicates the comparison with the 1987 Forest Plan direction. The distribution of Idaho Roadless Rule does not match the boundaries of habitat effectiveness objectives. So, comparing a spatial overlay of the land allocations within the proposed plan compared with the 1987 elk habitat effectiveness layers would produce complicated alignment problems and topological errors that might not be easy to understand. Such a comparison would result in four categories of elk objectives overlayed on the five categories of Recreation Opportunity Spectrum and the five Idaho Roadless Rule themes resulting in complex overlay combinations of categories, so the overlay was not quantified for this analysis. Suffice it to say the mechanisms are different, and the proposed direction would have more protections for secure habitat in some areas and less in other areas compared to the 1987 Forest Plans. Table 280 below attempts to qualitatively illustrate the differences.

Table 280. A comparison of measures that address motorized access in the revised Forest Plan compared to the direction in the 1987 Forest Plans

Land Allocation in the Preferred Alternative	Whether the protections for secure habitat in the Preferred Alternative are more protective, less protective, or equally protective	Reason	Projected future outcome of the Preferred Alternative
Management Area 3-Managed for Multiple Uses	Less protective	Most of Management Area 3 included some motorized restrictions of either 25 or 50% elk habitat effectiveness objectives in the 1987 plans but have few constraints on motorized uses in the proposed plan.	New roads and motorized trails would be easier to build, and motorized access is expected to increase, however, the need to increase roads is limited because the road system required to effectively administer the Nez Perce-Clearwater already reaches most of Management Area 3 (see travel management in the description of the Preferred Alternative above)
Management Area 2-Recommended Wilderness	More Protective	Motorized uses are not suitable in recommended wilderness. Most were 100% EHE objectives but the meadow creek recommended wilderness area includes areas that were 75% and 50% EHE areas.	Some existing motorized routes will need to be closed because of the new meadow creek recommended wilderness area. No new motorized roads and trails are expected to be constructed in those areas though the plan has limited exceptions to the constraints consistent with Idaho Roadless Rule regulations.
Management Area 2-Idaho Roadless Rule Areas	Some areas less protection, other areas more protection	Roads are suitable only under limited circumstances in most of the Idaho Roadless Rule Areas. However, some Idaho Roadless Rule Areas had standards requiring 100% Elk habitat effectiveness be maintained. Areas with 75% EHE standards still allowed some motorized routes while, 100% EHE objectives heavily restricted or prevented motorized routes. In the proposed plan, some areas with a 100% EHE requirement will be within a motorized setting in the proposed plan. Specifically, these include	New roads would be very limited in Roadless Rule Areas but still possible depending upon theme and exceptions in the Idaho Roadless Rule Regulations. Some new motorized trails are expected to be constructed resulting in some loss of secure habitat. However, they are expected to be limited by MA2-GDL-WL-05 which will help to conserve large secure habitats. Some areas were identified as unsuitable for motorized uses to provide for grizzly bear connectivity and motorized trails would not be allowed.

Land Allocation in the Preferred Alternative	Whether the protections for secure habitat in the Preferred Alternative are more protective, less protective, or equally protective	Reason	Projected future outcome of the Preferred Alternative
		west meadow creek, the Rackliff-Gedney, Moose Mountain, and Bighorn-Weitas Roadless Rule Areas, and as a result will have less protections because of the change. However, guideline MA2-GLD-WL-05 would apply, offering some protections.	
Management Area 2-Research Natural Areas	More protected	Research Natural Areas are not suitable for motorized travel. The plan proposes several new Research Natural Areas.	No new motorized routes are expected within Research Natural Areas.
Management Area 2-Eligible and Suitable Wild and Scenic Rivers	Variable but similarly protective	The plan proposes fewer suitable or eligible wild and scenic rivers. Most formerly eligible rivers that will not be suitable in the Preferred Alternative were wilderness areas or Idaho Roadless Rule Areas which affords them some protections. Plan components that guide suitable and eligible wild and scenic rivers are similarly protective. Many of these river corridors overlap with Idaho Roadless Rule Areas, recommended wilderness or designated wilderness Areas also.	A few new motorized trails or roads could be constructed in scenic or recreational rivers, but not in wild classifications. If the rivers overlap with other land allocations such as Idaho roadless Rule or Wilderness, they would be required to follow suitability components and applicable guidelines for those areas as well.
Management Area 1-Designated Wilderness	Similarly protective	Roads and Motorized Trails are not suitable in Designated wilderness.	No motorized routes are expected to be constructed in designated wilderness.
Management Area 1-Designated Wild and Scenic Rivers	Similarly Protective	While direction specific to Designated Wild and Scenic Rivers is similar in the Preferred Alternative compared to the existing condition, most of the river corridors were winter range that did not have elk habitat effectiveness objectives. Part of the Selway and Salmon River are designated wilderness.	Steep terrain and the protections of the Wild and Scenic River Act and designated wilderness are expected to limit new motorized roads and trails.

Land Allocation in the Preferred Alternative	Whether the protections for secure habitat in the Preferred Alternative are more protective, less protective, or equally protective	Reason	Projected future outcome of the Preferred Alternative
Management Area 1-The National Historic Landmark.	Similarly protective	This management area occurs concurrent with Idaho Roadless Rule areas and so it had 50% and 100% EHE objectives. Idaho Roadless Rule regulation apply, and so would MA2-GDL-WL-05.	Management is similar in the national historic landmark in the Preferred Alternative compared to the existing plans.

The plan must be viewed holistically to understand how the parts of the plan work together to address motorized access. The plan layers land use allocations, management area direction, suitability of uses, desired conditions, standards, and guidelines, which all contribute to manage motorized access to conserve secure habitats. This section provides an overview of how all the parts work together to address motorized access in relation to grizzly bears.

Motorized access is both a habitat related threat and a source of human caused mortality (U.S. Department of the Interior 2021c). The current scope of this threat is the area within 0.31 miles from any road or motorized trail open to the public or closed to the public but open to administrative uses by the Forest Service, which is approximately 37 percent of the total plan area currently. Large areas in the plan are precluded or have substantial restrictions on motorized uses in law, regulation, or policy. Consistent with these, suitability plan components also address motorized access through suitability of uses. Everywhere in the plan area is identified as either suitable, conditionally suitable, or unsuitable for a variety of activities related to motorized access. These include permanent road construction, temporary road construction, motorized over-snow travel, or motorized travel or motorized recreation. Designated areas that prohibit or regulate motorized uses include Designated Wilderness, Idaho Roadless Rule Areas, the National Historic Landmark, and Designated Wild and Scenic River corridors particularly in the wild classification.

The Bitterroot Recovery Zone is highly protected against motorized access because it occurs in designated wilderness and the Wilderness Act prohibits this activity, with only narrow exceptions that are rarely used. Recall only part of the Bitterroot Recovery Zone occurs within the Nez Perce-Clearwater National Forest as it extends across multiple national forests. Additionally, the vast majority of the Bitterroot Recovery Zone outside of the Nez Perce-Clearwater National Forest is also designated wilderness areas and would be similarly protected from motorized access. Furthermore, the wilderness areas within the plan are identified as unsuitable for all of the motorized use categories. In addition, the plan area also has the Gospel-Hump Wilderness Area, which also restricts motorized uses. There are no plans now or in the foreseeable future to have any new motorized roads, nor motorized trails within the Bitterroot Recovery Zone. There is no anticipated future need to have motorized access within the Bitterroot Recovery Zone. The Wilderness Act ensures that this threat will not affect the vast majority of the Bitterroot Recovery Zone. Suitability components ensure that there will be none of these activities under the plan in designated wilderness areas.

Outside of Wilderness, the Idaho Roadless Rule areas address this threat in part because it generally prohibits new road construction except in narrow and limited circumstances. These areas make up

1,481,565 acres of which 1,111,642 acres are secure habitat. Management Area 2 is made up of Idaho Roadless Rule Areas, Eligible and Suitable Wild and Scenic Rivers, Recommended Wilderness, and Research Natural Areas. Each of these constrain roads and motorized access to various extents. They combine to protect for 1,467,078 acres of which 1,124,882 or 76.6 percent is secure habitat currently. The Roadless Rule Area boundaries are often delineated by roads which existed prior to their establishment. So naturally there would be some lack of secure habitats from preexisting roads.

Allen (2011) described secure habitat conditions in the Selkirk and Cabinet Yaak ecosystems based on data from Wakkinen and Kasworm (1997). For context, the entire Selkirk Ecosystem is 1,307,525 acres of which only 688,642 acres occurs within the United States and of which only 298,176 acres of habitat was secure core. The Cabinet Yak Ecosystem is 1,693,248 acres of which 628,543 was secure core. The two ecosystems combined to support secure habitat of approximately 926,719 acres in 1997 (Allen 2011). By comparison, the Idaho Roadless Rule areas within the Nez Perce-Clearwater alone are 1,481,636 acres, not including the wilderness areas, and are larger than the entire Selkirk Ecosystem. The amount of secure habitat within Management Area 2, which is a total of 1,124,882 acres, is larger than the total amount of secure habitats in these two ecosystems combined (926,719 acres). The combined effects of Management Area 1 and 2 direction is that 2,698,716 acres that are either fully protected or partially protected by either the highly restrictive plan direction for Management Area 1 lands or the constraining direction of Management Area 2. These lands have 2,268,274 acres of secure habitat currently. These are in a landscape where roads are either not suitable in the plan, not allowed by law or allowed with only limited exceptions. Some Idaho Roadless Rule Areas are suitable for motorized uses and some are not. There are a total of 1,681,779 acres of secure habitat completely protected as either designated wilderness or Idaho Roadless Rule areas where motorized uses are not suitable. Of the Idaho Roadless Rule Areas, approximately 565,519 acres of secure habitat in Idaho Roadless Rule Areas that are suitable for motorized uses under the Recreation Opportunity Spectrum settings. These areas are protected against new road development by the Idaho Roadless Rule, and new motorized trails are constrained in these areas by MA2-GDL-WL-05. MA2-GDL-WL-05 both allows some limited impacts to 24 percent of the secure habitats in the plan area, while also placing a limit on the amount of secure habitat that motorized trails could impact. A total of 542,720 acres of secure habitats in Idaho Roadless Rule Areas are not suitable for motorized uses within Idaho Roadless Rule Areas. These areas may contribute to grizzly bear connectivity by constraining construction of new roads and other actions related to motorized uses that may affect grizzly bear secure habitats. Table 281 and Table 282 below detail how plan components address or constrain motorized routes.

Table 281 The content of suitability plan components in tables within the revised Forest Plan under the Preferred Alternative

Suitability Plan Component Tables in the Revised Plan	How Motorized access is addressed by the Suitability Plan Components
Table 18—Suitability plan component in Sustainable Recreation	Identifies the activities suitable or not suitable within the Recreation Opportunity Spectrum settings. Permanent road construction, temporary road construction, and motorized travel are unsuitable in Primitive and Semi-primitive Non-motorized settings. Some Recreation Opportunity Spectrum settings were identified as not suitable for motorized uses specifically for grizzly bears.
Table 17—Suitability in Developed Recreation Sites Table 20—Suitability in Administrative Sites Table 26—Suitability in designated wilderness Table 28—Suitability in designated Wild and Scenic River corridors Table 30—Suitability in recommended wilderness	The suitability of uses across all land management allocations in the Forest Plan are contained within land allocation specific tables: Table 17, 20, 26, 28, 30, 32, 33, 35 and 37. Construction of Permanent Roads: Indicates that permanent road construction is

Suitability Plan Component Tables in the Revised Plan	How Motorized access is addressed by the Suitability Plan Components
Table 32—Suitability in eligible and suitable Wild and Scenic River corridors Table 33—Suitability in Idaho Roadless Rule Areas. Table 35—Suitability in Research Natural Areas Table 37—Suitability in the Lolo Trail National Historic Landmark	unsuitable without conditions in Designated Wilderness; Recommended wilderness; Designated Wild and Scenic River -Wild classification; Eligible and Suitable Wild and Scenic River-Wild Classification; Idaho Roadless Rule Areas- Wildland Recreation, Primitive and Special Area Themes; Mass movement areas; and Research Natural Areas. They are conditionally unsuitable in Idaho Roadless Rule Areas with a backcountry restoration theme and in Riparian Management Zones except perpendicular stream crossings. Permanent road construction is conditionally suitable in Designated Wild and Scenic River corridors and in eligible and suitable Wild and Scenic River within Scenic and Recreational classifications as long as it is consistent with the river plan and provided ORV's are protected. They are conditionally suitable within Idaho Roadless Rule Areas within Backcountry Restoration Community Protection Zones in accordance with the Idaho Roadless Rule and in the Lolo Trail National Historic Landmark if the purpose is to benefit the National Register integrity. Construction of Temporary Roads: Not suitable in Lolo Trail National Historic Landmark Corridor, Designated Wilderness, Designated Wild and Scenic River's Wild classification, Suitable Wild and Scenic Rivers Wild Classifications, Recommended Wilderness, Idaho Roadless Rule Wildland Recreation Theme and Primitive and Special areas of Historic or Tribal Significance, Mass Movement Areas, and Research Natural Areas. They are conditionally unsuitable in Idaho Roadless Rule Backcountry/Restoration Themes as permitted by the Idaho Roadless Rule, and Riparian Management Zones prohibited except when they cross perpendicularly to the waterway. Temporary Roads are suitable with conditions in Idaho Roadless Rule Backcountry Restoration Community Protection Zones, Designated Wild and Scenic Rivers within Scenic and Recreation classifications consistent with wild and scenic river management plans, and suitable wild and scenic rivers within scenic and recreation classifications when Outstandingly Remarkable Values are protected. Motorized Recreation: Not suitable in Wilderness nor Recommended Wilderness, Primitive and Semi-primitive non-motorized Recreation Opportunity Spectrum settings, and within designated and proposed Research Natural Areas. Motorized recreation is conditionally suitable within Designated Wild and Scenic River wild classification depending on the Wild and Scenic River Plan and is limited to only motorized uses and unobtrusive trail bridges if ORVs are protected.
Table 26 In the Revised Forest Plan—Suitability plan components in the Forest Plan for Management Actions Suitable within Designated Wilderness.	Indicates that roads, temporary roads, motorized travel, mechanized travel, and motorized over-snow travel is not suitable in designated wilderness areas.

Suitability Plan Component Tables in the Revised Plan	How Motorized access is addressed by the Suitability Plan Components
Table 28 in the Revised Forest Plan—Suitability plan component for management actions in designated wild and scenic rivers.	Indicates permanent and temporary road construction is not suitable within wild classification, but in other classifications they are suitable so long as outstandingly remarkable values are protected. Reconstruction of roads is not suitable within wild classification, but suitable if outstandingly remarkable values are protected. Motorized travel is not suitable in wild classification but is suitable in other classifications as long as outstandingly remarkable values are protected.
Table 30 in the Revised Forest Plan—Suitability plan component in the Revised Forest Plan for Management Actions Suitable within Recommended Wilderness Areas.	Indicates permanent road construction is not suitable, Temporary road construction is conditionally suitable consistent with the Idaho Roadless Rule. Over-snow vehicle use is not suitable, recreational aircraft landings are unsuitable but landings for administrative uses are suitable, and motorized travel is unsuitable,
Table 32—Suitability plan components in the Revised Forest Plan that apply to Eligible and Suitable Wild and Scenic River corridors.	Indicates permanent and temporary road construction is not suitable within wild classification, but in other classifications they are suitable so long as outstandingly remarkable values are protected. Reconstruction of roads is not suitable within wild classification, but suitable if outstandingly remarkable values are protected. Motorized travel is not suitable in wild classification but is suitable in other classifications as long as outstandingly remarkable values are protected.
Table 33 in the Revised Forest Plan—Suitability of Uses within Idaho Roadless Rule Areas.	Indicates that permanent and temporary road construction is not suitable in Wildland Recreation Theme, Primitive and Special Areas of Historic or Tribal Significance theme, and Backcountry Restoration theme areas. Permanent road construction is conditionally suitable in Backcountry Restoration Community Protection Zone areas. Road construction and reconstruction may be allowed only to the extent permitted in the Idaho Roadless Rule (36 CFR 294.23). Motorized travel is suitable as mapped on desired recreation opportunity spectrum maps in the appendix, if mapped as rural, roaded natural, or semi-primitive motorized, motorized use is suitable; if mapped as semi-primitive non-motorized or primitive, motorized use is not suitable. Over-snow vehicle use is a suitable use.
Table 35 in the Forest Plan—Suitability of uses within designated and proposed Research Natural Areas	Motorized travel, permanent road construction and temporary road construction is not suitable within Research Natural Areas. Over-snow vehicle use is suitable in Research Natural Areas.
Table 37 in the Revised Forest Plan—Suitability plan components on lands within the National Historic Landmark	Permanent and temporary road construction is suitable only if the integrity of the National Historic Landmark is maintained, Guideline GA-GDL-NHL-05 further clarifies "New temporary or permanent road and trail construction should not be permitted within the Landmark unless the integrity of the National Historic Landmark is maintained and the purpose of the action is to benefit the National Register integrity of the Landmark."
Table 24 in the Revised Forest Plan—Timber Production Suitability Classification	Identifies which lands or management areas are suitable or not suitable for timber production, timber

Suitability Plan Component Tables in the Revised Plan	How Motorized access is addressed by the Suitability Plan Components
	harvest, and harvest suitable for other resource objectives.

Motorized access is further addressed by plan desired conditions, guidelines, and standards. Plan direction that addresses motorized access includes those within the Aquatic Ecosystem Plan components, multiple uses wildlife plan components, and recreation plan components. The following plan components further address motorized access as described in Table 282.

Table 282. How the plan component contributes to the threat of motorized access

Plan Component Name	Type of Plan component	How the plan component contributes to the threat of motorized access
FW-OBJ-WTR-02	Objective	Seeks to enhance or restore 50-100 miles of stream habitat every 5 years. Specifically mentions streamside road decommissioning as an included activity.
FW-OBJ-WTR-05	Objective	Improve soil and watershed conditions every 5 years in priority watersheds and Conservation Watershed Network watersheds. Specifically mentions non-system road decommissioning.
FW-OBJ-RMZ-01	Objective	Objective to improve 300-700 acres of riparian habitats every five years. Specifically mentions road obliteration and removal of road prisms as part of this restoration.
FW-GDL-RMZ-02	Guideline	Guideline that restricts new road and trail construction, including temporary roads, within riparian management zones except under three conditions: a) necessary for stream crossings, or b) a road or trail relocation contributes to attainment of aquatic and riparian desired conditions, or c) Forest Service authorities are limited by law or regulation (for example, General Mining Act of 1872). Also specifies that temporary roads should be managed to protect aquatic and riparian desired conditions.
FW-STD-ARINF-07	Standard	In the Conservation Watershed Network and HUC12 subwatersheds with Endangered Species Act critical habitat or listed aquatic species, when constructing or reconstructing roads, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network unless no further decreases are needed to meet desired conditions for Water and Aquatic Resources or Conservation Watershed Network. Treatment priority shall be given to roads or road segments that pose the greatest relative ecological risk to riparian and aquatic ecosystems. The net decrease is measured by project area.
FW-DC-ARINF-01	Desired Condition	States: “The transportation system has minimal impacts on aquatic and riparian conditions through reduced hydrologic connectivity of roads to streams, lower sediment delivery to streams, reduced road impact to floodplains, and improved aquatic organism passage, where transportation infrastructure affects these features.” This plan component would direct management to reduce impacts from the transportation system to areas aquatic and riparian conditions. In some cases, it would prevent construction of roads in riparian areas. It may encourage moving existing roads outside of riparian areas.
FW-STD-ARINF-01	Standard	States “Road maintenance and new road construction shall be designed to minimize adverse effects to threatened, endangered, proposed, or candidate aquatic species and their habitat.” This standard would have a chilling effect on roads from being constructed within riparian areas. It would address the manner in which these activities occurred to prevent impacts.
FW-GDL-ARINF-04	Guideline	States: “To reduce road-related mass wasting and sediment delivery to watercourses, new and relocated roads, including skid trails and temporary roads, and other linear features should not be constructed on lands with high mass wasting potential.” This guideline will restrict roads in some areas of the Nez Perce-Clearwater even when suitable for motorized uses. Lands with mass wasting potential would remain free of roads.

Plan Component Name	Type of Plan component	How the plan component contributes to the threat of motorized access
FW-GDL-ARINF-08	Guideline	This plan component states: “To avoid adverse effects to water resources, wetlands and seasonally wet meadows should be avoided when constructing new roads and landings, including temporary roads. For all roads, and where reconstruction of existing roads cannot avoid water courses and wetlands drainage features should maintain wetland functions and characteristics.” This guideline would constrain road construction in aquatic, wetlands, and wet meadow habitats.
FW- GDL-AREM -02	Guideline	Specifies that mineral operations should reuse existing access routes and processing sites from previous entries as long as they are not causing unacceptable impacts to aquatic and riparian dependent resources. Also specifies that when no longer required for mineral activities, roads should be decommissioned.
FW-GL-WL-02	Goal	States: “The Nez Perce-Clearwater cooperates with highway managers, state agencies, tribes, and landowners to implement wildlife and aquatic organism crossings that reduce encounters and contribute to public safety.” This goal would encourage management to address road crossings for wildlife which would also help reduce potential vehicle strikes and enhance connectivity.
FW-DC-WL-06	Desired Condition	States “The grizzly bear Bitterroot Recovery Zone provides the ecological conditions to support recolonization of grizzly bears. Land Management Plan land use allocations provide connectivity to allow secure passage from occupied habitat to the Bitterroot Recovery Zone” This desired condition would direct management to maintain or restore ecological condition to maintain connectivity which might include considerations when constructing or authorizing motorized roads or trails. Although a project does not have to achieve all desired conditions, all projects must be consistent with plan components and cannot preclude achievement of a desired condition.
FW-GDL-WLMU-01	Guideline	States: “When closing routes to motorized use, to ensure benefits to wildlife habitat are realized, include measures to sufficiently exclude motorized use on closed routes.” Guideline intended to ensure that road closures effectively close and prevent unauthorized use by the public. This plan component would minimize the amount of use closed roads or trails would receive. It only requires the deciding official to consider taking actions but does not require actions. All use of these features would not be legal.
FW-DC-WLMU-07	Desired Condition	States: “Elk habitat is distributed throughout the planning area to support elk populations. Motorized access does not preclude use of high-quality nutritional resources or winter ranges.” A desired condition that would guide management to locate motorized access away from high or moderate quality nutrition for elk, and away from winter ranges. This would also indirectly benefit grizzly bears nutritionally by preventing impacts from roads to these important areas. Grizzly bears will find nutritional resources and more elk away from motorized access because of this desired condition.
MA2-DC-WLMU-02	Desired Condition	Desired condition specific to Management Area 2 that states: “Areas at least 5,000 acres in size exist without motorized access open to the public to maintain habitat use by elk.” This desired condition would direct management to maintain large areas without motorized uses. While the plan component focuses on elk, it would also have benefits to grizzly bears because it would maintain non-motorized areas within Management Area 2.

Plan Component Name	Type of Plan component	How the plan component contributes to the threat of motorized access
MA2-GDL-WL-05	Guideline	Plan guideline that states "MA2-GDL-WL-05. To maintain large areas of unfragmented habitat for wide-ranging species, such as elk and grizzly bear, new motorized trails open to the public should not be authorized in Idaho Roadless Areas unless there are adjacent areas of 5000 acres without open motorized system routes. This guideline does not apply to: Community Protection Zones (CPZs) as defined by the Idaho Roadless Rule. Areas with existing motorized access that are currently less than 5,000 acres. Existing trails that are relocated or reconstructed to mitigate negative impacts to ecological resources. This plan guideline acts as a constraint on motorized trails within Idaho Roadless Rule Areas which make up the majority of Management Area 2. It does not constrain motorized routes in other areas of Management Area 2 that are not Idaho Roadless Rule Areas. It would allow some new motorized trails in Idaho Roadless Rule Areas suitable for motorized uses, but these trails would be limited to areas larger than about 10,000 acres and would maintain secure habitats areas in blocks no smaller than 5000 acres or larger without motorized access in Management Area 2. It would not apply to secure habitats smaller than 5000 acres so motorized trails could be constructed without restraint there. It also would not apply to lands outside of Idaho Roadless Rule Areas.
MA3-GDL-WLMU-01	Guideline	States: "Treatments designed to improve elk habitat should focus on one or more of the habitat covariates likely to improve predicted cow elk body fat condition. This plan guideline integrates factors that affect predicted cow elk body fat as a restriction, which could include open motorized routes and nutrition. The four factors that affect predicted elk body fat include the abundance of high quality nutritional resources within a given area such as a watershed, whether those nutritional resources are usable by elk based on whether they occur more than one-half mile from a road, the slope that those resources are located on, and the distribution of those nutritional resources in relation to forage cover edges. The specific factors and how they will be applied are outlined in Management Approaches for elk. This plan component would only apply to projects that aim to improve elk habitats in Management Area 3.
FW-DC-REC-12	Desired condition	Desired condition that states: "Trails (e.g., trails converted from roads, user created trails) not needed to serve management or public needs and purposes are absent." This would direct management to eliminate any unneeded trails including on old roads and user created trails.
FW-STD-REC-01	Standard	Standard that enforces Recreation Opportunity Spectrum Settings as follows: "Construction and reconstruction of recreation facilities and trails shall be compatible with the appropriate recreation opportunity spectrum class and other applicable resource management plans, such as wilderness, recreation corridor, river management, scenic byway, or trail plans." This plan standard would help ensure that trails, including motorized trails, would be managed compatible with Recreation Opportunity settings.

In summary, the plan has significant measures to prevent or address the threat of motorized access within the plan area. They are hierarchal and start with law, regulation, and policy; are reinforced by suitability plan components and summer Recreation Opportunity Spectrum settings; and then are addressed further by desired conditions, standards, and guidelines. There are rigorous measures to restrict the construction of permanent roads, temporary roads, and motorized travel in a substantial portion of the Nez Perce-Clearwater. Measures for roads in riparian areas as noted in the table above (for example, FW-DC-ARINF-01, FW-GDL-RMZ-02) represent a substantial addition because they occur across all management areas and make up approximately 548,284 acres or about 14 percent of the plan area. This includes 233,201 acres of riparian habitats in land allocations otherwise suitable for motorized uses. About 332,862 acres of riparian habitat are secure habitat.

While these measures address motorized access in many areas of the Nez Perce-Clearwater, motorized access is generally not restricted within Management Area 3, and some motorized trails might be constructed in areas suitable for motorized uses in Management Area 2 provided they comply with applicable plan direction. These are activities that could have consequences to grizzly bears because they would result in loss of secure habitat, potential human-bear conflicts, and could result in grizzly bear death. These were analyzed in detail in the Effects of Motorized Suitability and Summer Recreation Opportunity Spectrum section above.

Winter Recreation Opportunity Spectrum Settings and Winter Motorized Suitability

Winter recreation is thought to be less impactful to grizzly bears. There are no known studies that have documented or evaluated the impact of winter recreation on denning or hibernating grizzly bears directly. Instead, researchers and managers have speculated that motorized winter recreation could disturb hibernating grizzly bears and modeled the potential overlap of potential denning areas and snowmobile use as a way to estimate and minimize potential impacts, for example as in Podruzny et al. (2002).

Winter motorized recreation includes snowmobile use, 4-wheelers with winter tracks, snow bikes, and any other motorized vehicles designed for use over-snow. The primary concern for effects would be if recreational activities cause disturbance or abandonment of dens and especially, females with cubs. The other concern would be if recreationalists encounter a female grizzly bear emerging from her den with cubs while recreating leading to conflict. If winter motorized uses are authorized, they could have increased probability that grizzly bears are disturbed in their dens and increase the probability that emerging females could encounter winter recreationalist. However, this type of disturbance is a non-issue without current occupancy and will likely be an uncommon event once occupied based on the infrequent or rarely documented den disturbance in other recovery zones.

Linnell (2000) documented both den abandonment and tolerance of disturbance in brown bears (grizzly bears), and that bears appear to be undisturbed by most activities that occur at distances greater than 1 km. Activity closer than 1 km and especially within 200 m has variable results, with some bears tolerating activity right up to the den.

The revised forest plan would not open areas to winter motorized vehicles; instead, it identifies areas suitable for winter motorized recreation, which could be opened after site specific analysis. Authorization of winter motorized uses would be determined in a future travel management decision under the guidance of the Nez Perce-Clearwater. These types of decisions identify areas open for motorized winter recreation. They may include decisions on specific winter motorized routes, parking lots, and whether routes are groomed as well. Most likely, areas suitable for motorized winter recreation would be opened for motorized winter recreation in the future.

Areas suitable for winter motorized uses are established in the Land Management Plan through Winter Recreation Opportunity Spectrum Settings and Suitability plan components. These decisions dictate not only whether the activity is suitable, but also guides the management of the land to provide a specific recreational experience that is influenced by the level of development. Motorized winter recreation would be suitable in Semi-Primitive motorized, Roaded Natural and Rural settings, while it would be unsuitable in primitive and semi-primitive non-motorized settings The acres of secure habitat within the different winter recreation opportunity spectrum settings by alternative are shown in Table 283.

Table 283. Acres of secure habitat in winter ROS setting by alternative

Secure Habitat in Winter ROS settings	AltP	AltW	AltX	AltY	AltZ
P	1,124,066	1,124,066	1,124,066	1,124,066	1,124,066
R	333	124	124	124	124
RN	31,472	31,983	41,199	39,005	41,199
SPM	923,681	585,308	1,258,382	984,412	1,258,373
SPNM	383,528	721,599	39,309	315,473	39,317

Motorized winter recreation is not suitable within recommended wilderness and designated wilderness in any alternative and would not be allowed under the plan. Therefore, the majority of the Bitterroot Recovery Zone is not suitable for motorized winter recreation and would not be allowed under the plan. Recommended wilderness areas would provide additional areas without winter motorized uses to contribute to connectivity into the Recovery Zone because recommended wilderness areas are outside the recovery zone. Recommended wilderness would provide areas without this activity for dispersing bears and would maintain ecological conditions for a grizzly bear population.

The number of people participating in winter recreation in the plan area is likely to increase in the future as the population in surrounding communities grows, and as more people obtain motorized winter recreation equipment. Most winter motorized recreation is from snowmobiles, but snow bikes and off-highway vehicles (OHVs) equipped with snow tracks are also used. The advent of motorized snow bikes has improved motorized winter recreation technology that could potentially increase the area of use. Snow bikes are narrow, light, and much easier to turn, which lets users go where snowmobiles simply cannot, cutting through dense trees. While more of the Nez Perce-Clearwater will be suitable for winter use under the Preferred Alternative, any new winter motorized recreation will only be authorized after a site specific National Environmental Policy Act analysis and Endangered Species Act consultation. Even where winter uses are authorized, winter recreation would not be distributed evenly on the landscape. There tends to be more use where there are roads for access and groomed trails. Also use would be higher where there is rolling or flatter terrain.

The plan contains FW-STD-WL-01 which requires that the Northern Rockies Lynx Management Direction (NRLMD) would be followed. The NRLMD includes Forest Plan Guideline HU G11 which directs that over-the-snow routes or designated play areas should not expand outside baseline areas of consistent snow compaction. The NRLMD is required to be followed in areas considered to be occupied by lynx which currently includes the Clearwater National Forest. This direction would help prevent new winter motorized uses in lynx habitat within many of the larger secure habitats of the Clearwater National Forest. The Record of Decision for the NRLMD states that "When National Forests are designing management actions in unoccupied mapped lynx habitat they should consider the lynx direction, especially the direction regarding linkage habitat." Because the Nez Perce National Forest is currently considered unoccupied by lynx, the national forest would need to consider the direction in the NRLMD.

This direction would help address impacts from winter motorized recreation to grizzly bear denning habitat.

The Clearwater Travel Plan (U.S. Department of Agriculture 2011e, U.S. Department of Agriculture 2017f) considered and abided by Guideline HU G11, which states over-snow routes should not expand outside baseline areas of consistent snow compaction. The Clearwater National Forest Travel Plan identified 115 miles of baseline motorized snow routes and authorized no expansions in over-snow routes. The Nez Perce National Forest has not yet undergone winter travel planning and is currently open to all winter motorized activities except in areas closed to winter motorized uses.

Some evidence suggests that there may be spatial separation between where winter recreationists choose to recreate and where denning grizzly bears tend to select for dens. Grizzly bears tend to den in areas at high elevations, on steeper slopes, under tree canopy, and relatively far from developed areas or human activity (Linnell et al. 2000, Craighead and Craighead 1972). They avoided valley bottoms, exposed ridge tops and high peaks (Linnell et al. 2000). Linnell (2000) reported that grizzly bear winter dens tend to be located on steep terrain of between 30 and 50 degrees, at higher elevations and under tree canopy. Olson et al. (2017) studied factors selected by GPS-equipped winter recreational users. Snowmobilers riding off trail selected areas for ease of access, reflected in proximity to highways and densities of open forest roads, with lower canopy cover, and smoother, less steep terrain (Olson et al. 2017). On-trail snowmobilers selected for greater forest road density, moderate annual precipitation, and lower terrain variability, and moderate levels of snow, shallow slopes, and higher elevation (Olson et al. 2017). Slopes used averaged between 14.7 and 16.28 degrees for motorized winter users, and canopy cover was between 33.88 to 37.88 percent (Olson et al. 2017). Therefore, winter recreators are less likely to use the same areas as grizzly bear dens because of the avoidance by snowmobilers of steep slopes and tree cover. While overlap of motorized winter recreation and potential grizzly bear den sites undoubtably occurs, the tendencies of both grizzly bears and winter recreational users might provide some partitioning of areas used that reduces overlap.

Snowmobile selection potential was modeled by Lucretia Olson within the Nez Perce-Clearwater National Forest and is shown in Figure 89. This figure estimates where snowmobilers are likely to prefer based on terrain, slope, vegetation, and other factors. It does not reflect where winter recreation is open for use nor where it is actually occurring. The model was created based on parameters obtained from user data from Colorado and applied to Idaho landscapes and standardized to Idaho conditions. Once developed, it was validated by data from user groups from Idaho and Montana. Additional validation was verified by recreation specialists who work on the Nez Perce-Clearwater National Forest and are familiar with known use patterns.

Olson et al. (2017) modeled terrain selection of motorized and non-motorized winter recreationists, including snowmobile, backcountry ski, and snowmobile-assisted hybrid ski. They used GPS systems carried by winter recreationists to determine use selection of remotely sensed environmental characteristics, including topography, vegetation, climate, and road access. Model results indicated that motorized and non-motorized activities select different environmental characteristics. Both motorized and non-motorized winter recreationists selected for ease of access, reflected in proximity to highways, and densities of open forest roads. Areas predicted to have only motorized recreation were more likely to occur further from highways, with greater forest road densities, lower canopy cover, and smoother, less steep terrain, while areas with only non-motorized recreation were closer to highways, with lower forest road densities, more canopy cover and steeper terrain. Snowmobiles using trails selected areas that had greater forest road density, moderate annual precipitation, and lower terrain variability. Off-trail snowmobiles users selected moderate levels of snow, shallow slopes, and higher elevation.

A stronger response to vegetation covariates at a small scale suggests that recreationists select areas in which to recreate at a hierarchical scale, with road access and large topographic features dictating an initial area selection, and finer scale features such as forest density determining where to move within this area. The greater influence of vegetation at a small spatial scale may be related to the differences in movement speed and maneuverability of the different recreation types, since non-motorized recreationists may be better able to safely move through dense trees, while motorized recreationists may select open areas for play and fast travel.

Grizzly bears, in contrast, are known to select steeper slopes with some canopy cover. Linnell (2000) reported that mean slopes of brown bear (grizzly bears) dens were between 30–50-degree slopes (57.73 to 119 percent slope). Mace and Waller (1997) reported that grizzly bear dens averaged 63 percent slope and that grizzly bears denned in open timbered, timbered, and open habitats. According to Olson (2017) the average slope for motorized winter recreational use was about 9 degrees, which is much less steep than grizzly bear den preferences reported by Linnell (2000), and Mace and Waller (1997). While the average is 9-degree slopes, some winter motorized recreationalists seek out steeper areas for hill climbing and high marking, so some overlap occurs.

Generally, bears select dens 1 to 2 km from human activity (roads, habitation, industrial activity) and seemed to tolerate most activities that occurred more than 1 km from the den (Linnell et al. 2000). Olson (2017) in contrast reported that winter motorized users tended to select areas with higher road densities and more access.

Average percent canopy cover reported by Olson (2017) for motorized winter recreational users was about 28 percent. Mace and Waller (1997) classified open canopy cover as less than 40 percent canopy cover, open timbered between 41 and 60 percent canopy cover, and timbered when greater than 60 percent. They found that 40 percent of grizzly bears denned in open, 43 percent denned in open-timbered habitat, and 17 percent denned in timbered habitat. This means that those in open timbered habitats have higher canopy cover than the average amount of canopy cover used by motorized recreationalists, but some grizzly bears use areas with canopy characteristics similar to those preferred by winter motorized users. Based on the preferences, there appears to be some separation in use of space between motorized winter recreationalists and where grizzly bears prefer to den. The differences mostly appear to be in their preferences for slopes wherein there is little overlap in where winter motorized users select and where grizzly bears select. Vegetation characteristics may also prevent some use of motorized winter recreation in areas where grizzly bears den. However, winter recreation is also widespread and overlap of uses probably will occur within potential denning areas once grizzly bears become established. Keep in mind that the Bitterroot Recovery Zone is not suitable for motorized winter recreation and thus it would not be allowed there under the Preferred Alternative. Therefore, the effects from motorized winter recreation are limited to areas outside of the recovery zone.

Concern has been raised that disturbance from winter recreation, and especially motorized over-snow recreation, could potentially adversely affect grizzly bears shortly before or after den emergence of a female with cubs. Females and their cubs remain in the den site area for several weeks after emergence from dens (Mace and Waller 1997). Females with cubs have high energetic needs, and cubs have limited mobility for several weeks after leaving the den. Disturbance levels that cause a female to prematurely leave the den in spring or move from the den area could impair the fitness of the female and safety of the cubs. If cubs attempt to follow their mother, they will likely experience decreased fitness and the family group may be pushed to less suitable habitat. Late season snowmobile use is not restricted under the plan, and extended winter motorized use seasons (after April 1) could occur.

While a conflict like this is possible, it is a low likelihood event for the following reasons. Winter recreation drops off sharply as the snow melts. Winter trail grooming on the Nez Perce-Clearwater begins on around December 1st and ends March 31st and use drops off sharply after grooming ends. Bears in contrast emerge from their dens typically in April in Idaho and Western Montana (Linnell et al. 2000). Females with cubs of the year are the last to leave den sites and some may remain in the vicinity of the den until the snow has disappeared (Linnell et al. 2000, Craighead and Craighead 1972). Snow melts unevenly in spring, leaving patches of snow in some areas while it melts in other areas. People are reluctant to navigate those conditions with motorized over-snow vehicles because they are reluctant to drive across dirt and mud trying to access the next snow patch. While snow melts later in the season at higher elevations, there are often challenges for people accessing those areas because of muddy roads, snow drifts, downed trees across roads, and other seasonal hazards that tend to keep people out of high elevation areas in spring. There are no known grizzly bear denning sites within the action area. To date, litter abandonment by grizzlies due to snowmobiling activity has not been documented in the lower 48 states (Hegg et al. 2010).

The 1987 Forest Plans did not use Winter Recreation Opportunity Spectrum settings to identify whether or where motorized uses are suitable. Instead, Winter Recreation Opportunity Spectrum settings under the existing 1987 Forest Plans were a way to guide management of the land to provide a variety of recreational experiences. Therefore, Winter Recreation Opportunity Spectrum Settings in the existing condition do not reflect suitability of winter motorized uses in the 1987 plans. Prior to the Clearwater Travel Plan, winter motorized uses were allowed across the whole forest unless closed by site specific decisions such as in those that closed designated wilderness areas or other site-specific closures. The Clearwater Travel plan closed winter motorized uses in recommended wilderness but allowed it everywhere outside of recommended wilderness. The existing condition is that motorized winter recreation is currently allowed in most of the Nez Perce-Clearwater where it is not specifically closed, and use is currently occurring in many areas, especially those proximate to the groomed winter recreation features. In contrast, the Revised Forest Plan under the Preferred Alternative does use the Winter Recreation Opportunity Spectrum settings to establish motorized suitability, so it is different than how it was used in the 1987 plans. The alternatives vary the most in which areas are semi-primitive non-motorized versus semi-primitive motorized. The winter recreation opportunity spectrum also identifies the settings under which winter recreation facilities and recreation sites are managed. Alternative W has the least percent of the area suitable for winter motorized uses, while alternatives X and Z have the most area suitable for winter motorized uses with 70 percent of the Nez Perce-Clearwater. For grizzly bear conservation, Alternative W would be best as it would represent the most area not suitable for motorized winter recreation. The Preferred Alternative identifies 60 percent as suitable while 40 percent would be unsuitable for winter motorized uses. Winter motorized recreation under the Preferred Alternative should generally be of low impacts to grizzly bear denning overall. A map of the winter recreation opportunity spectrum for the Preferred Alternative is shown in Figure 109.

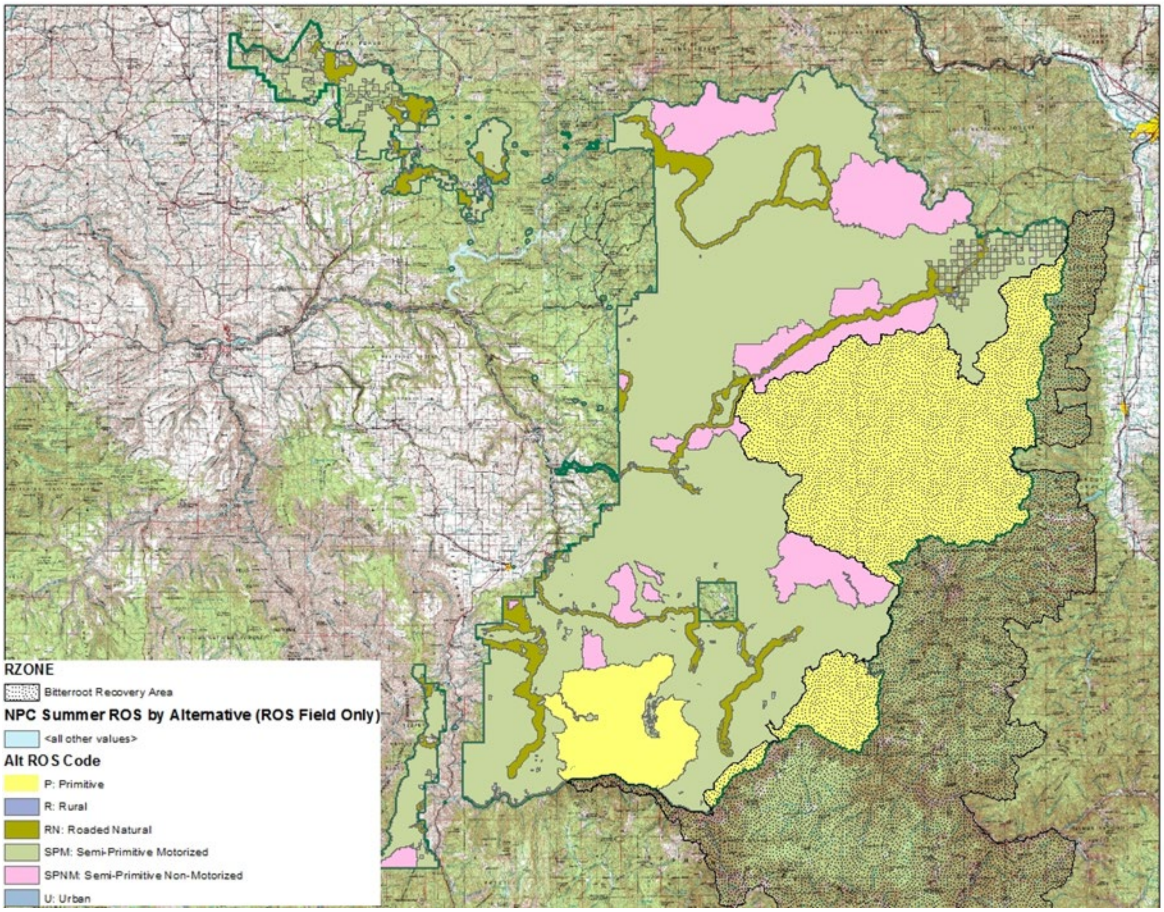


Figure 109. The winter recreation opportunity spectrum settings in relation to the Bitterroot Recovery Zone. Primitive and Semi-Primitive Non-motorized are the Non-motorized settings. Motorized settings include the Urban, Rural, Roaded Natural and Semi-Primitive motorized

Aircraft Use

The Revised Forest Plan will not make any decisions to authorize, nor close aircraft use and does not make decisions to authorize nor close backcountry airstrips. Also, it will not change ongoing aircraft use. Instead, under the Preferred Alternative the Revised Forest Plan will provide plan components to guide future authorization of aircraft and helicopter use. Decisions on the establishment, maintenance, reauthorization or closing of backcountry airstrips would require site specific environmental analysis and Endangered Species Act consultation.

Airplane and helicopters operated by the public and administratively may land at the backcountry airstrips as an ongoing activity. The public typically does not land aircraft anywhere in the Nez Perce-Clearwater outside of these airstrips unless they receive authorization through a permit. The use of backcountry airstrips could have some displacement effects and brings some people into backcountry areas within the Recovery Zone.

The land allocations under the revised Forest Plan influence where aircraft use may occur. Aircraft use within wilderness includes emergency situations or when the agency has undertaken a minimum requirements analysis, National Environmental Policy Act and Endangered Species Act consultation to authorize such use in wilderness areas. State or federal agencies sometimes request authorization to use aircraft in wilderness for research or wildlife management purposes. These also require a minimum requirements analysis and authorization.

The plan identifies aircraft use within Recommended wilderness as suitable and thus allowed for administrative uses, but recreational uses are not suitable and would not be allowed. Administrative uses related to management responsibilities, including by other federal and state agencies in coordination with the Nez Perce-Clearwater and includes research, monitoring, aircraft landing including unmanned aircraft would be suitable in recommended wilderness. Emergency aircraft use and administrative aircraft use is not expected to be recurrent and will occur as dispersed and infrequent disturbances.

Outside of wilderness and recommended wilderness, there are no restrictions on administrative or emergency use of aircraft in the plan. The Forest Service may authorize such uses in response to emergencies or for administrative purposes without environmental analysis or consultation. Aircraft use by other state and federal agencies also can occur after authorization and coordination with the Forest Service.

Aircraft uses may also be authorize for operators or the public. For example, authorizations have occurred for aerial timber harvest, commercial uses, or for any other uses requiring aircraft. Generally speaking, helicopter logging does not pose the same long-term displacement effects and increased mortality risk to grizzly bears as roads do. Helicopter logging is transitory and does not bring additional human use into grizzly bear habitat, whereas roads are generally longer term or permanent features on the landscape and facilitate human access into grizzly bear habitat. Helicopter logging may, however, result in short-term adverse impacts to grizzly bear core habitat because the ability of the area to function as grizzly bear core habitat is compromised, and grizzly bears are likely to be displaced from the area during the time the helicopter logging operations are on-going. Thus, while helicopter logging within grizzly bear secure habitat may not necessarily result in a long-term loss of secure habitat (unlike road construction within grizzly bear secure habitat), the potential temporary adverse displacement effects to grizzly bears associated with helicopter logging within grizzly bear core habitat must be considered. Under the Preferred Alternative, helicopter or aerial logging systems are anticipated to continue to be used within Management Area 3 and within Management Area 2, especially when resource concerns, such as impacts to soils, aquatic resources or wildlife are accounted for in projects. Aerial logging projects are evaluated on a case-by-case basis when analyzing projects and must undergo site specific analysis and Endangered Species Act clearances.

The revised Forest Plan has only a few plan components that guide air travel or helicopter use. Desired condition FW-DC-INF-04 says:

"Airstrips serve the Nez Perce-Clearwater land management and public recreation opportunities. The seven existing public backcountry airstrips for airplane and helicopter access to the Nez Perce-Clearwater's backcountry maintain historical site conditions to provide safe and functioning airstrips for backcountry access."

Desired condition FW-DC-REC-15 states:

"The seven existing public backcountry airstrips provide users the unique opportunities to quickly access vast and remote backcountry and wilderness areas for recreational activities."

These desired conditions would direct management to maintain recreational use of backcountry airstrips and ensure they are maintained for public safety. The backcountry airstrips are expected to continue to receive recurrent use by the public and by the Forest Service. These actions could displace grizzly bears within areas near the three backcountry airstrips within the Bitterroot Recovery Zone once occupied. It could also displace bears from around the four airstrips outside the recovery zone. These effects would be localized around the airstrips. Once bears move into the recovery zone, the airstrips could increase the probability of human bear conflicts.

Administrative or emergency aircraft uses are infrequent and may result in disturbance but not lasting or recurrent effects. Perhaps the most impactful uses are those authorized through special uses permits to the public or operators who then use them for recurrent uses. These can result in longer lasting and repeated disturbances that can displace grizzly bears from important resources. Outside of these effects, aircraft use is expected to be localized, infrequent, and of little consequences to grizzly bears.

Domestic Livestock Grazing

Grazing of domestic livestock is another factor that can affect grizzly bears, in that grizzly bears are known to occasionally depredate on domestic grazing animals such as cattle or sheep. Such conflicts between grizzly bears and domestic livestock can result in the capture, relocation, injury, or removal of grizzly bears. Grizzlies prey more readily upon sheep than cattle, but cattle may compete with grizzlies for forage in key habitats such as riparian sites. The plan only varies whether the only sheep allotment in the plan area is suitable for sheep grazing and varies to consider effects of exposure of bighorn sheep to pathogens from domestic sheep. This allotment would be evaluated for decisions after site specific analysis.

Livestock allotments only overlap a little of the Bitterroot Recovery Zone and most allotments are spatially separated from where grizzly bears would most likely disperse through the Nez Perce-Clearwater. The likelihood of grizzly bear depredation would be low until more grizzly bears enter the analysis area and the bear population grows. The Bitterroot Recovery Zone on the Nez Perce-Clearwater is largely ungrazed, save for a very small portion of one cattle allotment that overlaps about 380 acres of the Recovery Zone near the Big Mallard Creek trailhead. That allotment is currently vacated and is not currently grazed though it is not closed and could again be grazed in the future. Most future potential conflicts, if they occurred, would be outside of the Bitterroot Recovery Zone. The current distribution of allotments maintains the ecological conditions to provide for grizzly bear recovery because most areas where grizzly bears would be expected to occur are separated in space from grazing allotments. For reference and distribution of the allotments (Figure 100).

Grazing is a suitable use on most of the Nez Perce-Clearwater under the Preferred Alternative. Any authorization or reauthorization of grazing allotments would require a site-specific analysis and decision before approval. Livestock grazing is suitable in most of the national forest under the Preferred Alternative. It is conditionally suitable within designated and suitable wild and scenic rivers. Generally, grazing is subject to the wild and scenic river plan and must protect outstandingly remarkable values. Suitability within wilderness areas depends upon the enabling legislation for each wilderness. For the Selway-Bitterroot and Frank Church Wilderness Areas, enabling legislation essentially allows grazing of livestock established prior to the date established and shall be allowed to continue with reasonable regulations. The Wilderness Act and the Central Idaho Wilderness Act does not allow livestock grazing after the dates these wilderness areas were established.

FW-DC-GRZ-01 is a desire to allow range resources to be available for use. Plan direction in the livestock grazing section would potentially have minor environmental consequences for grizzly bear habitat conditions because it could alter vegetation that provides habitat. Desired conditions FW-DC-GRZ-01 outline the desire for grazing to provide for ecosystem services including on transitory forage created after disturbances. Guidelines in the grazing section would ensure that grazing resources are used sustainably because guideline FW-GDL-GRZ-03 specifies that utilization would be limited to between 35 and 55 percent utilization, which is considered moderate grazing. These plan components would help reduce or minimize impacts to vegetation. The range management section of the plan has no specific plan direction related to grizzly bears. Additionally plan components for grazing found in Livestock Grazing (Aquatics and Riparian) would help prevent habitat changes from grazing within riparian areas which should help maintain these habitats for grizzly bear use. Comparatively speaking, the plan direction in the 1987 plans for range management are similar to plan direction in the Preferred Alternative. In the event, that grizzly bears begin residing within the plan area, measures could be taken to minimize potential conflict.

Food Storage and Attractants

The revised Forest Plan does not have direction for management of attractants. The plan area also does not have a food storage order in place; however, food storage orders can be implemented with a forest order outside of the Forest Plan. Instead, it has a desired condition to educate the public about bear safety and food storage, and a desired condition to equip campgrounds with food storage infrastructure in FW-DC-WL-07 and FW-DC-WL-08. These plan components state:

> **FW-DC-WL-07.** The risk of grizzly bear-human conflict is reduced through awareness. The public, Forest Service employees, contractors, volunteers, and permittees are knowledgeable of conflict prevention strategies through education and interpretation.
>
> **FW-DC-WL-08.** Within occupied grizzly bear habitat, developed recreation sites, administrative sites, and dispersed recreation sites where garbage disposal services are provided, facilities are equipped with necessary infrastructure so that food, garbage, and other attractants can be made inaccessible to grizzly bears to reduce the potential of human-bear conflict.

The potential increase of developed and dispersed recreation sites as outlined below could create conditions where conflicts with humans are more probable. See the section below on developed and dispersed sites. In the event, that grizzly bears begin residing within the plan area, measures could be taken to implement a food storage order though a special forest order in coordination with the Bitterroot Interagency Subcommittee.

The plan's Management Strategy and Approaches outlines agency intent related to grizzly bear conservation. They includes the following:

> Interagency Grizzly Bear Committee recommendations for sanitation plans, infrastructure and reducing attractants may be implemented within and outside recovery areas to reduce grizzly bear-human conflict.

This management approach would suggest that the Nez Perce-Clearwater would implement the Interagency Grizzly Bear Committee recommendations for reducing attractants. For more information see the potential management approaches section below.

Consequences of Developed and Dispersed Recreation sites

Since adoption of the forest plans, recreation activities across the Nez Perce-Clearwater have changed and will continue to change. This analysis assumes that changes to recreational use patterns would occur naturally as a result of factors associated with recreation trends, advances in technology, aging population, aging infrastructure, local population increase and decreases, and climatic changes. Recreation trends and use patterns would continue to influence the demand for development, amount, and distribution of developed and dispersed recreation across the Nez Perce-Clearwater. Recreational use is expected to increase in the analysis area over time. Demand for developed and dispersed sites may increase as a result of changing demographics of Nez Perce-Clearwater visitors. Currently, developed campground capacity maxes out during summer weekend peak time periods. The existing 55 developed campgrounds would likely continue to be at or near capacity during the busiest weekends. Use of dispersed recreation overnight sites may increase as these developed sites reach or exceed capacity. The effects from the action alternatives are expected to be similar to those of the No Action Alternative, with a few exceptions based on recreation opportunity spectrum differences by alternative.

The Forest Plan does not authorize any new recreational developments or dispersed sites. Instead, it sets the context under which decisions on future recreation sites and upgrades to existing sites would be developed under the plan. The mechanism to set those contexts in the plan is the Recreation Opportunity Spectrum settings analyzed above. Recall that the recreation opportunity spectrum classes differ in their level of development in addition to whether motorized uses are suitable (table 275). Therefore, it also determines the amount, and types of suitable recreation sites.

Demand for dispersed sites may increase or decrease parallel to the amount of motorized access. As recreation use in general increases, there is likely to be additional demand for dispersed sites. With an increase in motorized access would come an increased number of dispersed sites. These would likely be concentrated along currently open roads and trails, as this use would be less accessible elsewhere in the non-motorized areas. Most of the recreation use on the Nez Perce-Clearwater occurs in dispersed sites rather than developed facilities. Dispersed recreation sites are typically concentrated in the Nez Perce-Clearwater's roaded natural recreation opportunity spectrum settings. There are a total of 1,241 dispersed overnight sites known on the Nez Perce-Clearwater. These features are within the road buffer area and do not reduce secure core area. Demand for dispersed sites may increase or decrease parallel to the amount of motorized access by alternative. As recreation use in general increases, there is likely to be additional demand for dispersed sites. With additional recreation opportunity spectrum motorized settings, such as in Alternatives W and X, some of this demand may be in areas in current non-motorized settings under the No Action Alternative. In Alternatives Y and Z, where less of the Nez Perce-Clearwater is suitable for motorized use, an increased number of dispersed sites would likely be concentrated along currently open roads and trails, as this use would be less accessible elsewhere in the non-motorized areas.

Increasing dispersed and developed sites could cause an increase in the probability of a bear and human conflict. These could be mitigated or reduced through measures to educate the public about bear safety as directed in plan component FW-DC-WL-07 for grizzly bears. Ongoing actions that seek to educate the public include education about the use of bear spray, bear education efforts at events in local communities, information distributed at ranger stations, and signs at recreation facilities. Education materials would probably be more available within developed sites than dispersed sites. Human-bear conflicts could also be minimized through proper storage of attractants. While the plan does not have any direction requiring storage of food or attractants, the intent is that the Nez Perce-Clearwater would initiate efforts to implement food storage orders in the future through a Forest Order as bears become established.

An increase in formerly primitive settings or semi-primitive non-motorized settings would place more people into proximity with secure habitat that potentially has a higher potential for grizzly bear presence. Roadside dispersed sites are more likely in semi-primitive motorized settings and are less likely to have bear food storage infrastructure which could increase the chance of bear-human conflict. Dispersed sites are often established by users in suitable spots, so the Forest Service has less discretion in how they are established. Until a food storage order is in place, grizzly bears in the plan area might be attracted to these sites and have increased probabilities of bear-human conflicts resulting in grizzly bear removal or death. The plan has no components that restrict construction or improvement of development of developed or dispersed sites. The plan contains a desired condition FW-DC-WL-06 to provide the ecological conditions to allow for colonization of and connectivity to the Bitterroot Recovery Zone. This would direct management to maintain areas important to grizzly bear dispersal to maintain these conditions. FW-DC-WL-06 states:

> **FW-DC-WL-06:** The grizzly bear Bitterroot Recovery Zone provides the ecological conditions to support recolonization of grizzly bears. Land Management Plan land use allocations provide connectivity to allow secure passage from occupied habitat to the Bitterroot Recovery Zone.

Roads, motorized trails, non-motorized trails, rivers, and airstrips are present on the Nez Perce-Clearwater for visitors to walk, bike, boat, ride, drive, or fly to their destination. There are about 5,300 miles of system trails on the Nez Perce-Clearwater documented in the national infrastructure database, which is the official database for the Forest Service. There are about 1,300 miles of trails located inside designated wilderness areas. These trail numbers include both motorized and non-motorized trails. The use of hiking trails is expected to increase through time as demographics change. The trails system extends throughout the Nez Perce-Clearwater to provide a variety of experiences for the public. Mountain bikes generally can travel any trail on the Nez Perce-Clearwater outside of designated wilderness and recommended wilderness areas and often use a combination of all maintenance level roads and trails to connect desirable areas to ride. In more developed settings, mountain bikers look for roads that access single-track trails in which they can ride mostly downhill. Mountain biking is restricted in designated wilderness and in most alternatives of recommended wilderness. Mountain biking is generally suitable in all other areas. Recreational use of trails in areas where grizzly bears occur would have the potential for bear human conflicts and potentially bear removal or loss as bears become established. There is no specific direction for trail management related to grizzly bears in the plan. No areas would be precluded from new trail construction or reconstruction as a result of the revised Forest Plan. Plan components provide for increasing connectivity of communities to one another and for increased efficiency of moving people along trails from one location to another.

Motorized trail use is expected to increase as the population grows. Demand for motorized vehicle access and trails is predicted to increase as technology advances. The number of motorized trails is expected to increase some under the plan. New motorized trails would impact or reduce secure habitat. The plan does not authorize, fund, or carry out any new motorized roads or trails. Instead, it sets the conditions under which these features could be authorized in the future. New motorized trail or roads would be authorized or identified during a travel planning project that would require further consultation with the U.S. Fish and Wildlife Service. The plan has few constraints on motorized road or trail building within Management Area 3.

Within Management Area 2, motorized trails would be constrained to be required to leave areas of 5,000 acres or larger without motorized access. This would limit motorized trails to leave secure habitats at least 5,000 acres or larger and would limit the total amount of these features allowed within Management Area 2. Furthermore, some areas were identified within Management Area 2 to be in either semi-primitive non-motorized or primitive recreation opportunity settings where motorized trails would not be suitable. New motorized trails would not be suitable within Recommended nor Designated Wilderness Areas and would not be allowed. Motorized suitability was analyzed in the in the Recreation Opportunity Spectrum section above. Motorized trails were included in the delineation of secure habitat. The miles of various trails, including motorized trails, are shown in table 284 and are the existing condition. Summer motorized trails were accounted for in the calculation of secure habitats. Some existing hiking, pack trails, and bike trails travel through secure habitats. Grizzly bears can be displaced from areas with human foot or bike travel and may react aggressively if surprised by hikers or biking. The Forest Service classifies electric bikes as motorized vehicles, and they must remain on motorized trails or roads and are not allowed on non-motorized trails. The Preferred Alternative does not authorize any new motorized or foot trails. New trails would require site specific National Environmental Policy Act analysis and Endangered Species Act consultation prior to authorization and must comply with the Forest Plan.

Table 284. Miles of trail by designed use managed by Nez Perce-Clearwater ranger districts[1]

District	Hiking Trail	Pack Trail[2]	Bike Trail	Winter Non-Motorized Trail[3]	Winter Motorized Trail	Motorcycle Trail	<50-inch Motorized Trail[4]	>50-inch Motorized Trail[5]	Total
Salmon River	1	454	0	6	88	62	111	0	722
Red River	5	590	0	2	316	20	83	0	1016
Moose Creek	1	739	0	0	24	19	4	0	787
Palouse	1	51	15	20	0	16	172	0	275
NorthFork	3	611	0	14	272	0	426	61	1387
Lochsa-Powell	4	766	0	8	114	4	222	2	1120
Total	**15**	**3211**	**15**	**50**	**814**	**121**	**1018**	**63**	**5307**

1 - Designed use is the use for which the trail was designed, although other uses maybe allowed; for example, a trail designed for pack use may also be used by hikers

2 - Pack type trails are designed for pack and saddle users

3 - Non-motorized winter use includes both Nordic skiing and snowshoeing trails

4 - Motorized vehicles less than 50 inches wide. The Forest Service classifies e-bikes as motor vehicles

5 - Motorized vehicles greater than 50 inches wide

The Nez Perce-Clearwater has approximately 212 recreation facilities serving a variety of different recreational opportunities (Table 285). Most of the recreation facilities on the Nez Perce-Clearwater were developed in the 1960s when highway development expanded access to more of the forest and especially too many of the waterways where facilities are concentrated.

Table 285. Number of recreation facilities by site type[1]

Type	Total Number of Facilities	Of the Total, Facilities that charge Fees	Of the Total, Sites that require a Reservation to Use
Campground (developed)	55	29	6
Camping Area (dispersed)	53	0	0
Group Campground	3	0	1
Visitor Centers	3	0	0
Picnic Day Use Site	12	0	1
Pavilion	3	0	2
Cabin/Lookout	16	11	12
Boat Launch	3	0	0
River Access/Boating Site	5	31	0
Trailheads	40	0	0
Interpretive Sites	12	0	0
Fishing Sites	3	0	0
Snow Park/ Snow Play	4	0	0

Type	Total Number of Facilities	Of the Total, Facilities that charge Fees	Of the Total, Sites that require a Reservation to Use
Total	212	43	22

1 - Fee at boating site is for floating permit on main Salmon River.
Data Source: INFRA

Recreation special use permits are issued to private businesses, individuals, institutions, and nonprofit groups to provide for occupancy and use of the national forest beyond what is normally available to the public. Permitted recreation uses provide specific recreational opportunities to the public and deliver economic benefits to rural economics. Examples of commercial enterprises requiring permits include outfitting and guiding services, resorts, recreation events, and organizational camps. Noncommercial recreation uses are those where the use or activity does not include an entry or participation fee and the purpose is not primarily the sale of a good or service. Examples of noncommercial use include family reunions, weddings, or other similar group gatherings. The Forest Service issues these permits under the authority of a variety of specific laws. About 60 recreational use permits are issued in any given year across the Nez Perce-Clearwater. Recreation use patterns and emerging technologies would continue to influence the need for recreation special use permits across the Nez Perce-Clearwater. The plan has no specific direction for issuing these permits in regard to grizzly bears. However, these permits can provide requirements in special use permits without being required in the Forest Plan. Special use permits often include conditions or measures to protect natural resources and the permittees. A number of measures for grizzly bears could be considered and include as a condition of use for both grizzly bears and human safety based on factors such as the permit duration, location, action, and grizzly bear activity in the area among other factors. Conditions or measures could include food storage requirements, timing restrictions, carcass disposal, prohibitions on firearms and other measures.

FW-DC-REC-04 would direct the management of any new or existing infrastructure to be consistent with the desired recreation opportunity spectrum setting. Timber production, timber harvest, permanent road construction, temporary road construction, construction of new buildings or structures, over-snow vehicle use, and mechanized and motorized travel would be suitable in semi-primitive motorized, roaded natural, and rural recreation opportunity spectrum classes.

FW-DC-REC-10 states: “The Forest’s trail system provides an array of trail classes for a variety of designed uses. Trail systems connect local communities through the Nez Perce-Clearwater, facilitating long-distance travel, as well as loop opportunities to accommodate short-term, day use activities.” This direction would potentially facilitate additional motorized trails and loops, mechanized access, and pedestrian trails potentially where bears may be present or traveling through. Trails, roads, and facilities would be constructed only after site-specific analysis and further consultation with the U. S. Fish and Wildlife Service. These activities would be suitable within about 55 percent of the national forest under the Preferred Alternative, including some areas that currently have high amounts of secure habitat. While these activities may be suitable, and are reasonably likely to occur, the exact location, amount and where is unknown at this time. Non-motorized or foot and horse trails would be suitable across the whole forest under the plan. Mechanized trails, such as bicycle trails, are not suitable within designated wilderness nor recommended wilderness and would not be allowed there but are otherwise a suitable use across the rest of the national forest. The suitability of motorized trails was analyzed above in the effects of motorized suitability and summer recreation opportunity spectrum section and below in the section titled how the plan addresses motorized access.

Similarly, activities found not suitable would be prohibited, such as roads and motorized trails, and recreation facilities would be managed in a more primitive condition consistent with definitions such as those of the primitive and semi-primitive non-motorized settings and would serve to protect bear habitat. Timber production, permanent road construction, temporary road construction, building permanent structures, over-snow vehicle use, and motorize travel are prohibited within primitive and semi-primitive non-motorized recreation opportunity spectrum classes, all of which would help protect grizzly bears. Semi-primitive non-motorized and primitive settings are found on about 45 percent of the Nez Perce-Clearwater under the Preferred Alternative. See the Effects of Motorized Suitability and Summer Recreation Opportunity Spectrum section above for more information on effects of Recreation Opportunity Spectrum settings.

FW-DC-REC-05, FW-DC-REC-10, and FW-DC-REC-12 would direct management to facilitate community connections, which might include motorized routes that connect the Nez Perce-Clearwater to communities and communities to each other. These may result in a reduction in secure habitat and potentially increase the probability of bear-human conflicts. The Grand Exploration Motorized Trail, or GEM Trail, could increase motorized use on some segments of existing roads or trails.

FW-DC-REC-06 could increase use by increasing outfitter and guide activities that bring people into nature. These activities, depending upon where they occur and the terms of special use permits that authorize those activities, could increase the probability of human-bear conflict as bears move in. FW-DC-REC-14 would help ensure that dispersed sites reduce the risks of social and environmental impacts possibly to grizzly bears.

Some plan components would prevent or address effects to grizzly bears. These are included in Table 286 below.

Table 286. Recreation plan components that may be beneficial or prevent effects to grizzly bears

Plan component Name	Type of Plan Component	Description of plan component	Effect of the plan component
FW-DC-REC-04	Desired Condition	Plan component states "The type and level of infrastructure, visitor services, and information are sustainable and consistent with the desired recreation opportunity spectrum settings."	This desired condition would direct management of recreation infrastructure to be consistent with the pertinent recreation opportunity spectrum setting. Broad areas of the Nez Perce-Clearwater would be managed as primitive and semi-primitive non-motorized.
FW-DC-REC-01	Desired Condition	States: "Recreation opportunities are available across a variety of settings that foster quality year-round developed and dispersed experiences, as well as motorized and non-motorized opportunities consistent with the applicable recreation opportunity spectrum (ROS). These settings reflect the integration of other resource values in a sustainable manner with the desired recreation opportunities, facilities, infrastructure, and access provided within those settings. A table of the desired summer recreation opportunity spectrum	This desired condition would direct the amount of development of recreation sites across broad areas of the Nez Perce-Clearwater. Large areas are composed of settings that would be managed for a more remote and rustic recreation experience which would benefit grizzly bears. Other settings may not be as favorable for grizzly bears.

Plan component Name	Type of Plan Component	Description of plan component	Effect of the plan component
		classes is displayed in Table 15 in the Forest Plan and desired winter recreation opportunity spectrum classes in Table 16 of the Forest Plan as well as in maps in Appendix 1.	
FW-DC-REC-13	Desired Condition	States "Dispersed recreation sites are available in desirable locations, are socially and environmentally sustainable, and are consistent with the recreation opportunity spectrum classes and travel management designations."	This desired condition would direct dispersed sites to be consistent with the definitions of the respective summer recreation opportunity spectrum classes. This would serve to maintain many areas in the Nez Perce-Clearwater as a primitive or semi-primitive setting which could help maintain some grizzly bear habitats.
FW-STD-REC-01	Standard	States: "Construction, reconstruction, and maintenance of recreation facilities and trails shall be consistent with the recreation opportunity spectrum classes and specialized plans such as wilderness, recreation corridor, river management, scenic byway, and trail management plans as appropriate."	This would require any new or existing facilities to be consistent and appropriate for the respective area and consistent with the definitions of recreation opportunity spectrum classes.
FW-DC-WL-07	Desired Condition	States: "The risk of grizzly bear-human conflict is reduced through awareness. The public, Forest Service employees, contractors, volunteers, and permittees are knowledgeable of conflict prevention strategies through education and interpretation."	This plan component would direct the Nez Perce-Clearwater to enhance and increase efforts for educating the public of the possibly of bear-human conflicts, the presence of grizzly bears within the plan area and how to stay safe while recreating. This will in turn help prevent bear deaths.
FW-DC-WL-08	Desired Condition	States: "Within occupied grizzly bear habitat, developed recreation sites, administrative sites, and dispersed recreation sites where garbage disposal services are provided, are equipped with necessary infrastructure so that food, garbage, and other attractants can be made inaccessible to grizzly bears to reduce the potential of human-bear conflict.	This plan component would help address attractants at recreation sites to help prevent attracting grizzly bears to recreation sites and prevent conflicts.

Minerals and Energy

Inside the Bitterroot Recovery Zone, mineral rights were withdrawn through wilderness designation, save for any mineral rights at the time in accordance with enabling legislation. The Frank Church-River of No Return, Selway Bitterroot, and Gospel-Hump Wilderness areas are not available for new leases or claims for locatable minerals, mineral materials, or leasable minerals. These withdrawals largely prevent impacts to the Bitterroot Recovery Zone from mineral and energy related activities.

In other areas of the Nez Perce-Clearwater where connectivity is important, mineral activities will be recognized and developed in accordance with existing laws, regulations, and rights of the individuals and companies involved. The laws and regulations largely govern the effects. Plan direction for minerals is within allowed uses under laws and regulations.

There are no plan components that restrict the location of mineral activities except suitability plan components. Mineral activities and their effects on grizzly bears would change very little under the Preferred Alternative. The difference in the influence on mineral, geological, and energy resources are primarily through changes in land allocation and suitability of uses. These would alter the considerations made when approving surface occupancy and developments for mining activities. For example, how mineral activities are approved for surface occupancy and reasonable access managed differ in recommended wilderness compared to Idaho Roadless Rule Areas. However, recommended wilderness areas are not withdrawn from mineral entry and are available for new leases or claims if the social and ecological characteristics that provide a basis for wilderness designation are maintained and protected.

The effects to dispersing bears outside of the Bitterroot Recovery Zone is influenced by how the Idaho Roadless Rule allows mineral activities. The Idaho Roadless Rule does not restrict any authorized mineral activity prior to October 16, 2008. Road construction or reconstruction associated with mining activities within Idaho Roadless Rule areas may only be approved after evaluating other access options. Road construction or reconstruction associated with mining activities within Idaho Roadless Rule areas must be conducted in a manner that minimizes effects on surface resources and must be consistent with land management plan components. Roads constructed or reconstructed within Idaho Roadless Rule areas must be decommissioned upon completion of the project or expiration of the lease, permit, or other authorization.

The Idaho Roadless Rule does not affect mining activities conducted pursuant to the General Mining Law of 1872. The Forest Service will not authorize the sale of common variety mineral materials in Idaho Roadless Areas designated as Wild Land Recreation, Special Areas of Historic or Tribal Significance, or other Primitive themes. The Forest Service may authorize the use or sale of common variety mineral materials and associated road construction or reconstruction to access these mineral materials in Idaho Roadless Areas designated as Backcountry Restoration only if the use of these mineral materials is incidental to an activity otherwise permissible. Overall, mineral activities in roadless rule areas or recommended wilderness areas would have little effect on grizzly bear habitats or connectivity.

The Forest Service may authorize the use or sale of common variety mineral materials and associated road construction or reconstruction to access mineral materials designated as General Forest, Rangeland, and Grassland only if the use of these materials is incidental to an activity otherwise permissible. Currently there are no lands in the planning area designated as General Forest, Rangeland, or Grassland under the Idaho Roadless Rule.

With proper coordination, minerals related activities may be compatible with grizzly bears and their habitat. The effects to grizzly bears include disturbance and displacement from around mining sites. There may be conflicts with bears during operations. Surface occupancy by mining operations will result in a loss of habitat. Energy and minerals management could affect grizzly bears through reductions in secure habitat due to additional road access or through additions of developed sites with associated noise and human presence.

Mineral extraction activities are also managed through suitability plan components. Suitability plan components determine where mineral extraction is suitable based on land allocations. Suitability for mineral-related activities can be found in tables included in the Forest Plan, including all their footnotes.

Activities can be suitable, conditionally suitable, or unsuitable. If an activity is not suitable under the plan in a particular area, the activity would be prohibited within those areas. Similarly, if an activity is conditionally suitable, it can occur only under the circumstances identified in the table footnotes. Suitability for mineral and mining activities addresses some of the threats to grizzly bears because they limit how and where these activities can occur depending upon the area. Areas with restriction include wilderness, designated wild and scenic rivers, and Idaho Roadless Rule Areas, for example.

Mineral activities are divided into three types, locatable minerals, leasable minerals, and mineral activities or saleable minerals. Mineral related activities and their availability are governed by law. Therefore, suitability must be consistent with the laws. Laws like the Wilderness Act, the Idaho Roadless Rule, and the Wild and Scenic River Act, as well as enabling legislation for wilderness and wild and scenic rivers, have withdrawn or modified how and where mineral activities are managed. Suitability differs for the three types of minerals.

Locatable minerals are suitable in most areas of the Nez Perce-Clearwater except wilderness, developed sites, and administrative sites. Locatable minerals are conditionally suitable in recommended wilderness and designated wild and scenic rivers. They are conditionally suitable in recommended wilderness to the extent allowed in the Idaho Roadless Rule Areas and designated wild and scenic rivers under specified conditions on valid mining claims (FSM 2354.42d), depending upon the river management plan.

Leasable minerals are not suitable in the Landmark Historic Corridor, Wilderness, and two Idaho Roadless Rule theme areas including the wildland recreation and primitive and Special Areas of Historic or Tribal Significance theme area. They are also not suitable in riparian management zones, mass movement areas, recreation sites, administrative sites, and research natural areas. They are conditionally suitable within designated and suitable wild and scenic rivers when consistent with river management plan and when protecting outstandingly remarkable values. They are otherwise suitable.

Mineral materials (saleable) are not suitable within Landmark Historic Corridor, Wilderness, designated wild and scenic rivers in the wild classification, and two Idaho Roadless Rule theme areas including the wildland recreation and primitive and Special Areas of Historic or Tribal Significance theme area. They are also not suitable in riparian management zones, mass movement areas, recreation sites, administrative sites, and research natural areas. They are conditionally suitable within designated and suitable wild and scenic rivers when consistent with river management plan or when protecting outstandingly remarkable values. Finally, they are suitable within Idaho Roadless Rule areas to the extent they are allowed in the Idaho Roadless Rule. Otherwise, they are suitable use outside these areas. Thus, vast areas of the Nez Perce-Clearwater receive various levels of protection against impacts from mineral extraction under the plan and would help maintain conditions for grizzly bears.

Plan components in the energy and minerals section may have some environmental consequences to grizzly bear habitats if mining or energy extraction activities occur within secure habitat. These activities would create a footprint representing loss of habitat and human presence at these sites could lead to bear-human conflicts. Reasonable access requirements sometimes would reduce secure habitat when roads are constructed. The desired condition in this section is that mineral resources are available for use. The Forest Service has limited authority to limit these activities. However, the extent of mining or mineral activities would likely be over only a small proportion of grizzly bear habitat so the effects would be minor. FW-STD-EM-01 would require abandoned operations to be returned to a state of site condition comparable to pre-mineral activity and provide comparable form and function based on site potential. This plan direction would help mitigate the loss of habitat after operation are complete. Essentially, management direction in the 1987 Forest Plans is similar to those in the Preferred Alternative.

Land Ownership and Uses

Plan direction in the land ownership and land uses section would have both negative and beneficial consequences on grizzly bears. FW-DC-LND-01 specifically would direct land acquisitions to prioritize habitat for at-risk species, which could have beneficial consequences for grizzly bear connectivity and habitat conservation. On the other hand, FS-DC-LND-04 could facilitate minor impacts to grizzly bear habitat from energy developments because it could encourage development of energy infrastructure. However, grizzly bears are expected to recover in designated wilderness where these facilities would not be allowed. The potential for oil or gas extraction is low to very low on the Nez Perce-Clearwater so there would be little chance to have oil and gas extraction projects. Wind energy potential is also low so there is less likely to be wind energy developments. More likely would be rights-of-way for the electrical grid or oil and gas pipelines for the transportation of these resources. These types of infrastructure usually have temporary impacts during construction but then would have low impacts after completion. The footprint would be limited to only a very small percent of grizzly bear habitat in the plan area. Plan direction in FW-GDL-LND-01 would require using exiting rights of ways before constructing new ones which would serve to minimize the impacts.

Ecosystem Services

The Forest Service balances multiple uses with the conservation of wildlife. Desired condition FW-DC-ES-01 emphasizes a variety of human uses including ecosystem services to area residents and visitors. Key benefits emphasized include clean water; clean air; wood products, including timber and firewood; forage; hunting and fishing; fish; cultural values, including heritage values, subsistence food gathering, and spiritual and inspirational values; scenery; recreation; and flood control and soil stabilization. Management will emphasize these uses as a result of this desired condition for the benefit of people, but there may be some instances when the resulting actions end up impacting grizzly bears. However, this plan component does not authorize these activities, and all projects would require separate consultation and analysis.

FW-GDL-ES-01 is a guideline to provide for social and economic sustainability of rural communities. It states:

> To provide for social and economic sustainability of rural communities, access to activities such as recreation, hunting, fishing, gathering, egress and wildfire management should continue to be provided for on routes or in areas designated as open to motorized use in the summer and winter. If a route is identified as adversely affecting aquatic ecological values, rerouting and route improvement should be considered prior to closure, to preserve motorized access opportunities. If a route or area needs to be closed, alternate motorized access to maintain social and economic sustainability of rural communities should be provided.

It ensures that routes open for motorized use in the summer and areas in the winter should continue to provide access for recreation, hunting, fishing, gathering, egress, and wildfire management. This guideline requires that, in the event of a route closure or relocation, alternate motorized access to maintain social and economic sustainability of rural communities should be provided. In many areas of the Nez Perce-Clearwater, road densities are high or very high locally and may need to be reduced due to resource concerns. In the event that happens, new roads or motorized trails may be required to maintain access. This plan component would also require that any closure of over-snow areas would require consideration to maintain access. This guideline would serve to maintain the baseline travel condition in the plan area, which is consistent with the minimum roads system analysis as the bases for travel planning. The plan component would have a chilling effect on reducing motorized impacts to natural resources through closures. Motorized Routes would be more likely to be moved rather than closed. It could also lead to a redistribution of roads and motorized access when closing areas to motorized access for resource reasons. If the redistribution of motorized access occurs in areas of currently existing secure habitat, secure habitat could be impacted. Any new motorized access would require a separate analysis and Endangered Species Act consultation prior to a travel management decision. New motorized access would be required to be consistent with the entirety of the plan, including wildlife components maintain secure habitat and riparian components greatly limiting new roads within riparian management zones. This plan component works in concert with other plan components, it does not supersede nor loosen requirements of any plan component, and a project must meet all standards and guidelines and not preclude attainment of any desired condition to be consistent with the plan.

FW-GDL-ES-01 would apply to all future travel management projects including forestwide travel decisions and travel decisions made in individual projects. Perhaps the most widespread ramification of FW-GDL-ES-01 would be in its application to conducting a forestwide travel plan, as would occur on the Nez Perce National Forest in the future. In this case FW-GDL-ES-01 would have sweeping influence on travel planning process. It would require careful consideration when closing routes for aquatic resources, and potentially require leaving open or providing alternative motorized access when doing so. The intent of the plan component is that it does not apply to closures needed to achieve the minimum travel system during forestwide travel planning. When closing routes, a responsible official would have to consider leaving routes open, and if a route or area needs to be closed, alternate access to maintain social and economic sustainability of rural communities should be provided. The plan component is not necessarily limited to specific locations or routes per se but could be applied so as to require providing alternative access opportunities or experiences as well. The plan component does not specify whether it would apply to requiring similar maintenance levels, seasons of use, nor whether the alternate access would be applied in the same general area or a new area. These decisions would be made by the responsible official during project development and through Endangered Species Act consultation.

While this plan guideline would not cause an increase in new motorized routes, it would hinder any progress to reducing any baseline conditions existing because of the travel system. In combination with motorized suitability decisions, the overall travel system would most likely trend higher rather than decline as a result of this guideline.

The direction in FW-GDL-ES-01 also applies to winter motorized recreation. If areas previously open to winter motorized recreation were closed, the guideline would require consideration to maintain access or providing alternate winter motorized access in the event areas for winter motorized access are closed. Closure of winter motorized access under in the future is a fairly unlikely event that would potentially occur during the establishment of a travel plan like would occur within the Nez Perce portion of the combined national forest. It would primarily affect potential denning habitat by requiring a maintenance of winter motorized access or the provision of alternate winter motorized access in the event of a closure. This would be essentially a one-time decision made within the scope of the travel plan and it would have a site-specific analysis with associated Endangered Species Act consultation. Effects of winter motorized access was analyzed in more detail above and the scope of the effects would be consistent with the effects detailed in that section. The guideline does not determine where the new area would be and may be located in areas outside of potential grizzly bear denning habitat.

Language in FW-GDL-ES-01 suggests that in order for the guideline to apply the area would need to have been “provided for on routes or in areas designated as open to motorized use.” This language seemingly would not apply to areas in the Nez Perce portion of the planning area that have not yet undergone travel planning and are “open unless designated closed” because they have not yet been designated as open in a travel plan.

These forestwide Travel Planning outcome would typically only occur once mostly within the Nez Perce National Forest portion of the planning area, though it could also apply to any forestwide modifications of the Clearwater Travel Plan. Thereafter, the travel system could be modified through decisions on individual travel routes. Aside from forestwide travel planning, FW-GDL-ES-01 would also apply to decisions regarding the travel system on individual routes or modifications of the travel plan. For example, road or trail system decisions are often made concurrent to support timber operations or individual projects can authorize new road or trails for recreational purpose. Likewise, individual travel decisions can also close individual routes. In these cases, FW-GLD-ES-01 would require consideration of or provision of alternative routes.

Motorized route closures would be more likely to occur where there are already more motorized routes such as within Management Area 3, though this plan component is a forestwide plan component and could occur within Management Area 2 as well. It is unlikely to apply to areas not suitable for motorized uses like in most areas of Management Area 1. The applicability of this plan component is more limited outside of Management Area 3 as described below.

This plan component would not result in new motorized roads nor trails within areas not suitable for motorized uses. These include wilderness areas, recommended wilderness areas, research natural areas, wild classification of suitable and designated wild and scenic rivers, and Idaho Roadless Rule Areas not suitable for motorized uses. The application of FW-GDL-ES-01 would be limited or not applicable to most area of Management Area 1 the vast majority of which is not suitable for motorized uses. Because motorized roads and trails would not be a suitable use in these areas, motorized access would not be allowed within these areas. Therefore, these areas would not have relocations of motorized routes resulting from FW-GDL-ES-01.

Within Idaho Roadless Rule areas that are suitable for motorized uses, which under the Preferred Alternative is mostly within the Backcountry Restoration Theme, road reconstruction or relocations are prohibited unless the regional forester determines that:

> Road is needed for public health and safety for imminent threat of loss of life or property; or in Response to CERCLA, Clean Water Act or Oil Pollution, or Statute, treaty, reserved or outstanding rights or other legal duty of the United States; or Road realignment to prevent irreparable resource damage that can't be mitigate by normal road maintenance for roads essential for public or private access, natural resource management, or public health or safety; or Road reconstruction for road safety on a road determined to be hazardous; or Secretary of Agriculture determines a Federal Aid Highway (Title 23 of the U.S. Code) is warranted.

Some situations might arise where the regional forester makes the determination that roads need to be reconstructed or relocated because of natural resource reasons. Therefore, FW-GDL-ES-01 could apply when system routes are closed for the specific reasons outlined in the Idaho Roadless Rule. Other Idaho Roadless Rule Area Themes do not allow these exceptions and so FW-GDL-ES-01 would not apply there. Furthermore, since they are not suitable for motorized uses, they would not be subject to new motorized routes.

The Idaho Roadless Rule areas suitable for motorized uses would allow relocation or reconstruction of motorized trails. Therefore FW-GDL-ES-01 could be applicable to motorized trails within Idaho Roadless Rule Areas suitable for motorized uses. Any motorized trail that would need to be closed for resource reasons could be relocated within Management Area 2, provided the trail is consistent with all other Forest Plan direction.

FW-GDL-ES-01 specifically identifies that when closing for aquatic resources, rerouting and route improvement should be considered. If routes are closed for aquatic resource reasons, it is reasonable to assume that in most of these cases the routes would be moved into upland areas. In these situations, the species-specific grizzly bear plan component MA2-GDL-WL-05 would not constrain this activity because it specifically states that the guideline does not apply to existing trails that are relocated or reconstructed to mitigate negative impacts to ecological resources.

Management Areas 3 has the highest likelihood of motorized route closures or relocations, simply because it has the most motorized routes, many of which are near important aquatic resources. Management Area 3 has few secure habitats, and most of them are small and scattered. Thus, they have less conservation value to supporting resident grizzly bear populations.

The plan component should not be expected to increase the probability of attractants or increase the probability of conflicts because it seeks to only maintain access so it would not generally result in an increase and would mostly redistribute motorized access. However, it may hinder addressing grizzly bear related conflict or mortality issues related to the distribution and abundance of motorized access because it would require that “alternate motorized access to maintain social and economic sustainability of rural communities should be provided.”

Plan Direction That Contributes to Grizzly Bear Recovery and Effects of Plan Direction from Other Resource Areas

The plan components contain provisions for connectivity. Plan components that express a desire for connectivity include FW-GL-TE-01, FW-DC-TE-04, FW-DC-WL-03, FW-DC-WL-06, MA2-DC-RWILD-03, MA2-DC-IRA-03. The plan does not propose any connectivity areas because the Nez Perce-Clearwater is already a contiguous block of land containing many acres of lands well preserved by management area direction, laws, and rules, such as the Idaho Roadless Rule, designated wilderness, and recommended wilderness. Plan components that express a desire that the land allocations provide for grizzly bear connectivity include FW-DC-WL-06, MA2-DC-RWILD-03, and MA2-DC-IRA-03.

Elk plan components under the action alternatives will continue to contribute to grizzly bear connectivity indirectly. Under the alternatives, the plan components for elk move away from a focus on elk habitat effectiveness and use a more integrated approach at the landscape scale that considers high quality summer forage, probability of use as influenced by roads. This new approach is consistent with new scientific findings that suggest that high quality nutrition and road distribution interact to drive elk distribution and habitat use.

Plan components for aquatic and riparian conservation would help provide both connectivity and forage resources for grizzly bears. Specifically, plan components that provide for riparian management zones would also provide habitat for dispersing bears. Taken as a whole, the aquatics plan components should also help improve fisheries that can provide forage for grizzly bears.

Goals FW-GL-WL-01 and FW-GL-TE-02 contribute to the recovery of federally listed species through cooperation and collaboration with the U.S. Fish and Wildlife Service, other federal agencies, state agencies, and tribes. Desired conditions support this goal, in that all revised plan alternatives include FW-DC-WL-01, which is a goal to have habitat conditions for federally listed threatened, endangered, and candidate plant and animal species that contribute to their recovery to the point at which listing is no longer appropriate and provide conditions to meet their life history needs.

There are three species-specific desired conditions for grizzly bears and one species-specific guideline. They include FW-DC-WL-06, FW-DC-WL-07, FW-DC-WL-08, FW-DC-WL-09, and MA2-GDL-WL-

05. FW-DC-WL-06 is a desired condition that "the grizzly bear Bitterroot Recovery Zone provides the ecological conditions to support recolonization of grizzly bears combined with a desire to have bears able to travel from occupied habitat to the recovery zone through Forest Plan land use allocations." This desired condition would direct management to maintain the conditions to support recolonization and connectivity to the Bitterroot Recovery Zone from other occupied areas. Desired conditions FW-DC-WL-07 and FW-DC-WL-08 would encourage management towards reducing bear-human conflicts through education and providing infrastructure in developed recreation areas to store attractants. Grizzly bear considerations were added to MA2-GDL-WL-05 as a mechanism to limit fragmentation of habitat currently without motorized roads or trails that exist in Management Area 2 and are only applicable in that management area.

As the planning rule directs, the plan provides coarse filter habitat plan components to provide for habitat that contributes to species recovery focused on providing composition, structure, function, and connectivity with the intent to achieve ecological integrity. The plan direction and specific plan components that contribute to ecological conditions for grizzly bears are discussed below.

Terrestrial Ecosystem

Threats Addressed

- Vegetation Management
- Climate change

Plan Component

- FW-DC-TE-04
- FW-DC-TE-05
- FW-GL-TE-02

Plan Component Summary

Provides vegetation conditions that reflect natural disturbances and that the composition, structure, function, and connectivity of native plant communities are appropriate for a given landscape and climatic setting. Includes a goal FW-GL-TE-02 to help meet other agencies goals like federally listed species recovery.

Effect

These should contribute to ecological conditions that should promote diversity of plant and animal communities that should help provide for ecological conditions to support grizzly bears. Would also promote achievement of recovery.

Caves and Karst

Threats Addressed

- Recreation
- Mineral
- Energy Development

Plan Component

- FW-DC-Cave-01
- FW-STD-Cave-01

Plan Component Summary

Includes a desired condition and standard to maintain biological function of caves and karst. The forestwide desired condition FW-DC-CAVE-01 expresses a desire to maintain and protect cave features. The standard FW-STD-BIOPHY-01 specifies that cave environments shall not be altered, except where necessary to protect associated natural resources or to protect health and safety.

Effect

This direction would maintain and protect caves that that might contribute to hibernation sites for grizzly bears. These plan components are a relatively minor contributor to grizzly bear habitats.

Forestlands

Threats Addressed

- Vegetation Management
- Climate change
- Wildfires

Plan Component

- FW-DC-FOR-01
- FW-DC-FOR-02
- MA2 and MA3-DC-FOR-10
- MA3-DC-FOR-11
- MA3-STD-FOR-01
- MA3-GDL-FOR-06
- MA3-GDL-FOR-07
- MA2 and MA3-GDL-FOR-01
- MA2 and MA3-GDL-FOR-02
- MA2 and MA3-GDL-FOR-03
- MA2 and MA3-GDL-FOR-04
- MA2 and MA3-GDL-FOR-05
- MA2 and MA3-DC-FOR-10
- FW-DC-FOR-09

Plan Component Summary

Comprehensive plan components that would direct management to provide a diversity of forest conditions across multiple broad potential vegetation types. The basic premise is that forest will be managed to manage for variation of structure, function, composition, and connectivity of forested habitats, including forest size classes, density, dominance types, and landscape pattern for broad potential vegetation types. Restoring forested habitats back to conditions similar to those under natural disturbances will be the primary driver for management of forested habitats. Forested lands plan components are specific to broad potential vegetation types that provide the physical characteristics that provide for a variety of forest types. The section contains direction to restore western white pine, whitebark pine, and aspen. Several plan components address conditions that describe vegetation patterns that reflect fire regimes, and landscape patterns. These sections also contain plan standards and guidelines to ensure that snags, live leave trees, and downed wood remain distributed across the plan area and provide protections for old growth, which could contribute to hibernation or denning sites. Specific desired conditions and objectives seek to restore whitebark pine which will provide an important source of nutrition at long time periods from now.

Effect

Provide a diversity of forest vegetation conditions to support grizzly bear ecology. These plan components would ensure properly functioning habitat and a variety of dominance types, forest densities, composition, and size classes to provide for the diverse needs of grizzly bears. These plan components would direct forest management towards maintaining or restoring conditions that existed under natural disturbance. These should contribute to ecological conditions like those that grizzly bears evolved with. Early seral conditions would promote bear nutrition while forested lands in mature size classes would promote resting and denning structures. These would seek to restore some bear nutrition through restoration of whitebark pine and perhaps white pine. Desired conditions are such that forests would be more resilient to the effects of climate change and should address vulnerability to uncharacteristic wildfire. Timber production in many cases will be the result of restoration actions to restore ecosystem integrity.

Meadows, Grasslands, and Shrublands

Threats Addressed

- Vegetation Management
- Livestock grazing
- Wildfire

Plan Component

- FW-DC-GS-01
- FW-DC-GS-02
- FW-DC-GS-03
- FW-DC-GS-04
- FW-DC-GS-05
- FW-DC-GS-06
- FW-DC-GS-07
- FW-DC-GS-08
- FW-OBJ-GS-01

Plan Component Summary

Desired conditions describe the desired composition and condition of meadows, grasslands, and shrublands. These plan components represent habitats where these features are persistent rather than a result from disturbance of forested habitats that create early seral forested conditions. These desired conditions are organized by grassland and shrubland types and describe the desired native plant composition. Objectives seek to maintain or expand these habitat features through disturbance.

Effect

Persistent non-forested habitats are relatively uncommon within the plan area as most of the land base is composed of forested habitats. These plan components help ensure that meadows, grasslands, and shrublands maintain composition to function properly and remain in extent to provide foraging resources for bears and their prey. Grazing allotments are often located where these features occur in abundance. Maintaining the composition of these habitats would require proper grazing intensities. Wildfire often maintains these habitats long term.

Fire Management

Threats Addressed

- Wildfire
- Vegetation management
- Climate change

Plan Component

- FW-DC-FIRE-01
- FW-DC-FIRE-02
- FW-OBJ-FIRE-01
- FW-OBJ-FIRE-02
- FW-OBJ-FIRE-02
- FW-GDL-FIRE-01
- FW-GDL-FIRE-02

Plan Component Summary

These are desired conditions and objectives that describe the desired landscape resiliency to fire, desired fuel conditions, spatial pattern, burn intensity, and processes that are a large driver of ecological conditions in the plan area. These conditions emphasize that wildfire plays an integral part of achieving ecosystem sustainability, including interrelated ecological, economic, and social components, such as improved ecosystem resilience and wildlife habitat, protection of property, other values at risk, and public safety. Objective to treat acres of habitat to achieve desired conditions both through prescribed burning and vegetation treatments and wildfire. Guidelines require utilizing opportunity to integrate wildland fires into other disturbances on the landscape. Guidelines require that planned ignitions should be planned and implemented with design features to address the spread of invasive weeds.

Effect

Uncharacteristic wildfire (either too little or too much wildfire) was identified as a threat because it is pervasive and may play a large role in ecosystem changes that could impact productivity of the landscape for grizzly bears. In many areas of the Nez Perce-Clearwater, fire exclusion has contributed to fuels conditions that may cause large, uncharacteristic wildfires. Similarly, fire exclusion has likely substantially reduced grizzly bear nutrition and perhaps carrying capacity. These plan components would serve to ensure that wildfire and prescribed fire continue to play a role to contribute to grizzly bear habitats and food sources. They would also help ensure that wildfire would be restored back to natural intensity and periodicity. Restoration of natural disturbance processes would improve function of forested ecosystems for grizzly bears. Restoring wildfire would help these systems be more resilient to the effects of climate change.

Invasive Species

Threats Addressed

- Wildfire

- Vegetation management
- Invasive species

Plan Component

- FW-DC-INV-01
- FW-OBJ-INV-01
- FW-GDL-INV-01
- FW-GDL-INV-02
- FW-GDL-INV-03

Plan Component Summary

Desired conditions, objectives, and guidelines designed to ensure that invasive species do not significantly increase across the Nez Perce-Clearwater and no new invasive species become established in any of the plant communities or aquatic ecosystems on the Nez Perce-Clearwater.

Effect

Invasive species have the potential to invade to the exclusion of native vegetation. Natural grasslands, shrublands, and other xeric habitats are more prone to invasive weeds and could affect grizzly bear nutrition and the conditions for their prey. Some invasive species like blackberry invade riparian areas and may provide bear foods. These plan components help ensure that weeds do not invade and permanently alter grizzly bear habitats. Wildfire often interacts with invasive weeds which can change natural disturbance patterns. Objectives seek to treat invasive weeds and prevent spread and establishment. Plan direction for invasive species would have negligible effects on grizzly bears. The guidance in these plan components would help prevent and address invasive plant and animal species to help reduce impacts from wildfire, vegetation management, and invasive species.

Soils

Threats Addressed

- Motorized Access

Plan Component

- FW-DC-SOIL-01
- FW-DC-SOIL-02
- FW-DC-SOIL-03
- MA2 and MA3-GDL-SOIL-02
- MA2 and MA3-GDL-SOIL-05

Plan Component Summary

Establishes desired conditions for soils and provides standards and guidelines to maintain and restore soil function during and after project activities. MA2 and MA3-GDL-SOIL-02 specify that temporary roads, skid trails, and landings should be located on existing disturbed areas before creating new soil disturbance. MA2 and MA3-GDL-SOIL-05 requires that after a road is decommissioned or after cessation of management activities on temporary roads, soil function appropriate to the site potential should be restored using demonstrably effective methods. MA2 and MA3-GDL-SOIL-02 require that temporary roads, skid trails, and landings should be located on existing disturbed areas before creating new soil disturbance to limit additional soil disturbance.

Effect

Ensures that national forest activities do not damage soils and restores them when disturbed. The forest vegetation relies on the integrity of soils to maintain productivity. These plan components ensure that soil conditions are maintained so they continue to support grizzly bear habitat. These would help to minimize creation of new temporary roads and help address unauthorized uses of decommissioned roads. Soil objectives propose restoration activities, which could displace bears or have a small chance of bear-human conflict, but those would have lower probabilities and would have at most short-term local impacts.

Aquatic Ecosystems

Threats Addressed

- Motorized Access
- Vegetation Management
- Recreation
- Livestock
- Mineral and energy development
- Wildfire

Plan Component

All plan components in Sections:

- Water and Aquatic Resources
- Riparian Management Zones
- Conservation Watershed Network
- Infrastructure (Aquatics and Riparian)
- Energy and Minerals (Aquatics and Riparian)
- Livestock Grazing (Aquatics and Riparian)
- Lands and Special Uses (Aquatics and Riparian)
- Recreation (Aquatics and Riparian)

Plan Component Summary

The water and aquatics resources section mostly addresses water quality, connectivity of aquatic systems, sediment, instream flows, and water temperature.

The Riparian Management Zones section addresses the condition and management of riparian areas. They are defined with one of four categories based on whether they are fish-bearing or not, whether they flow year-round, or are still waters. Various activities are restricted within different distances of the edge of the flood plain based on the categories. Restricted activities include vegetation management, timber harvest, thinning, staging of vehicles or heavy equipment, refueling, and fuel storage, fuelwood cutting, and direct ignitions. Additional activities are prohibited in most cases with exceptions and include landings, skidding, staging or decking, yarding, and machine burn piling, new road, trail, and landing construction, including temporary roads. Additionally, a number of fire suppression related activities are restricted or prohibited within riparian areas. Saleable minerals are also restricted within riparian areas.

Plan components in the Conservation Watershed Network emphasize conservation and restoration within watersheds important for at-risk fish species. In these watersheds, activities shall be designed and implemented in a manner that supports or contributes towards the recovery of aquatic federally listed species and the achievement of aquatic and riparian desired conditions. It includes standards that require that when constructing or reconstructing roads, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network unless no further decreases are needed to meet desired conditions for Water and Aquatic Resources or Conservation Watershed Network. Standards prohibit new hydroelectric facilities and water developments shall not be located in the Conservation Watershed Network with exceptions only where the Forest Service has limited authorities.

Plan direction in the Infrastructure (Aquatics and Riparian) section address road and the maintenance of the road system within riparian areas.

Energy and Minerals (Aquatics and Riparian) section includes standards and guidelines that address impacts to riparian areas from energy and mineral activities. These plan components address mineral operations, pollutants, infrastructure, and minimize adverse effects to aquatic and riparian-dependent resources in riparian management zones.

The Livestock Grazing (Aquatics and Riparian) section addresses impacts to riparian and aquatic resources from livestock use.

Lands and Special Uses (Aquatics and Riparian) section address impacts from special uses including hydropower infrastructure.

The Recreation (Aquatics and Riparian) section of the plan addresses impacts from recreation within riparian areas. The desired condition is that recreation sites and developments have minimal impacts to these habitats. Standards and guidelines restrict new sanitation facilities, new facilities, or infrastructure. They also provide guidance on how activities are performed to minimize impacts to water quality and riparian areas.

Aquatic and riparian plan components restrict or minimize motorized access in several sections. These include several plan components that seek to minimize the construction of roads within riparian areas including FW-DC-ARINF-01, FW-STD-ARINF-01, FW-GDL-ARINF-04, FW-GDL-ARINF-08, FW-GDL-RMZ-02, FW-STD-ARINF-01, FW-GDL-ARINF-04, FW-GDL-ARINF-08, and FW-GDL-AREM-02. These are meant to minimize the impact of the transportation system on aquatic and riparian habitats. Objectives FW-OBJ-WTR-02, FW-OBJ-WTR-05, and FW-OBJ-RMZ-01 specifically mention road decommissioning as objectives for riparian habitat restoration.

Effect

The aquatic and riparian ecosystem plan components provide a rigorous framework for the protection and restoration of aquatic and riparian habitats. Collectively, the restrictions on activities within riparian areas would result in the conservation of these areas for grizzly bear use and benefit. Riparian areas provide forage resources, travel corridors, and general habitat to grizzly bears. These plan components are designed to improve fishery resources that may contribute to high quality bear nutrition.

Measures that restrict motorized access in riparian areas represent a substantial restriction because they occur across all management areas and make up approximately 548,284 acres or about 14 percent of the plan area. This includes 233,201 acres of riparian habitats in areas suitable for motorized uses. While these restrictions apply in riparian areas, the restrictions may drive placement of roads and reconstruction of existing roads into upland habitats.

Because of their comprehensive nature, the aquatic plan components address several of the threats to grizzly bears, at least within riparian areas.

Wildlife

Threats Addressed

- Human-Bear Conflicts
- Vegetation management (via landscape pattern)

Plan Component

- FW-GL-WL-01
- FW-DC-WL-01
- FW-DC-WL-06
- FW-DC-WL-07
- FW-DC-WL-08
- FW-DC-WL-07
- FW-GDL-WL-01
- FW-GDL-WL-05

Plan Component Summary

While the needs for most species are expected to be met through coarse filter ecosystem plan components such as those in the Forested Lands, Aquatic Ecosystem, and Meadows, Grasslands, and Shrublands sections, plan component in the wildlife section provide additional guidance for the management of wildlife habitats.

FW-GL-WL-01 is a Forest Plan goal for the Nez Perce-Clearwater to work cooperatively with the U.S. Fish and Wildlife Service and other agencies on conservation strategies, recovery plans, habitat management, and ecological conditions towards recovery of federally listed threatened or endangered species.

FW-DC-WL-01 is a desired condition to provide habitat for federally listed threatened, endangered, and candidate plant and animal species that contribute to their recovery to the point at which listing is no longer appropriate. It also expresses a desire to provide conditions to meet their life history needs.

FW-DC-WL-03 is a desired condition that addresses landscape pattern to provide for connectivity.

This section includes three species specific desired conditions for grizzly bears. They include FW-DC-WL-06, FW-DC-WL-07 and FW-DC-WL-06. These would direct management to provide ecological conditions to support recolonization of grizzly bears within the Bitterroot Recovery Zone and allow travel from other recovery zones to the Bitterroot Recovery Zone. It specifies that allocations identified in the Forest Plan provide connectivity to allow secure passage from occupied habitat into the Bitterroot Recovery Zone.

FW-DC-WL-07 would encourage efforts by the Nez Perce-Clearwater to educate the public on grizzly bears and conflicts. It would encourage providing information and stipulations in issued permits for bear safety to reduce bear-human conflicts.

FW-DC-WL-08 would also encourage education on grizzly bear safety and guide management to equip developed and administration sites infrastructure so that food, garbage, and other attractants can be made inaccessible to grizzly bears to reduce the potential of human-bear conflict.

FW-STD-WL-01 requires that Canada lynx habitat shall be managed in accordance with the Northern Rockies Lynx Management Direction and Record of Decision.

FW-GDL-WL-01 Reduces impacts to dispersal, migration, or critical habitat from communication lines and towers.

FW-GDL-WL-05 is a species-specific component for both elk and grizzly bears. This plan guideline acts as a constraint on new motorized trail construction within Idaho Roadless Rule Areas. It only applies to Idaho Roadless Rule areas that are within a motorized Recreational Opportunity Spectrum (ROS) setting. It would limit the amount and distribution of motorized trails in secure habitat patches 10,000 acres or larger within Idaho Roadless Rule Areas within motorized ROS settings. When constructing motorized trails in areas 10,000 acres or larger, it would require leaving areas 5,000 acres or larger as a minimum after motorized trails are constructed. It would prohibit motorized trails in secure habitats between 10,000 acres and 5,000 acres with the exception that it would not apply within Community Protection Zones (defined in the Idaho Roadless Rule). It does not apply to secure habitats smaller than 5,000 acres in Idaho Roadless Rule Areas that are within a motorized ROS setting. The effects of this plan component were described in detail above. The guideline is not needed in Idaho Roadless Rule areas not suitable for motorized uses because no motorized uses would be allowed there.

Effect

There are three species-specific desired conditions for grizzly bears and one species-specific guideline. There are also plan components for other wildlife species that would indirectly benefit grizzly bears. These plan components are intended to provide management or direction for federally listed species, support recolonization of the Bitterroot Ecosystem by grizzly bears, provide for connectivity, increase public awareness and education about bear safety, and direct management to provide infrastructure for food storage in recreation sites. They also provide for other wildlife species that support grizzly bear prey. FW-DC-WL-01 would provide conditions for federally listed species. FW-DC-WL-03, FW-DC-WL-06, and FW-GDL-WL-05 would promote conservation of secure habitat in Idaho Roadless Rule Areas which will aide connectivity for grizzly bears. FW-STD-WL-01 requires that the Nez Perce-Clearwater follow the Northern Rockies Lynx Management Direction, which could indirectly benefit grizzly bears.

Multiple Uses-Wildlife

Threats Addressed

- Motorized Access
- Recreation
- Vegetation management
- Wildfires

Plan Component

- FW-GDL-WLMU-01
- FW-DC-WLMU-03
- FW-DC-WLMU-05
- MA1-DC-WLMU-01

- MA2-DC-WLMU-01
- MA2-DC-WLMU-02
- MA3-DC-WLMU-01
- FW-DC-WLMU-06
- FW-DC-WLMU-07
- FW-GDL-WLMU-01
- FW-GDL-WLMU-03
- MA3-GDL-WLMU-01

Plan Component Summary

FW-GDL-WLMU-01 is a guideline that ensures that when closing routes to motorized use, to ensure benefits to wildlife habitat are realized, that measures would be included to sufficiently exclude motorized use on closed routes.

FW-GDL-WLMU-02 is a guideline where the intent is to reduce barriers to big game movements when constructing new fences.

FW-DC-WLMU-02 is a guideline that should direct management of habitat to provide conditions to meet life history requirements year-round for ungulates. Additionally, it would guide management to help ensure that habitats are composed of native plants.

FW-DC-WLMU-04 emphasizes that natural processes contribute to the mosaic of habitats needed by ungulates.

FW-GDL-WLMU-03 seeks to protect wintering big game from disturbance activities.

FW-DC-WLMU-06 is the overarching desired condition to provide for elk. It emphasizes maintaining habitat use and nutrition. This desired condition also would direct management to address invasive weeds in elk habitats.

FW-DC-WLMU-07 describes the desired distribution of elk. Elk distribution is often affected by motorized access. It specifically addresses the desire that motorized access does not affect use of nutritional resources by elk.

MA1-DC-WLMU-01 describes how the desired vegetation conditions in Management Area 1 is through natural processes and are composed of native plants.

MA2-DC-WLMU-01 would direct management to provide between 10 and 20 percent of the landscape to provide for elk moderate to high quality forage.

MA3-DC-WLMU-01 is a desired condition meant to encourage providing nutrition away from open motorized access. It specifies that 10 to 20 percent of the management area provides moderate or high-quality nutrition for elk and that a portion of that habitat is occurs greater than 0.5 miles from open motorized routes.

MA2-DC-WLMU-02 is a desired condition that areas at least 5,000 acres in size exist without motorized access open to the public to maintain habitat use by elk.

MA3-GDL-WLMU-01 includes treatments designed to improve elk habitat should focus on one or more of the habitat covariates likely to improve predicted cow elk body fat condition. The guideline has an associated management approach that describes the framework that identifies the four habitat covariates and process that would be used in evaluating project effects on elk habitat and improve habitat conditions for elk (see the elk potential management approaches in the appendix to the Biological Assessment).

Effect

While these plan components emphasize ungulates and are intended to benefit species commonly used by the public for hunting, fishing, gathering, trapping, and other uses, these plan components indirectly benefit grizzly bears. Desired condition FW-GLD-WLMU-02 would encourage vegetation management to provide for ungulates year-round including summer and winter seasons. Early seral conditions would benefit both bears and ungulates by increasing nutrition through both ungulate protein and through improved herbaceous nutrition. Additionally, this direction would encourage the use of natural processes like wildfire would contribute to wildlife habitats. Protecting winter range from disturbance would also benefit grizzly bears from both a disturbance and food source standpoint. Bears often look for carcasses on winter ranges when they emerge from their dens. Essentially providing for ungulates increases nutrition for grizzly bears. Management towards reducing unauthorized motorized uses on closed roads or motorized trails would help reduce the impact of motorized access outside the designated road system.

Elk specific plan components (FW-DC-WLMU-06, FW-DC-WLMU-07, MA2-DC-WLMU-01, MA3-DC-WLMU-01, MA2-DC-WLMU-02, and MA3-GDL-WLMU-01) provide a framework for the management of elk habitats which emphasize habitat use and nutrition. Maintaining habitat use often requires reduction or prevention of motorized access. In addition, these plan components contribute to grizzly nutrition by providing for early successional resources that will provide for both elk and bear nutrition. These measures are intended to improve elk populations which would also result in ungulate protein for grizzly bears. Elk plan components encourage providing nutrition that are located away from motorized access. These plan components provide direction specific to the management areas with particular emphasis in Management Areas 2 and 3.

In Management Area 3 plan, guideline MA3-GDL-WLMU-01 requires improving cow body fat. The Potential Management Approaches provides an integration of four factors known to affect elk habitat use which are: 1) nutritional quality of forage resources, 2) increasing distances from roads (areas one-half mile or more away from open motorized access), 3) habitat factors on slopes less than 40 percent and 4) improved habitat interspersion by factors such as increased edge to interior ratios, a mix of mature and open habitats, decreased distance from nutrition to forest edges, or other landscape patterns that facilitate elk selection. Nutrition must be usable by elk and distance from roads is one factor that allows nutrition to be usable. Additional information about how this is envisioned to work is provided in elk potential management approaches. The basic premise is to evaluate all these factors together during project development and make strategic decisions to increase habitat use and nutrition. In some cases, secure habitat would increase as a result of increasing distance from roads so that nutritional resources would be useable by elk. Elk plan components address motorized access, vegetation management, and would break up contiguous fuels so that wildfires would be less severe.

Sustainable Recreation

Threats Addressed

- Motorized Access
- Recreation
- Bear-human conflicts

Plan Component

- FW-DC-REC-04
- FW-DC-REC-13
- FW-STD-REC-01

Plan Component Summary

These plan components provide direction as to how recreation is to be managed. Those related to grizzly bear conservation are those that enforce recreation opportunity spectrum settings, especially those that address motorized access and the levels of development for recreation facilities.

FW-DC-REC-04 specifies that the type and level of infrastructure and visitor services are sustainable and consistent with the Recreation Opportunity Spectrum settings. This is helpful since vast areas of the national forest are in primitive and semi-primitive settings that would be managed. Since several areas of the national forest are in primitive and semi primitive settings, this desired condition would direct management to be consistent with these settings.

FW-DC-REC-13 specifies that trails including motorized trails not needed to serve management or public needs and purposes are absent. This would help ensure that there is not a proliferation of these features and direct management to remove or close areas that are not needed.

Standard FW-STD-REC-01 requires that construction, reconstruction, and maintenance of recreation facilities and trails shall be consistent with the Recreation Opportunity Spectrum classes designations and specialized plans (for example, such as wilderness, recreation corridor, river management, scenic byway, and trail management plans) as appropriate.

Effect

These are the primary plan components that enforce Recreation Opportunity Spectrum Settings. Recreation Opportunity Spectrum Settings that support less development and primitive or semi-primitive settings would provide lower levels of development, more rustic infrastructure, and a more natural setting that would be better for grizzly bear occupancy. Recreation settings, such as those for non-motorized settings prohibit motorized uses, road construction, and other developments that could impact grizzly bears. Suitability plan component in this section cement that motorized travel, permanent road construction, and temporary road construction are not allowed within primitive and semi-primitive-non motorized settings.

Public Information, Interpretation, and Education

Threats Addressed

- Human-bear conflicts

Plan Component

- FW-DC-ED-01

Plan Component Summary

A desired condition to provide interpretation and educational opportunities enhance the visitor’s understanding and appreciation for the rich natural and cultural history of the Nez Perce-Clearwater. This desired condition specifically mentions wildlife in general but could also include information about grizzly bear ecology and safety.

Effect
Would direct management towards increasing education and interpretation opportunities which may include grizzly bear topics to assist in educating the public about grizzly bear issues.

Infrastructure

Threats Addressed
- Motorized Access

Plan Component
- FW-DC-INF-02
- FW-OBJ-INF-01

Plan Component Summary
FW-DC-INF-02 is a desired condition that roads not needed to serve management and public needs and purposes are absent. Plan direction in the infrastructure section emphasizes the maintenance and condition of roads and structures. These plan components would not increase or cause more roads or trails.

FW-OBJ-INF-01 is an objective to complete road work, such as reconstruction; re-routing; road improvements; decommissioning; or placing roads in intermittent stored service every five years. It also priorities reducing effects on desired aquatic and riparian conditions from chronic sediment delivery or potential future road prism failures, including previously decommissioned roads where drainage features have failed.

Effect
This desired condition should direct management to minimize the road system to only those roads needed for specific purposes and would serve to reduce these features. The maintenance levels of roads are set base upon recreation opportunity spectrum settings and travel management decisions. By themselves, these plan components have little effect on grizzly bears other than when roads or buildings are maintained. In that case, the effects might be temporary displacement. Some plan direction within this section would decrease some roads. This direction would help minimize unneeded roads, which could serve to reduce the impacts to secure habitat for grizzly bears. Objective FW-OBJ-INF-01 would improve conditions for grizzly bears over time and may increase secure habitat.

Suitability

Threats Addressed
- Motorized Access
- Recreation
- Vegetation management
- Human bear-conflicts
- Livestock grazing
- Mineral and energy development
- Wildfires

Plan Component
- Plan components found in the table in Suitability section of the plan

Plan Component Summary
Identifies areas as suitable or not for a variety of uses. Prohibits or allows a variety of activities within different land management allocations such as designated wilderness, recommended wilderness, Designated Wild and Scenic Rivers or areas suitable for timber production for example. If an activity is not suitable within an area, that activity would not be allowed under the plan within the specified area. If on the other hand, the activities are identified as suitable, those activities would be allowed within those areas in the future after a project level analysis and consultation. Activities included in suitability determinations include timber production, timber harvest, permanent road construction, temporary road construction, prescribed fire, livestock grazing, minerals-saleable, minerals-locatable, minerals-leasable, new facilities, motorized recreation, over-snow motorized recreation, and mechanical transport recreation travel.

Timber production and harvest suitability was analyzed in detail in the Timber Suitability, Production, Harvest, and Vegetation Restoration section above and is not discussed further here.

Suitability plan components restrict motorized access via restrictions on permanent road construction, temporary road construction, and motorized travel. These were analyzed in detail in the Effects of Motorized Access Section above.

Prescribed fire is suitable everywhere. This would allow this activity throughout the plan area.

Suitability for livestock grazing was evaluated within the Effects of Rangeland Management and Domestic Livestock Grazing section above.

Suitability for minerals was analyzed within the Effects of Minerals and Energy section above.

New facilities are unsuitable in many areas including the Landmark Historic Corridor, Designated Wilderness, Recommended Wilderness, and Designated wild and scenic rivers within the wild classification. They are also unsuitable in the following Idaho Roadless Rule themes: Wildland Recreation, Primitive and special areas of historic or tribal significance, and backcountry restoration themes. They are only suitable in Idaho Roadless Rule within the Community Protection Zones. They are also not suitable within the primitive recreation opportunity spectrum setting, Riparian Management Zone, Mass movement areas, and Research Natural Areas.

Motorized over-snow travel is unsuitable in designated wilderness, recommended wilderness, and non-motorized winter recreation opportunity spectrum settings.

Mechanical transport includes mechanical activities such as bicycling. These are unsuitable within Wilderness, Recommended Wilderness but are otherwise suitable across the national forest.

Effect
These are broad brush plan components that find activities suitable or not within specific areas of the Nez Perce-Clearwater. An activity can be suitable, unsuitable, or conditionally suitable. Some of these activities are known to affect grizzly bears and their habitat. Effects are closely tied to land management allocations. In many cases, these activities are not suitable and thus prohibited across broad areas. Thus, where activities are unsuitable, threats to grizzly bears are reduced or eliminated.

Threats addressed through suitability include timber, construction of permanent roads, construction of temporary roads, motorized recreation or travel, mineral activities, construction of new facilities, motorized over-snow transportation, and mechanical transportation.

Suitability of uses differs for each activity and each land type as identified in the Suitability section of the plan. However, some generalizations can be made. Designated areas like wilderness, wild and scenic rivers, research natural areas, and the Landmark Historic corridor have fewer suitable uses, or in other words, more activities are not suitable and will not be allowed under the plan. Similarly, areas recommended for designation, such as recommended wilderness and suitable wild and scenic rivers, typically have many uses that are unsuitable. Other areas like the Idaho Roadless Rule areas have a variety of activities that are either unsuitable or conditionally suitable. The elimination of these activities from large areas via suitability plan components prevents effects to grizzly bears.

Timber production is unsuitable on about 73.5 percent of the Nez Perce-Clearwater. Timber harvest of any kind is unsuitable on about 58.7 percent of the national forest.

Prescribed fire being suitable everywhere will allow the national forest to address habitat changes as a result of fire exclusion and uncharacteristic wildfire. Prescribed fire would diversify grizzly bear habitat and provide for better nutrition.

New facilities are not suitable in many areas of the national forest especially those with high value to grizzly bears such as wilderness and most Idaho Roadless Rule theme areas. This would prevent development of new facilities in these areas which would maintain grizzly bear habitat.

Areas where winter-motorized recreation is unsuitable includes areas important to grizzly bears. Wilderness areas and recommended wilderness areas would prevent this activity from occurring within these areas which make up substantial acres within the plan area. This would prevent impacts to denning bears in these areas.

Mechanized transport suitability would protect the grizzly bear Recovery Zone and recommended wilderness areas from this activity. This would prevent impacts from mechanized travel such as bicycles.

Timber

Threats Addressed

- Vegetation management

Plan Component

- FW-DC-TBR-04
- FW-STD-TBR-01
- FW-STD-TBR-02
- FW-STD-TBR-03
- FW-STD-TBR-04
- FW-STD-TBR-05
- FW-GDL-TBR-01

Plan Component Summary

These plan components direct how and where timber harvest and production is to proceed. These plan components would help support ecological conditions for grizzly bears, especially within areas not suitable for timber production. Plan standard FW-STD-TBR-01 specifies that harvest for timber production shall only occur on lands classified as suitable for timber production. Standard FW-STD-TBR-02 specifies that on lands identified as not suitable for timber production but where timber harvest could occur should only be used as a tool to protect other multiple-use values and for salvage, sanitation, or public health or safety. Plan standard FW-STD-TBR-03 would protect soil, slope, and watershed conditions from being irreversibly damaged. Plan standards would ensure that forest stands would be restocked as in FW-STD-TBR-04. Standard FW-STD-TBR-05 specifies that silvicultural treatments shall be selected based on their ability to meet desired conditions and not based solely on economics or unit output of timber. Guideline FW-GDL-TBR-01 specifies that timber harvest within areas not suitable for timber production should only occur for such purposes as salvage, fuels management, insect and disease mitigation, protection or enhancement of biodiversity or wildlife habitat, meeting desired conditions to perform research or administrative studies or recreation and scenic-resource management consistent with other multiple use and management direction. They also identify only a portion of the plan area as suitable for timber production, with the majority not suitable.

Effect

These plan components ensure timber production is conducted in a sustainable manner and only in suitable areas. Areas not suitable for timber production protects grizzly bear habitat from this activity altogether. The effects are that the majority of the national forest would not be subject to this activity.

Additional areas are suitable for timber harvest but not production. Timber harvest may be used as a tool for the purpose of maintaining or restoring other resource values in lands not suited for timber production. Examples include maintaining a healthy, visually pleasing forest in the recreation segment of a wild and scenic river corridor or reducing fire hazard in the wildland urban interface or riparian conservation areas. These plan components should help ensure that grizzly bear habitats are managed in a sustainable manner in relation to timber harvest. Areas suitable for timber harvest but not production include about 586,014 acres total or about 14.8 percent of the national forest. These activities typically restore vegetation to desired conditions.

Energy and Minerals

Threats Addressed

- Mineral and Energy Development

Plan Component

- FW-STD-EM-01

Plan Component Summary

Directs how energy and mineral activities would occur. FW-STD-EM-01 ensures that mining activities shall only be authorized when the associated reclamation plan includes provisions to return disturbed areas to a state of site condition comparable to pre-mineral activity.

Effect

Helps ensures that areas impacted by mining would be restored after mineral activities are completed. This will help restore some areas impacted by mining activities. This would be helpful to restore some grizzly bear habitats.

Livestock Grazing

Threats Addressed

- Livestock allotments

Plan Component

- FW-GDL-GRZ-01

- FW-GDL- GRZ-03

Plan Component Summary
FW-GDL-GRZ-01 directs that livestock salting should be excluded from riparian areas, meadows, designated sensitive plant habitat, seedling conifer regeneration areas, aspen restoration areas, and prescribed restoration areas. FW-GDL-GRZ-03 requires that forage utilization should not exceed 35 to 55 percent.

Effect
Ensure grazing is conducted sustainably, leaving habitat in good condition for grizzly bears.

FW-GLD-GRZ01 would prevent trampling and concentrated uses areas within habitats that may be important to grizzly bears such as meadows, and riparian areas.

FW-GLD-GRZ-03 would ensure that grizzly bear habitats are not overutilized and that they maintain plant vigor and abundance of species despite grazing pressure.

Designated Wilderness Areas

Threats Addressed
- Motorized Access
- Vegetation management

Plan Component
- MA1-DC-WILD-01
- MA1-STD-WILD-01
- MA1-SUIT-WILD-01
- MA1-SUIT-WILD-02
- MA1-SUIT-WILD-03
- MA1-SUIT-WILD-04
- MA1-SUIT-WILD-05
- MA1-SUIT-WILD-06
- MA1-SUIT-WILD-07
- MA1-SUIT-WILD-08
- MA1-SUIT-WILD-09
- MA1-SUIT-WILD-10
- MA1-SUIT-WILD-11

Plan Component Summary
MA1-DC-WILD-01 would direct management to ensure that natural ecological processes and disturbances (for example, succession, wildfire, avalanches, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation.

MA1-STD-WILD-01 requires that management activities within designated wilderness areas shall preserve and protect wilderness character as required by the Wilderness Act, as well as each wilderness area's enabling legislation and its specific management plan.

Suitability was addressed above but essentially timber harvest, timber production, permanent road construction, temporary road construction, mineral extraction (except for those established prior to January 1, 1989), new facilities, motorized recreation, motorized over-snow travel, and mechanized transport are all unsuitable and prohibited in wilderness areas. Livestock grazing is suitable per designating legislation.

Effect

These plan components remove many threats and should maintain ecological conditions to contribute to recovery, especially within the Bitterroot Recovery Zone. Standards that require management to maintain wilderness character would prevent any actions not consistent with wilderness management. These would protect grizzly bear habitats. Suitability reduces or prevents many activities known to impact grizzly bears. These apply to designated wilderness that makes up the Bitterroot Recovery Zone, but also the Gospel-Hump Wilderness Area.

Designated Wild and Scenic Rivers

Threats Addressed

- Motorized access
- Vegetation management
- Wildfires

Plan Component

- MA1-DC-DWSR-01
- MA1-STD-DWSR-01
- MA1-STD-DWSR-02
- MA1-SUIT-DWSR-01
- MA1-SUIT-DWSR-01
- MA1-SUIT-DWSR-03
- MA1-SUIT-DWSR-04
- MA1-SUIT-DWSR-05
- MA1-SUIT-DWSR-06
- MA1-SUIT-DWSR-07
- MA1-SUIT-DWSR-08
- MA1-SUIT-DWSR-09
- MA1-SUIT-DWSR-10
- MA1-SUIT-DWSR-11

Plan Component Summary
Desired condition MA1-DC-DWSR-01 would direct management so that designated wild, scenic, and recreational rivers retain their free-flowing condition, water quality, and the outstandingly remarkable values for which the river was designated.

Standard MA1-STD-DWSR-01 requires that management activities in designated wild and scenic river corridors shall comply with their individual comprehensive river management plans.

MA1-STD-DWSR-02 requires that management activities in designated wild and scenic river corridors shall maintain their free-flowing character, water quality, and outstandingly remarkable values for which the river was designated.

The plan identifies uses that are suitable or not within wild and scenic rivers. These were analyzed in detail above.

Effect
These plan components would help ensure that designated wild and scenic rivers would contribute habitat conditions for grizzly bears because they are managed to conserve free flowing condition and outstandingly remarkable values within the river corridor (one-quarter mile of the river on either side). Outstandingly remarkable values include values for recreation, scenery, wildlife, geology, fisheries, and cultural outstandingly remarkable values. All these values must be protected which indirectly protects these areas for future grizzly bear use. “Free flowing” as applied to any river or section of a river means existing or flowing in a natural condition without impoundment, diversion, straightening, riprapping, or other modification of the waterway (as defined in the Wild and Scenic River Act). The requirement to maintain free flow would prevent alteration of these rivers.

Timber production is not suitable in wild and scenic river corridors, timber harvest is allowed under some circumstances, and road construction is restricted in areas designated as wild but not under recreational rivers. Some mineral extraction, motorized travel, and road construction is limited within wild rivers corridors. Restrictions on these activities would help to protect these areas from alteration and maintain conditions that could benefit grizzly bears.

Recommended Wilderness

Threats Addressed
- Motorized access
- Vegetation management
- Wildfires

Plan Component
- MA2-DC-RWILD-01
- MA2-DC-RWILD-02
- MA2-DC-RWILD-03
- MA2-OBJ-RWILD-01
- MA2-STD-RWILD-01
- MA2-STD-RWILD-02
- MA2-GDL-RWILD-01
- MA2-SUIT-RWILD-01
- MA2-SUIT-RWILD-02
- MA2-SUIT-RWILD-03
- MA2-SUIT-RWILD-04
- MA2-SUIT-RWILD-05
- MA2-SUIT-RWILD-06
- MA2-SUIT-RWILD-07
- MA2-SUIT-RWILD-08
- MA2-SUIT-RWILD-09
- MA2-SUIT-RWILD-10
- MA2-SUIT-RWILD-11
- MA2-SUIT-RWILD-11
- MA2-SUIT-RWILD-12
- MA2-SUIT-RWILD-13

- MA2-SUIT-RWILD-14
- MA2-SUIT-RWILD-16
- MA2-SUIT-RWILD-17
- MA2-SUIT-RWILD-18
- MA2-SUIT-RWILD-19
- MA2-SUIT-RWILD-20

Plan Component Summary

MA2-DC-RWILD-01 is a desired condition that Recommended wilderness areas maintain their existing wilderness characteristics to preserve opportunities for inclusion in the National Wilderness Preservation System.

MA2-DC-RWILD-02 would direct management so that recommended wilderness areas are characterized by a natural environment where ecological processes and disturbances (for example, natural succession, fire, avalanches, insects, and diseases) are the primary forces affecting the composition, structure, and patterns of vegetation.

MA2-DC-RWILD-03 would direct management to ensure that recommended wilderness areas facilitate the connectivity and movement of wildlife species across the Nez Perce-Clearwater by remaining large areas with little human activity.

MA2-OBJ-RWILD-01 is an objective that seeks to ensure activities within recommended wilderness areas are consistent with plan suitability components within five years.

MA2-STD-RWILD-01 requires that summer recreation opportunities shall be compatible with the appropriate recreation opportunity spectrum classification of primitive or semi-primitive non-motorized.

MA2-STD-RWILD-02 requires that winter recreation opportunities shall be compatible with the appropriate recreation opportunity spectrum classification of primitive or semi-primitive non-motorized.

MA2-GDL-RWILD-01 requires that if fire management actions are required within recommended wilderness, the Forest Service should apply minimum impact strategies and tactics to manage wildland fire that protect wilderness characteristics, unless more direct attack is needed to protect life or adjacent property or mitigate risks to responders.

Suitability plan components were analyzed above but essentially, most uses within recommended wilderness are unsuitable or conditionally suitable where the activities are allowed consistent with Idaho Roadless Rule.

Effect

These plan components should help ensure that recommended wilderness areas would remain in a natural and wild state. It would promote ecological conditions to provide for grizzly bear habitat. These areas would provide for connectivity and secure habitat for grizzly bears. They would be managed largely by natural disturbances.

Standards MA2-STD-RWILD-01 and MA2-STD-RWILD-02 and suitability components ensure that these areas remain free from motorized uses.

Eligible and Suitable Wild and Scenic Rivers

Threats Addressed

- Motorized Access
- Recreation
- Vegetation management
- Mineral and energy development

Plan Component
- MA2-DC-E&SWSR-01
- MA2-STD-E&SWSR-01
- MA2-STD-E&SWSR-02
- MA2-GDL-E&SWSR-02
- MA2-SUIT-E&SWR-01 through MA2-E&SWR-22

Plan Component Summary
MA2-DC-E&SWSR-01 would direct management to ensure suitable wild, scenic, and recreational rivers retain their free-flowing condition, preliminary classification, and the outstandingly remarkable values that provide the basis for their inclusion in the system.

MA2-STD-E&SWSR-01 prohibits the authorization or construction of roads, trails, facilities, or airstrips that would alter the classification of the river.

MA2-STD-E&SWSR-02 applies to suitable wild river segment corridors. It prevents authorization or construction of roads outside of the corridor that would adversely affect the wild classification of the river.

MA2-GDL-E&SWSR-02 would restrict new road, trail, and airfield construction so that should be designed to maintain the outstandingly remarkable values, classification, free-flowing character, and water quality of the river.

Suitability was analyzed above but would essentially be managed similar to designated wild and scenic rivers. Rivers in the wild classification have more restrictions and do not allow timber production, permanent road construction, temporary road construction, reconstruction of roads, mineral materials-saleable, major facility construction, motorized over-snow vehicle use, and motorized travel. Activities in other classes of rivers are conditionally allowed such as when needed to maintain a primitive recreation experience or to protect users or to protect outstandingly remarkable values.

Motorized travel is generally not compatible with a Wild classification. Where motorized travel options are deemed to be necessary, such uses should be carefully defined and impacts mitigated. Motorized travel in Scenic and Recreational classifications may be permitted, prohibited, or restricted to protect outstandingly remarkable values.

Effect
Effects are similar to designated wild and scenic rivers. These plan components would help protect habitats one-quarter mile around eligible rivers and would contribute to grizzly bear habitats indirectly through management to maintain free flowing characteristics and outstandingly remarkable values. Similarly, prohibitions on suitability of uses would help conserve these habitats.

Idaho Roadless Rule Areas

Threats Addressed
- Motorized Access
- Recreation
- Vegetation management
- Mineral and energy development

Plan Component
- MA2-DC-IRA-01
- MA2-DC-IRA-02
- MA2-DC-IRA-03
- MA2-DC-IRA-05
- MA2-STD-IRA-01
- MA2-SUIT-IRA-01 through MA-SUIT-IRA-11

Plan Component Summary
MA2-DC-IRA-01. Roadless Areas maintain the roadless characteristics and themes assigned to them in the Idaho Roadless Rule.

MA2-DC-IRA-02. The composition, structure, and pattern of vegetation reflect natural disturbances and follow Idaho Roadless Rule themes, as assigned.

MA2-DC-IRA-03. Roadless areas contribute habitats for wide ranging species and connectivity for movement of wildlife. These areas also provide foraging, security, denning, and nesting habitat for wildlife.

MA2-DC-IRA-05. Habitat configuration, distribution, and composition provide ecological conditions that increase elk herds.

MA2-STD-IRA-01. The provisions in the Idaho Roadless Rule (36 CFR 294 Subpart C) shall take precedence over any inconsistent land management plan component unless and until the rule is amended. Land management plan components that are not inconsistent with the Idaho Roadless Rule will continue to provide guidance for projects and activities within Idaho Roadless Areas and those related to protection of threatened and endangered species (36 CFR 294.28(d)).

Suitability within Idaho Roadless Rule were designed to be consistent with the rule and was analyzed above. Activities that are suitable or not depend upon the roadless rule theme, with Wildland recreation theme areas being the most restrictive while the Backcountry Restoration theme is least restrictive. Some activities are only conditionally suitable.

Effect
Roadless rule areas would be managed consistent with the Idaho Roadless Rule. Vegetation management would seek to maintain the composition, structure and pattern that reflect natural disturbances. Desired condition MA2-DC-IRA-03 would direct management to provide connectivity for wildlife, including grizzly bears, within the Idaho Roadless Rule Areas. Plan direction for Idaho Roadless Rule areas prevents activities like road construction and timber production that can affect conditions for grizzly bears. Direction to increase elk herds would contribute to bear nutrition. Suitability plan components are consistent with the Idaho Roadless Rule and will help provide ecological conditions for grizzly bears.

Research Natural Areas

Threats Addressed
- Motorized Access
- Recreation
- Vegetation management

- Mineral and energy development

Plan Component

- MA2-DC-RNA-01
- MA2-STD-RNA-01
- MA2-STD-RNA-02
- MA2-SUIT-RNA-01 through MA2-SUIT-RNA-11

Plan Component Summary

Desired Condition MA2-DC-RNA-01 would direct management to maintain a representation of natural systems as a baseline for research, monitoring, and education by the agency, academia, and public interests. Additionally, these areas would be managed so that wildfire, insects, and pathogens, along with other processes and disturbances, continue to affect vegetation, reflecting the dynamic nature of the systems they represent. Research natural areas contribute to ecological sustainability and biological diversity.

MA2-STD-RNA-01 does not allow collection of forest products.

MA2-STD-RNA-02 will not allow or authorize uses that threaten or interfere with the objectives or purposes for which a research natural area is established consistent with the desired condition above.

The following activities are unsuitable in Research Natural Areas: Timber production, Timber harvest, Permanent Road construction, temporary road construction leasable minerals, mineral materials, new facilities, and motorized recreation.

Effect

These areas make up a small percent of the plan area but management within them would maintain grizzly bear habitat there. Timber production, harvest, road building, temp roads, mineral extraction, construction of new buildings, and motorized travel are prohibited and thus would protect these areas from those impacts. Management emphasis is on maintaining natural conditions which should maintain habitats for grizzly bears.

Lolo Trail National Historic Landmark

Threats Addressed

- Motorized Access
- Vegetation management
- Mineral and energy development

Plan Component

- GA-GDL-NHL-05

Plan Component Summary

GA-GDL-NHL-05 states; "New temporary or permanent road and trail construction should not be permitted within the Landmark unless the integrity of the National Historic Landmark is maintained, and the purpose of the action is to benefit the National Register integrity of the Landmark."

Suitability plan components find timber production, timber harvest, livestock grazing, leasable mineral extraction, mineral materials, new building construction as unsuitable. Permanent and temporary road construction are only suitable if the integrity of the National Historic Landmark is maintained.

Effect

These areas would be maintained for grizzly bear by this management. Maintain habitats for grizzly bears by preventing some actions known to impact grizzly bears. Management emphasizes managing wildfire to operate as the disturbance regime.

Summary

The overarching theme of vegetation management is to manage the national forest in a sustainable manner based on natural range of variation, with an emphasis on timber production limited to Management Area 3. The plan contains no direction to restrict road or motorized trail densities other than those within the multiple uses elk plan components, or those that apply within specific management areas such as recommended wilderness, recreation, suitable wild and scenic rivers, research natural areas, eligible and suitable wild and scenic rivers, and the National Historic Landmark. Instead, it relies on existing regulations found in law or regulation for Idaho Roadless Rule, designated wilderness, designated wild and scenic rivers, and designated research natural areas to maintain low road densities and secure habitat. An additional layer of management is included in the recreation opportunity spectrum alternatives that were analyzed in detail above, where decisions about suitability of uses are made across broad areas, including motorized travel and recreational development.

Plan Direction that Contributes to Ecological Condition for Grizzly Bear Recovery

Air Quality

Plan direction in the air quality section would have no effect on grizzly bears.

Cultural Resources

Plan direction for cultural resources would have no environmental consequences for grizzly bears.

Municipal Watersheds

Plan direction for municipal watersheds would have no environmental consequences for grizzly bears.

Scenery

Plan direction in the scenery section would have no effect or beneficial effects on grizzly bears.

Public Information, Interpretation, and Education

Plan direction in the public information, interpretation, and education section would have beneficial or no effect on grizzly bears. This plan direction may provide a mechanism for increased public awareness and education about attractants and grizzly bear ecology.

Lower Salmon

Plan direction in the Lower Salmon geographic area section would have negligible consequences on grizzly bears.

Pilot Knob

Plan direction in the Pilot Knob geographic area section would have negligible or no consequences for grizzly bears.

Lolo Trail National Landmark

Plan direction in the Lolo Trail National Landmark section would have negligible or no consequences for grizzly bears.

Connectivity Cumulative Effects

The analysis of cumulative effects provides a larger context in which to evaluate existing conditions and the effects of continuing to implement the Forest Plan. This section discusses the effects of management on adjoining federal, state, and private lands; the potential for connectivity between Recovery Zones; and the ongoing effects of climate change.

The area for cumulative effects is the Bitterroot Ecosystem. This ecosystem occurs roughly approximately from I-90 in the North, south following Highway 93 in Montana and Idaho, West along Highway 23 and I-84 in Idaho, North along Highway 95 in Idaho up to I-90.

Grizzly bear management is guided by the Bitterroot chapter to the grizzly bear recovery plan. That plan seeks to recover grizzly bears in the ecosystem. Originally, the plan was to recover grizzly bears within the Frank Church-River of No Return Wilderness and the Selway-Bitterroot Wilderness via translocation. Since then, the emphasis changed to natural dispersal. The ability of the recovery zone to recover grizzly bears therefore depends on connectivity from other grizzly bear ecosystems.

The Bitterroot recovery zone occurs almost entirely on National Forest System lands and several national forests administer different parts of the recovery zone and surrounding lands, including the Lolo, Bitterroot, Salmon-Chalis, and Boise. These national forests have Forest Plans that support recovery within the ecosystem and cooperate with the U.S. Fish and Wildlife Service in recovery efforts. The designated wilderness areas have wilderness management plans that direct the management of the wilderness areas such that they maintain wilderness character. As most of the recovery zone is designated wilderness, there are few threats to grizzly bears there, other than potential human bear conflicts. Wilderness plans provide strong direction to manage these lands with constraints on many activities. Additionally, Forest Plans provide significant direction for the management of designated wilderness areas. Outside of the recovery zone, but within the Bitterroot ecosystem, National Forest System lands are managed under the direction of Forest Plans, largely to manage lands for multiple uses. Forest plans have constraints or direction to support or manage for the recovery of federally listed species, but the measures used can vary widely depending upon the degree to which there has been a history of grizzly bear presence. Forests that have not previously had a history of grizzly bear presence have fewer measures in their plans for recovery whereas forests in closer proximity to recovery zones have more measures in their plans. Forest in Montana have managed for grizzly bear conservation as a result of grizzly bear occurs from either the Northern Continental Divide, the Cabinet-Yaak, or Selkirk ecosystems. National forests near the Yellowstone Ecosystem have a history of conservation measures for grizzly bears coming from the Greater Yellowstone Ecosystem.

All the national forests within the Bitterroot Ecosystem participates in the Interagency Grizzly Bear Bitterroot Ecosystem subcommittee to make progress towards recovery and implement measures to contribute to recovery. In both the Northern Region and Intermountain Region, forests manage grizzly bear habitat as federally listed threatened species. The Forest Service Manual includes specific direction for the management of grizzly bears. Several forest plans have direction on the management of federally listed species, and each forest consults with the U. S. Fish and Wildlife Service on projects that may affect grizzly bears. The Nez Perce-Clearwater plans include measures to provide for grizzly bears through both the 1987 plans and through this Forest Plan revision effort. The National Forests that administer lands within the ecosystem participate in efforts to provide food storage infrastructure in when funding is available and participate in public education and outreach with their bear aware programs.

The Beaverhead-Deerlodge to the East has amended their plan have revised or amended their forest plans to incorporate habitat management direction from the Greater Yellowstone Ecosystem Grizzly Bear

Conservation Strategy. The Caribou-Targhee National Forest reverts to 1997 direction, which does not directly incorporate conservation strategy recommendations, but follows Grizzly Bear Guidelines from the mid-1980s and access recommendations from the mid-1990s. The Caribou-Targhee is in the process of beginning their Forest Plan Revision efforts. The Caribou-Targhee has specific plan components for maintaining secure habitat in certain areas, phasing out domestic sheep grazing allotments and requiring proper storage of food and attractants.

The Nez Perce-Clearwater is flanked on the north by the St. Joe National Forest, the northeast by the Lolo National Forest, the east by the Bitterroot National Forest, and the south by the Payette National Forest. Management on these national forests is unlikely to disrupt connectivity for grizzly bears. The Nature Conservancy mapped landscape permeability for the Pacific Northwest (McRae et al. 2016), including western Montana, by classifying areas as having high, moderate, or low landscape permeability. Overall, their analysis indicated that the network of federal lands in north central Idaho provides a high degree of landscape permeability for wildlife. Collectively they provide management to contribute to recovery of federally listed species like grizzly bears.

The Nez Perce-Clearwater plan under the Preferred Alternative is part of a larger cooperative effort to provide for recovery in the Bitterroot Ecosystem and Recovery Zone. The plan provides species specific plan components to maintain connectivity and manage for grizzly bear conservation consistent with efforts within the Bitterroot Ecosystem. The Idaho Department of Lands manages lands adjacent to the west of the Nez Perce-Clearwater. These lands are primarily managed for timber production and are heavily roaded. These lands mostly occur to the west of the plan area where grizzly bear dispersal is not expected to occur. In the event a grizzly bear enters these lands, the management of these lands are not likely to pose a barrier to dispersal. However, the higher road densities and increased human activities may cause some bear-human conflict that could result in removal of dispersing bears.

Private Lands

In Idaho, large tracts of private lands are owned to the east of the Nez Perce-Clearwater boundaries. Large portions of these lands are managed for timber production and are heavily roaded but are not populated. A much lesser portion of private lands in these areas are residences or farmlands. These land areas are not located where bears are expected to disperse from the other ecosystems.

The human population in northwest Montana has grown at a relatively high rate during the past few decades and growth is expected to continue. Increasing residential development and demand for recreational opportunities can result in habitat loss, habitat fragmentation, and increases in human-grizzly bear conflicts. Private lands continue to account for a disproportionate number of conflicts and grizzly bear mortalities in Montana. These impacts are likely to intensify, although appropriate residential planning, outreach to landowners about how to avoid conflicts, tools such as bear-resistant containers and electric fencing, and assistance in resolving conflicts can help prevent or reduce these impacts.

Increasing development on private lands and the accompanying risk of human-grizzly bear conflicts has the potential to have cumulative adverse effects on grizzly bears that are moving towards the Bitterroot Ecosystem. Developments within northwestern Montana may pose a barrier to grizzly bear dispersal into the plan area.

Highways and Development North of Nez Perce-Clearwater

In order for grizzly bears to reach the Nez Perce-Clearwater, they must pass one or more highways. Some of these highways have developments that may pose a challenge to the dispersal of grizzly bears into the Nez Perce-Clearwater (Servheen, Waller, and Sandstrom 2003). The combination of highways and developments poses significant barriers to grizzly bear dispersal into the Bitterroot Ecosystem. Servheen (2003) predicted linkages that would allow dispersal. These linkages will be evaluated for effects to dispersing grizzly bears.

The most significant barriers to connectivity include the I-90 corridor, Montana Highway 200, Montana Highway 93, and associated human development. Servheen (2003) predicted several linkage areas through these developed areas into the Bitterroot Ecosystem. Passage of bears through these linkage areas may dictate where bears enter the Nez Perce-Clearwater and the Bitterroot Ecosystem to some extent.

Most fragmentation between the Northern Continental Divide and Bitterroot Ecosystems occurs along the I-90 corridor between Missoula, Montana and Superior, Montana and along U.S. Highway 93 north of Missoula from Evaro Hill to Ravalli Hill. Missoula is a rapidly growing city and suburban development has been rapidly spreading west and north along these major highway corridors. Some connectivity areas were available between Alberton, Montana and Superior, Montana; between Superior, Montana and St. Regis, Montana; and northwest of St. Regis (Servheen, Waller, and Sandstrom 2003). Bears traveling through these linkage areas would most likely enter the Nez Perce-Clearwater through the Hoodoo or Mallard Larkin areas. The area between Lolo, Montana and Lolo Hot Springs, Montana along U.S. Highway 12 is well connected. Bears traveling through this area would have little trouble passing into the plan area and would do so near Lolo Pass.

Servheen (2003) did not evaluate connectivity south of Lolo, Montana. The spread of the Northern Continental Divide Ecosystem population southward may enable this area to serve as a path through which bears may disperse. Bears dispersing through this area would also face significant barriers through Highway 93 and associated development into the Bitterroot Ecosystem area. However, if they made it through these areas, bears would have an easy time reaching the Bitterroot Ecosystem because they would enter the Bitterroot National Forest and be a short distance away from the Bitterroot Ecosystem boundary.

State Management of Grizzly Bears

The Montana Department of Fish, Wildlife, and Parks completed a grizzly bear management plan for western Montana in 2006 (Dood et al. 2006) and a grizzly bear management plan for southwestern Montana in 2013 (Montana Fish Wildlife and Parks 2013). Grizzly bear management plans establish goals and strategies to manage and enhance grizzly bear populations and to minimize the potential for grizzly bear-human conflicts. A long-term goal is to allow the populations in western and southwestern Montana to reconnect through intervening currently unoccupied habitats.

The Montana Department of Fish, Wildlife, and Parks is very active in providing public information and education about conserving grizzly bears and their habitat. Several bear management specialists, including one stationed nearby in Missoula, work with landowners and educate the public to avoid or resolve grizzly bear-human conflicts and to reduce grizzly bear mortalities. Bear specialists provide information and assistance to landowners on appropriate ways to secure food and bear attractants and respond to reports of conflicts with black bears and grizzly bears. These programs have a proven track record of success in informing the public, reducing the availability of attractants to bears on private and public lands, and reducing human-caused mortalities of grizzly bears.

Montana and Idaho regulate hunting for black bears and other wildlife species. Hunting of grizzly bears has not been allowed in Montana since 1991. There is a potential for grizzly bear mortality by hunters to occur as a result of mistaken bear identification or self-defense, especially in proximity to the carcasses of harvested animals. The Montana Department of Fish, Wildlife, and Parks provides a variety of public information and education programs, including a mandatory black bear hunter testing and certification program, to help educate hunters in distinguishing the two species. Black bear hunting seasons have been shortened in recent years, reducing the potential for mistaken identity. These efforts have helped to decrease legal and illegal shooting mortalities. No adverse cumulative effects are anticipated due to management actions of the Montana Department of Fish, Wildlife, and Parks.

The State of Idaho cooperates with the U. S. Fish and Wildlife Service and the Forest Service for the proper management of grizzly bears. The state supports grizzly bear recovery in the Bitterroot Ecosystem through participation in the Interagency Grizzly Bear Bitterroot Ecosystem subcommittee and supports the recovery of grizzly bears in the ecosystem but desire grizzly bears to migrate to the recovery zone on their own. While the State of Idaho does not have a grizzly bear plan for the Bitterroot Ecosystem, they do have plans that support efforts to recover grizzly bears in other ecosystems in the state like the Greater Yellowstone Ecosystem, Selkirk Ecosystem, and Cabinet-Yaak Ecosystem. The state also participates in outreach and education efforts and provide hunters with information on grizzly bear identification and safety information to help reduce or avoid accidental grizzly bear deaths. The State of Idaho also participates in efforts to reduce grizzly bear human conflicts. The Statewide Wildlife Action Plan addresses grizzly bear management and habitat and provides goals, objectives, and strategies related to grizzly bears.

Idaho's strategy for grizzly bears, outlined in their Statewide Wildlife Action Plan, includes continuing conservation partnerships, reducing or preventing illegal and accidental mortalities, reducing anthropogenic attractants and other potential for human-bear conflicts, and managing access to limit conflict and disturbance. The Idaho Department of Fish and Game allows liberal black bear hunting, including over bait. They engage the public in education about the difference between black and grizzly bears and notify the public about the potential to encounter a grizzly bear in the Clearwater region.

Climate Change

The rate of change and the impacts from climate change are accelerating. The U.S. Fish and Wildlife Service examined climate change and potential future effects on the grizzly bear in its five-year status review (U.S. Department of the Interior 2011c). The most likely ways in which climate change may potentially affect grizzly bears are reduction in snowpack levels, shifts in the denning season, shifts in the abundance and distribution of some natural food sources, and changes in fire regimes due to summer drought.

Reduced snowpack or a shorter winter season could improve over-winter survival of bears, assuming that sufficient bear foods are available later in the fall and earlier in the spring. However, a shorter denning period could increase the potential for spring and fall encounters between grizzly bears and hunters and recreationists, which in turn would increase the risk of mortality to grizzly bears (Servheen and Cross 2010). The extent and rate to which individual plant species or plant communities will be impacted by climate change is not possible to foresee with any level of confidence (Fagre et al. 2003, Walther et al. 2002). However, there is general consensus that grizzly bears are flexible enough in their diet that they will not be impacted directly by plant community changes in response to climate change (Servheen and Cross 2010). Fire frequency and severity are predicted to increase in the western United States as a result of climate change. Large, severe wildfires that convert mature forest to early successional condition alter the availability of grizzly bear foods and cover, potentially changing how bears use the landscape. Decreases in forest cover could benefit grizzly bears by increasing the production of shrubs, berries, and root crops in the years following large fires. The potential positive and negative effects of climate change would likely be variable and are difficult to predict. Grizzly bears are habitat generalists and opportunistic omnivores, which may make them less susceptible to changes in plant communities than some other species of wildlife. There is a high degree of uncertainty, but the continuing effects of climate change are unlikely to reduce the ability of the Nez Perce-Clearwater to support occasional bears moving into or through the action area.

Conclusions

Once grizzly bears establish a population, and perhaps as they move into the plan area, they will inevitably encounter existing conditions that could lead to conflict. The plan does not, nor could it, prohibit all actions that could lead to effects on grizzly bears, human-bear conflicts, and mortality as they move into the national forest. Some actions conducted under the plan or in the existing condition will increase the probability of human-bear conflicts that most likely will leads to either bear relocation or deaths after they become established. The most impactful factors for grizzly bear persistence across their range has been those that influence survival. Other than natural mortality, grizzly bear mortality is most affected by human-bear conflicts that result from grizzly bear and human behavior when they are in proximity and often result in bear deaths. Conflicts arise from bears being attracted to human foods, surprise encounters, livestock depredation, hunting related contact, and recreation related contact. All of these conflicts are correlated with the travel access system, and multiple studies have found that bear survival is related to motorized access.

The plan area and alternatives would contribute to the recovery of grizzly bears because the Bitterroot Recovery zone currently provides the ecological conditions for a grizzly bear population, which is maintained through wilderness management under law and the plan direction across all alternatives would contribute to recovery, provided they can disperse there. Direction for the Bitterroot Recovery Zone in the Land Management Plan would prohibit any new motorized uses in the recovery zone because it identifies these lands as unsuitable for motorized uses so no motorized roads and trails would be allowed. This would maintain the ecological conditions within the recovery zone as nearly 100 percent secure habitat.

The salient question then becomes, does the plan area outside the recovery zone provide the ecological conditions to provide connectivity to the Bitterroot Recovery Zone? Areas outside of the Bitterroot Recovery Zone, excluding Management Area 3, also could currently contribute to grizzly bear recovery because they currently have the sufficient secure habitat for female dispersal and reproduction required for allowing grizzly bears to spread into the Bitterroot Recovery Zone. Together with the designated wilderness, the plan area provides 2,698,716 acres of protected lands, of which 84 percent or 2,268,274 is secure habitat, an area larger than Yellowstone National Park. The 84 percent are secure habitat conditions in Management Area 1 and 2 lands are comparable to the percent in the North Continental Divide and Greater Yellowstone ecosystems. Consider that the Idaho Roadless Rule Areas in the Nez Perce-Clearwater Alone include 1,481,636 acres, of which 76.6 percent is secure habitat, which is an area comparable to the Selkirk and Cabinet-Yaak ecosystems, with a total amount of secure habitat that exceeds the amount of secure habitat in both those ecosystems combined. These measures would provide for grizzly bear recovery within the recovery zone and would largely maintain the conditions in the Idaho Roadless Rule Areas that would overall provide for grizzly bear connectivity and occupancy. Clearly, the plan area provides conditions capable of supporting grizzly bear populations and connectivity.

Grizzly bears are most likely to enter the Nez Perce-Clearwater from the north or northeast from potentially three other grizzly bear ecosystems. Based on female dispersal patterns, female dispersal could require females living on the Nez Perce-Clearwater outside of the Recovery Zone before they reach the Bitterroot Recovery Zone. However, the recovery zone is within the dispersal capabilities of female grizzly bears. The plan area currently has these ecological conditions as a result of a combination of management direction in the 1987 plans for elk security, restrictions on road construction in the Idaho Roadless Rule, designated wilderness management, and recommended wilderness management, which all constrained travel access.

Forest plans provide integrated plan components for the management of resources and allocate lands for a variety of uses. Various direction in the Land Management Plan has the potential to affect grizzly bears. This is expected as the plan balances human uses with measures for the sustainability of natural resources including wildlife habitat. Many areas of the plan have direction that would be beneficial to grizzly bear habitats. Other direction would have negative consequences for grizzly bear habitat, which includes Forestlands related to timber, energy and minerals, sustainable recreation, ecosystem services, suitability, and timber (related to roads), and have the potential to modify potential grizzly bear habitat. The plan does not authorize these activities but instead provides the broad programmatic direction under which actions would be guided. This plan used the new suitability plan components authorized by the 2012 Planning Rule to identify lands suitable for various uses. As such, this analysis evaluated the effects of the programmatic direction, the land allocations, and the uses suitable within those lands. Under the alternatives, the potential for effects stem from suitability determinations for timber production, temporary roads, livestock grazing, minerals, and motorized travel, each of which have environmental consequences. Many of these activities are constrained in Management Areas 1 and 2 because they are identified as unsuitable or conditionally suitable. The integrated plan components do not vary much by alternative. The land allocations on the other hand vary their distribution and the alternatives provide a gradient of land allocations that provide different levels of protection for grizzly bear habitats.

The most impactful factor influencing the future potential maintenance of secure habitat under the alternatives are the variations in motorized access explored to strike a balance of ecological conditions with social and economic considerations. Access was one of the issue statements for the development of the plan, with some wanting more access while others wanting less. The most impactful potential change under the alternatives are variations in the recreation opportunity spectrum, which dictates suitability for motorized uses. In terms of grizzly bear conservation, alternatives that provide the most secure habitat not suitable for motorized use ,better provide future conditions for grizzly bear occupancy. Other alternatives have lower amounts of secure habitat not suitable for motorized uses, with the Preferred Alternative having the second lowest amount at 66 percent.

However, some roadless rule areas are suitable for motorized uses in some areas. In these areas, since roads are prohibited, the key consideration would be the future creation and use of motorized trails within Management Area 2, which is mostly composed of Idaho Roadless Rule areas. Even with increased areas suitable for motorized uses, the plan area would follow Idaho Roadless Rule restrictions that would restrict roads, manage designated and recommended wilderness to maintain wilderness character, and authorize motorized access only after a site-specific analysis. There are a total of 1,681,779 acres of secure habitat completely protected as either designated wilderness or Idaho Roadless Rule areas where motorized uses are not suitable. About 565,519 acres of secure habitat in Idaho Roadless Rule Areas are suitable for motorized uses, with only limited possibilities of new roads due to the Idaho Roadless Rule constraints, but plan component MA2-GDL-WL-05 would apply to constrain the development of motorized trails.

In these cases, plan direction in the wildlife section limit motorized trails so that they would have to maintain areas 5,000 acres or larger without motorized access on either side of the new trail. While this mechanism would allow incremental reductions in secure habitat, it establishes a limit on both the overall amount of secure which could be impacted by motorized trails, a limit on the conditions that would allow motorized trails, and which would in turn limit the local distribution of motorized trails in Management Area 2. This plan component would restrict where and how much new motorized access there would be in Management Area 2 and still maintain many areas as secure habitats. This plan component was based on conditions preferred by elk but exceeds the sizes of secure habitat preferred by grizzly bears. Thus, the plan area would maintain the ecological conditions for connectivity into the Bitterroot Recovery Zone and even potential occupancy by grizzly bears. Still, a total of 542,720 acres of secure habitats in Idaho Roadless Rule Areas are not suitable for motorized uses within Idaho Roadless Rule Areas. This plan component would restrict where and how much new motorized access there could be in Management Area 2 and still maintain many areas as secure habitats because most of the secure habitats in Idaho Roadless Rule Areas are larger than 10,000 acres and could only be divided a limited number of times.

The context for this constraint is important to consider. In other grizzly bear ecosystems, constraints on motorized access were typically limited to areas within the recovery zones and were not applied or were applied at lower levels outside of recovery zones. MA2-GDL-WL-05 applied to Idaho Roadless Rule Areas that are completely outside the Bitterroot Recovery Zone and with the recovery zone fully protected from motorized uses. These are appropriate constraints given that the Nez Perce-Clearwater is currently considered unoccupied, and that these measures apply outside the recovery zone.

The alternatives provide varying amounts of recommended wilderness, which would slightly enhance connectivity for grizzly bears over Idaho Roadless Rule area management. The proposed Mallard-Larkin, Meadow Creek North-Upper North Fork, Rawhide, Hoodoo, Sneakfoot, and Northfork Spruces White Sand recommended wilderness areas would provide the most benefits to connectivity for dispersing bears to enter the Bitterroot Ecosystem. These are found in various combinations under the alternatives and would be best for grizzly bear connectivity in the following order: Alternative W, Alternative Z, the No Action Alternative, Alternative Y, and Alternative X. The Preferred Alternative selected the Hoodoo, Mallard Larkin, and Meadow Creek areas as recommended wilderness, which is more than in the No Action Alternative.

Alternatives for wild and scenic river suitability would provide some limited connectivity for bears because they would provide linear corridors for travel in various amounts that could be followed by dispersing bears. The benefits of these alternatives for grizzly bear connectivity from highest to lowest are in the following order: Alternative W, Alternative Z, Alternative Y, and Alternative X. The Preferred Alternative selected only a few rivers as suitable.

The key determination is whether the plan would provide connectivity from the Northern Continental Divide, Cabinet-Yaak, or Selkirk ecosystems into the Bitterroot Recovery Zone. Bears would most likely have to pass through the northern portion of the Nez Perce-Clearwater to enter this ecosystem. The northern portion of the Nez Perce-Clearwater provides the ecological conditions to provide connectivity because it has low road densities and management areas, such as Idaho Roadless Rule areas that restrict motorized development. Forest management may affect connectivity for grizzly bears, but mechanisms are in place to constrain those activities to maintain conditions for connectivity. Cumulative effects outside of Forest Service control may make it difficult for bears to enter into the Nez Perce-Clearwater and the Bitterroot Ecosystem from the other ecosystems to the north of the Nez Perce-Clearwater. The most significant barrier is highways, such as I-90, Montana Highway 200, and Montana Highway 93, and the associated human development around these highways that pose the most significant challenges for dispersing grizzly bears to make it into the Bitterroot Ecosystem. Based upon the linkage areas identified in Servheen and others (2003), the most likely places for bears to enter the Nez Perce-Clearwater are between the Mallard-Larkin area and the Hoodoo area. Once bears cross the highways and associated development in and around Missoula, Montana, they should be able to be connected to the Bitterroot Ecosystem.

The plan establishes three species specific desired conditions and a species-specific guideline for grizzly bears that will guide management of all future projects under the plan. These include FW-DC-WL-06, FW-DC-WL-07, FW-DC-WL-08, and MA2-GDL-WL-01. Additional plan desired conditions would guide the Nez Perce-Clearwater to provide for connectivity in for FW-DC-WL-09 for species like grizzly bears and others. Many other coarse filter ecosystem plan components also contribute to ecological conditions for grizzly bear dispersal and occupancy. Collectively, all these aspects of the plan combine to establish measures that will continue to maintain ecological conditions for grizzly bears to disperse into the Bitterroot Recovery Zone and establish a grizzly bear population.

The plan includes a potential management approaches section specific to grizzly bear management and which takes an adaptive approach to manage grizzly bears as they move into the area. While these are optional plan content and are not required to be followed the same as plan components, provide agency intent on management of grizzly bears in the future as bears move into the area. Topics include participation by the Nez Perce-Clearwater National Forest as a member of the Bitterroot Ecosystem subcommittee to understand best available science and best practices regarding grizzly bears in the Bitterroot Ecosystem and support recovery in the Bitterroot Recovery Zone. Potential management approaches also describe the use of minimization measures and conservation recommendations by the Bitterroot Ecosystem Subcommittee including sanitation plans, infrastructure, and reducing attractants. It describes incorporating consideration of connectivity for grizzly bear at a site-specific scale, and follow direction of the U.S. Fish and Wildlife Service regarding management, project level analysis, and consultation for grizzly bear on projects to reduce human-bear conflict and reduce impacts to current bear secure habitat.

The effects of the plan must be viewed as an integrated whole rather than focusing on individual plan components because it is the integrated and interacting parts of the plan that provide the overall guidance for forest management. The plan does not have many species-specific plan components for grizzly bears because of the direction in the 2012 Planning Rule to provide the ecosystem integrity and coarse filter ecosystem plan components to provide the ecological conditions for recovery. In whole, the plan provides a variety of plan desired conditions, guidelines, standards, and suitability of uses that indirectly benefit grizzly bears. Examples include plan components noted in the "Plan Direction that Contributes to Grizzly Bear Recover" section above.

These measures meet the requirements of the 2012 Planning Rule to provide the ecological conditions to contribute to recovery. These measures are also sufficient to provide the ecological conditions within the Bitterroot Recovery Zone for the achievement of recovery goals as outlined in the 1993 Grizzly Bear Recovery plan including the Bitterroot Ecosystem Chapter of the Recovery Plan (1996).

Multiple Uses Wildlife

The following analysis addresses the effects to socially and economically important wildlife and their habitat from the suite of plan components and range of alternatives considered in the Land Management Plan. The 2012 Planning Rule directs that plans must provide for ecosystem services and multiple uses within Forest Service authority and the inherent capability of the plan area. Plans must include plan components for multiple uses and for integrated resource management to provide for ecosystem services and multiple uses in the plan area. The responsible official must consider habitat conditions for wildlife, fish, and plants commonly enjoyed and used by the public and for hunting, fishing, trapping, gathering, observing, subsistence, and other activities in collaboration with federally recognized tribes, other federal agencies, and state and local governments. This must be done while meeting requirements for providing for the diversity and abundance of wildlife under Section 219.9 of the planning rule.

The spatial scale of this analysis includes the lands administered by the Nez Perce-Clearwater for effects. This area was chosen because the Nez Perce-Clearwater only has control of habitat conditions within the plan area. For cumulative effects, the spatial scale is the Clearwater Region of the Idaho Department of Fish and Game. The cumulative effects analysis area was chosen because the Idaho Department of Fish and Game typically has the basic role in fish and resident wildlife management and has primary authority and responsibility as trustee over wildlife populations. Therefore, this analysis tiers to the state's game management units, which are bounded by their regional boundaries.

Wildlife data from the Idaho Department of Fish and Game was obtained to inform the analysis, which contains data of game species found within the plan area. Idaho Department of Fish and Game data represents the best scientific information available for wildlife populations of species commonly used for multiple uses. The Nez Perce Tribe was also engaged for their expertise in wildlife species important to them to exercise their treaty reserved rights. Additional data sources included the Forest Service's Natural Resource Information System database of wildlife observations, migratory bird monitoring data from the Intermountain Bird Observatory, and other sources of data held internally. When available and relevant, the state provides habitat models for game species, count data, trend data, and other sources of information. The literature cited throughout this section is also identified as the best scientific information.

The Nez Perce-Clearwater engaged the Nez Perce Tribe, the Idaho Department of Fish and Game, and the Clearwater Basin Collaborative, as well as members of the public, in the development of plan components for multiple use wildlife species. Among these government agencies, groups, and individuals, there was an almost universal desire to have healthy populations of wildlife species typically used by the public, even though they may disagree in how to achieve or maintain this goal. The Nez Perce-Clearwater leveraged the expertise of these entities and brought in experts from the Pacific Northwest Research Station's Forestry and Range Sciences Laboratory in La Grande, Oregon, to help draft plan components to provide the ecological conditions needed for these species. These plan components were integrated with other resource areas to allow the Forest Service to balance the Nez Perce-Clearwater's ability to provide other multiple uses. The plan components underwent multiple iterations and changes during this process.

The effects of the plan components and alternatives on multiple use wildlife were evaluated under the context of 1) how the plan will maintain or improve habitat conditions for commonly used species and 2) how the plan might affect the ability of the public to continue to use this resource. The ability of the plan area to do this depends upon the size of the populations of these wildlife species. The Forest Service does not control all the factors that control wildlife populations. The primary factors the Forest Service has responsibility and control over is to provide the ecological conditions for these species within Forest Service authority and the capability of the plan area. These responsibilities must be balanced with other multiple uses while providing for the diversity and abundance of wildlife.

Changes between Draft and Final Environmental Impact Statements

During public meetings and in comments on the Draft Environmental Impact Statement, there was concern that plan components FW-STD-WL-02 and FW-GDL-WL-05 would inappropriately restrict pack goat use within the plan area. The response was to clarify FW-STD-WL-02 to not include pack goats. It now states:

In order to prevent disease transmission between wild sheep and domestic sheep and goats, domestic sheep and goat grazing (excluding pack goats) shall not be authorized in or within 16 miles of bighorn sheep occupied core herd home ranges.

Originally, FW-GDL-WL-05 was intended to prevent "permitting" or, in other words, issuing a special use permit for pack goat use within bighorn sheep core herd home ranges. A special-use authorization is a legal document, such as a permit, term permit, lease, or easement, which allows occupancy, use, rights, or privileges of agency land. The authorization is granted for a specific use of the land for a specific period.

An organization or individual requires a special use permit to occupy, use, or build on Forest Service land for personal or business purposes, whether the duration is temporary or long term. Similarly, if there is a fee being charged or if income is derived from the use, or if an activity on those lands involves individuals or organizations with 75 or more participants or spectators, then a special use permit is required. Guideline FW-GDL-WL-05 was not intended to restrict the public from personal use of pack goats within bighorn sheep core herd home ranges. After consideration of the comments, and the low probability of contact that pack goat use may present to the bighorn sheep herd, it was thought that measures to reduce the probability of contact could be included in special use permits that would safely allow pack goat use under a special use permit. As in the Draft Environmental Impact Statement, the guideline allows use of pack goats by the public when a special use permit is not required. FW-GDL-WL-05 was edited to clarify the guideline which now states:

New authorizations and permit reauthorizations for domestic goat packing should include provisions to prevent disease transmission between domestic goats and bighorn sheep.

Affected Environment

Existing Condition

The plan area supports 62 species commonly used by the public for hunting, trapping, gathering, subsistence, and other uses. These species use a variety of habitats or key ecological features provided by ecosystem plan components. Table 287 lists the species commonly used as big game, upland game, furbearers, and waterfowl. Tribes may use other species in addition to these species for clothing, subsistence, ceremonial purposes, religious purposes, or to exercise treaty reserved rights.

Table 287. Wildlife typically used by the public, how they are used, and a brief habitat description.

Common Name	Use	Habitat Description
Bighorn sheep	big game	Rocky steep break lands.
Gray wolf	big game	Ranges in all northern habitats where there is suitable food with densities being highest where prey biomass is highest (Fuller 1989). Food is extremely variable but mainly large ungulates, such as moose, caribou, deer, elk, and wild boar. Wolves will also eat smaller prey items, livestock, carrion, and garbage.
Moose	big game	Found in woodland habitats, both coniferous and broad-leaved. This species prefers a mosaic of second-growth boreal forest, openings, swamps, lakes, and wetlands. Forages on broadleaf trees, preferring birch, ashes, and willow, in the spring and summer and the twigs of these species, as well as of fir, alpine, and juniper, in the autumn and winter. It also eats shrubs, such as blueberry and heather, dwarf shrubs, herbs, and aquatic plants.
Mountain goat	big game	Most occur in high altitude habitats up to the limit of vegetation. Although they sometimes descend to sea level in coastal areas, they are primarily an alpine and sub-alpine species. Their diet includes grasses, herbs, sedges, ferns, moss, lichen, twigs, and leaves from low-growing shrubs and conifers in their high-altitude habitat. The most common range feature is steep, rocky terrain.
Mountain lion or cougar	big game	Cougars are found in a broad range of habitats in all forest types, as well as lowland and montane desert. Several studies have shown that habitat with dense understory vegetation is preferred; however, cougars can live in very open habitats with only a minimum of vegetative cover. In North America, deer make up 60-80 percent of the diet. In the plan area, cougars are an important predator of elk.

Common Name	Use	Habitat Description
Mule deer	big game	Adapted to a variety of habitats including temperate forest, desert and semi desert, open range, grassland, field, and scrub habitats, as well as mountainous areas. Feeds mostly on browse.
Rocky Mountain elk	big game	Mainly coniferous forests interspersed with natural or man-made openings, such as mountain meadows, grasslands, burns, and logged areas. Forages on grasses, forbs, or browse, depending upon availability.
Whitetail deer	big game	Whitetail deer inhabit a wide range of habitats from temperate to subtropical and semi-arid environments in North America and include rainforests and other equatorial associations, such as deciduous forests and savannas of Central America and northern South America. Requirements are met in practically every ecological type, including grasslands, prairies, plains, mountains, hardwoods, coniferous and tropical forests, deserts, and even woodlots associated with farmland.
American badger	furbearer	Grasslands, meadows, open forest, brush, and deserts. Prefers grasslands or shrub lands, which can include parklands, farms, and treeless areas with friable soil and a supply of rodent prey. They may also be found in forest glades and meadows, marshes, brushy areas, hot deserts, and mountain meadows.
American beaver	furbearer	Rivers, springs, and lakes with adjacent woody broad-leaved foods, such as willow, aspen, and hardwoods.
American mink	furbearer	Species is found along streams and lakes, as well as in swamps and marshes. It prefers densely vegetated areas. It dens under stones or the roots of trees, in expropriated beaver castor or muskrat houses, or in self-excavated burrows. Forages on a variety of prey.
Common muskrat	furbearer	Found in brackish and fresh-water lakes, ponds, streams, rivers, and marshes.
Coyote	furbearer	Coyotes utilize almost all available habitats, including prairie, forest, desert, mountain, and tropical ecosystems. Prey populations are a key feature of these habitats. Foods include small mammals, birds, and deer sized ungulates.
Ermine or short-tailed weasel	furbearer	Often found in successional or forest-edge habitats, scrub, alpine meadows, marshes, riparian woodlands, hedgerows, and riverbanks that have high densities of small mammals, especially Microtus and Arvicola voles. Coniferous and mixed woodlands are preferred.
Long-tailed weasel	furbearer	Found in a wide variety of habitats, usually near water. Associated with non-forested habitats within forested landscapes. Favored habitats include brushland, open woodlands, field edges, riparian grasslands, swamps, and marshes. Dens are in abandoned burrows made by other mammals, rock crevices, brush piles, stump hollows, or space among tree roots. These weasels are usually most abundant in late seral stages or ecotones where prey diversity is greatest. Waterways provide access to suitable habitat and are a natural avenue for dispersal, particularly in areas that otherwise are unsuitable. Feeds primarily on small mammals, occasionally birds, other small vertebrates, and insects. They are not found in deserts or thick, dense forests.
Northern river otter	furbearer	Found anywhere there is a permanent food supply, such as fish, crustaceans, and amphibians, and easy access to water. In Idaho, river otters prefer valleys over mountain habitats, and they select valley streams over valley lakes, reservoirs, and ponds. Woody vegetation and log jams are important habitat features. In plan area, most observations are in larger rivers.
Red fox	furbearer	Utilizes a wide range of habitats, including forest, tundra, prairie, desert, mountains, farmlands, and urban areas.
Western spotted skunk	furbearer	Widespread in many habitats. In Idaho, western spotted skunks occur most commonly along streams, especially in the vicinity of basaltic outcroppings and rock piles. In southeastern Washington, uses rocky places and riparian thickets of willow and cottonwood. Commonly uses canyons, cliffs, rimrocks, lava fields,

Common Name	Use	Habitat Description
		and arid valleys, whereas, in coastal regions it is common in alder, salmonberry, riparian alder, riparian hardwood, and tanoak habitats. Known to use dens of other animals, such as beavers and woodrats, or under buildings. Dens in rock outcrops, road cuts, under shrubs, in crevices, and tree cavities.
California quail	upland game	Found in chaparral, sagebrush scrub, grassland oak, and riparian and foothill woodlands.
Chukar	upland game	Steep, rocky, mountainous terrain and a mixture of brush, grasses, and forbs. In the plan area, found in dry break lands.
Dusky grouse	upland game	Summer—shrub step, grassland, aspen, or non-forested alpine adjacent to conifer forest or open conifer forest, also forest mosaic. Abundant arthropods for broods and lush vegetation for adult food. Winter—high elevation conifer forest, Douglas-fir, and lodgepole important in winter diet.
Gray partridge	upland game	Agricultural fields and grasslands; in summer, especially with broods, mainly fields with cereal grains and row crops but also roadsides and shelterbelts.
Mountain cottontail	upland game	Occurs in a variety of habitats throughout its range. In the north, it primarily occupies sagebrush habitat while it occurs more frequently in forested areas in the south. Feeds on sagebrush and juniper all year where this vegetation occurs but grasses are preferred when available in spring and summer.
Mourning dove	upland game	Nests in a wide array of ecological types, usually open woodlands and edges between forest and prairie. Foods are seeds of herbaceous plants found in early successional habitats.
Ring-necked pheasant	upland game	Open habitats, often associated with agriculture lands.
Rock pigeon	upland game	Nest in crevices and caves in rocky seaside cliffs or interior uplands, especially near open scrub vegetation or human agriculture. Also, around human infrastructure.
Ruffed grouse	upland game	Closely associated with aspen. Most abundant in early-successional forests dominated by aspens and poplars. Present in riparian habitat and early-seral-stage deciduous forest in mountainous regions of Pacific Northwest. Although associated with aspen, heavy seasonal use of conifers in Idaho.
Snowshoe hare	upland game	Associated with conifer and mixed deciduous forest of North America. It requires dense understory vegetation, which it uses as cover. Diet consists mostly of grasses, forbs, sedges, and ferns.
Spruce grouse	upland game	Strongly associated with conifer forest. Fire seres are the typical habitat of this bird that prefer relatively young stands over more mature conifer forests.
Wild turkey	upland game	Found in Ponderosa pine, aspen/fir, spruce/fir, and oak. Brood rearing habitat consists of grassy openings in mixed conifer forests, stands of aspen, and open meadows.
American coot	waterfowl	Wetland species with heavy emergent vegetation along the shoreline in combination with deeper water.
American wigeon	waterfowl	Shallow, freshwater wetlands: sloughs, ponds, small lakes, marshes, and rivers.
Blue-winged teal	waterfowl	Shallow ponds with abundant invertebrates
Canada goose	waterfowl	A broad range of habitats near lakes, ponds, larger streams, marshes, muskegs, and wet hummocky areas.
Canvasback	waterfowl	Uncommon visitor in the plan area, only during migration. Uses a wide variety of aquatic features during migration, such as ponds, lakes, and slow rivers.
Cinnamon teal	waterfowl	Wetlands, ponds, and lakes with emergent vegetation.
Eurasian wigeon	waterfowl	Wetland or aquatic habitat.

Common Name	Use	Habitat Description
Gadwall	waterfowl	Breeding habitat—seasonal and semi-permanent wetlands, mixed prairie, parkland, shortgrass prairie, and tallgrass prairie. Migration habitat—lakes, reservoirs, beaver ponds, and farm ponds.
Green-winged teal	waterfowl	Forest wetlands. Breeds in wetlands in boreal forest and deciduous parklands and wetlands adjacent to grasslands or sedge meadows with brush thickets or woodlands.
Harlequin duck	waterfowl	Clear, fast-flowing rivers and streams with boulder substrates, low acidity, wide riparian vegetative zones, abundant aquatic insect larvae, midges, caddis flies, stone flies, mayflies, and salmonid roe.
Lesser scaup	waterfowl	Large seasonal and small, semi-permanent wetlands and lakes with emergent vegetation.
Mallard	waterfowl	Wide variety of wetlands, lakes, ponds, and other aquatic environments.
Northern pintail	waterfowl	Open country with shallow, seasonal, or intermittent wetlands and low vegetation.
Northern shoveler	waterfowl	Found in a variety of wetland habitats with nearby grasslands or rangelands for nesting.
Redhead	waterfowl	Habitat generalist. Uses wide variety of wetlands.
Ring-necked duck	waterfowl	Only a migrant in plan area. Migration habitat includes shallow lakes and impoundments with dense stands of flooded emergent or submergent vegetation. Mostly documented on large rivers in plan area.
Ruddy duck	waterfowl	Prairie pothole region where it nests in wetlands and marshes. No nesting habitat in plan area. Only a visitor to large rivers or wetlands in the plan area.
Sandhill crane	waterfowl	Open grasslands, meadow, wet meadows, marshes, and shallow wetlands. Nests near or in water on floating nests.
Snow goose	waterfowl	Migrant only in the plan area. Classification based upon migratory habitats. Frequents protected freshwater and brackish marshes, slow-moving rivers, large and small lakes, impoundments, farm fields, and sand bars; avoids forested areas.
Tundra swan	waterfowl	Migrant only in plan area - Migration habitat shallow ponds, lakes, and riverine marshes; also harvested agricultural fields and fields growing winter cereal grain. Sego pondweed important.
Wilson's snipe	waterfowl	Edges of bogs, fens, willow and alder swamps, and marshy edges of ponds, rivers, and brooks.
American black bear	big game	Reported from a broad variety of forested habitats from deciduous forests in eastern North America to coniferous forests in the west. Dense forests, riparian areas, open slopes, or avalanche chutes during spring green-up. Uses snow slides, stream bottoms, and wet meadows in early and mid-summer. May concentrate in berry and whitebark pine areas in fall. Hibernates in natural cavities, such as in trees or rocks, under logs, and brush piles. Studies in north central Idaho show bears select mature grand fir and Douglas-fir with greater than 60 percent canopy cover and select riparian areas. They also select fruiting shrub fields for foraging.
American marten and Pacific marten	furbearer	Associated with late-seral coniferous forests characterized by closed canopies, large trees, and abundant standing and fallen woody material. It dens in hollow trees or logs, in rocky crevices, or in burrows. Diet consists of rodents, hares, birds, and seasonal fruit. Voles, squirrels, and hares are the most important prey seasonally.
Bobcat	furbearer	A wide variety of habitats, including boreal coniferous and mixed forests in the north, bottomland hardwood forest and coastal swamp in the southeast, and desert and scrubland in the southwest. High rabbit and small mammal populations are requisite. They seem to prefer shrub, open, or early seral habitats over forested habitats. Only large, intensively cultivated areas appear

Common Name	Use	Habitat Description
		to be unsuitable habitat. Areas with dense understory vegetation and high prey density are most intensively selected. They sleep in hidden dens, often in hollow trees, thickets, or rocky crevices.
Northern raccoon	furbearer	Found almost anywhere water is available along streams and shorelines. Dens under logs or rock, in tree cavities, ground burrows, or banks. Most abundant in hardwood swamps, mangroves, flood forests, and marshes. Opportunistic omnivore, eating fruits, nuts, insects, small mammals, bird eggs and nestlings, reptile eggs, frogs, fish, aquatic invertebrates, worms, and garbage.
Barrow's goldeneye	waterfowl	Barrow's goldeneye is a cavity-nesting duck that depends heavily on the availability of large cavities. Winters mostly in marine habitats (salt water) and a few inland open rivers. Uses open rivers in the plan area during winter only. Most observations were during migration or wintertime. Prefers alkaline to freshwater lakes in parkland areas and, to a lesser extent, subalpine and alpine lakes, beaver ponds, and small sloughs for breeding. In British Columbia, breeding habitat includes aspen parkland, open Ponderosa pine forests, rangeland, alpine meadows, and subalpine lakes in closed coniferous forest at 300–1,850 meters elevation.
Bufflehead	waterfowl	Ponds, small lakes, and cavities for nesting during breeding season. Uses lakes or major river systems during migration.
Common goldeneye	waterfowl	Winter habitat only in the plan area. Winter habitat is usually marine environments but inland they use larger lakes and rivers as far north as open water is available. Most observations in the plan area are in larger rivers during fall, winter, and early spring. Migrates north for the summer.
Common merganser	waterfowl	Oligotrophic lakes and rivers bordered by mature tree cavities and abundant fish. Uses large rivers extensively in plan area during the breeding season.
Hooded merganser	waterfowl	Forested wetland habitats, including emergent marshes, small lakes, ponds, beaver wetlands, forested creeks and rivers, and swamps. Only a migrant in plan area.
Wood duck	waterfowl	Wide variety of habitats: creeks, rivers, overflow, bottomlands, swamps, marshes, and beaver and farm ponds. Abundant plant and invertebrate food bases close to suitable nest sites are essential components of breeding habitat. Herbaceous emergent plants, flooded shrubs, and downed timber are important. Mature forests are needed for development of trees with suitable cavities for nesting. Trees producing suitable nest sites are greater than 11 inches DBH but are commonly 23 inches.

Table 288. Wildlife species commonly used by the public and their assigned habitat grouping and subgrouping, as analyzed in the Abundance and Diversity of Wildlife Report

Species Name	Habitat Grouping	Habitat Subgroups
Sandhill Crane	Aquatic, wetland, water, and riparian habitats	Aquatic non-forested interface or non-forested wetlands
Bufflehead	Aquatic, wetland, water, and riparian habitats	Aquatic and forested habitats or forested wetlands
Common Merganser	Aquatic, wetland, water, and riparian habitats	Aquatic and forested habitats or forested wetlands
Hooded Merganser	Aquatic, wetland, water, and riparian habitats	Aquatic and forested habitats or forested wetlands
Wood Duck	Aquatic, wetland, water, and riparian habitats	Aquatic and forested habitats or forested wetlands
Common Muskrat	Aquatic, wetland, water, and riparian habitats	Aquatic generalist

Species Name	Habitat Grouping	Habitat Subgroups
Canada Goose	Aquatic, wetland, water, and riparian habitats	Aquatic generalist
Mallard	Aquatic, wetland, water, and riparian habitats	Aquatic generalist
American Mink	Aquatic, wetland, water, and riparian habitats	Aquatic generalist
American Coot	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
American Wigeon	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Blue-winged Teal	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Cinnamon Teal	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Eurasian Wigeon	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Gadwall	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Green-winged Teal	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Northern Pintail	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Northern Shoveler	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Redhead	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Ring-necked Duck	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Wilson's Snipe	Aquatic, wetland, water, and riparian habitats	Depressional wetlands, ponds, wetlands, marsh, emergent vegetation
Canvasback	Aquatic, wetland, water, and riparian habitats	Open water-Lakes, large rivers, open water within wetlands
Lesser Scaup	Aquatic, wetland, water, and riparian habitats	Open water-Lakes, large rivers, open water within wetlands
Ruddy Duck	Aquatic, wetland, water, and riparian habitats	Open water-Lakes, large rivers, open water within wetlands
Snow Goose	Aquatic, wetland, water, and riparian habitats	Open water-Lakes, large rivers, open water within wetlands
Tundra Swan	Aquatic, wetland, water, and riparian habitats	Open water-Lakes, large rivers, open water within wetlands
American Beaver	Aquatic, wetland, water, and riparian habitats	Riparian habitats
Northern Raccoon	Aquatic, wetland, water, and riparian habitats	Riparian habitats
Northern River Otter	Aquatic, wetland, water, and riparian habitats	Riverine
Harlequin Duck	Aquatic, wetland, water, and riparian habitats	Riverine
Barrow's Goldeneye	Aquatic, wetland, water, and riparian habitats	Riverine

Species Name	Habitat Grouping	Habitat Subgroups
Common Goldeneye	Aquatic, wetland, water, and riparian habitats	Riverine
Western Spotted Skunk	Substrate habitats—Rock outcrop; soil, downed wood; cliff, talus, or cave habitats	Habitats under rocks, logs, downed wood, or leaf litter
Rocky Mountain Elk	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
White-tailed deer	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
Dusky Grouse	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
Mourning Dove	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
Wild Turkey	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
Ermine or Short-tailed Weasel	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
Moose	Ecotone, forest edge, or habitat combinations	Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
Mule deer	Non-forested or early seral habitats	Shrubland, thickets, woodlands, and early seral forest. Forested and non-forested habitats interface, forest edges, open habitats with scattered trees, or open woodland
American Marten and Pacific Marten	Forested habitats	Closed Forest- higher density late seral or old forest or large tree habitat, with closed canopy
Ruffed Grouse	Forested habitats	Early seral forest
American Black Bear	Forested habitats	Closed Forest—higher density late seral or old forest or large tree habitat with closed canopy
Snowshoe Hare	Forested habitats	Forest understory
Chukar	Non-forested or early seral habitats	Meadow, grassland, forbland, or scrubland
American Badger	Non-forested or early seral habitats	Meadow, grassland, forbland, or shrubland
Gray Partridge	Non-forested or early seral habitats	Meadow, grassland, forbland, or shrubland
Mountain Cottontail	Non-forested or early seral habitats	Meadow, grassland, forbland, or shrubland
Ring-necked Pheasant	Non-forested or early seral habitats	Meadow, grassland, forbland, or shrubland
California Quail	Non-forested or early seral habitats	Shrubland, thickets, woodlands, and early seral forest
Spruce Grouse	Non-forested or early seral habitats	Shrubland, thickets, woodlands, and early seral forest
Gray wolf	Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations
Mountain Lion or Cougar	Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations

Species Name	Habitat Grouping	Habitat Subgroups
Red Fox	Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations
Long-tailed Weasel	Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations
Bobcat	Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations
Coyote	Resource habitats—nectar, fruit, seeds, plant forage, or prey	Carrion or prey populations
Mountain Goat	Substrate habitats—rock outcrop, soil, downed wood, cliff, talus, or cave habitats	Cliff or steep terrain
Bighorn Sheep	Substrate habitats—rock outcrop, soil, downed wood, cliff, talus, or cave habitats	Cliff or steep terrain

A total of 17, or about 27 percent of these species, use snags or downed trees as important habitat characteristics. Ten species use snags while eleven species use downed wood. Four species use both downed wood and snags. Those that use these features are composed mostly of furbearers and waterfowl species. The only big game species that uses snags or downed trees is the black bear. See Table 289 for the species associated with snags and downed trees.

Table 289. Commonly used wildlife that are known to use snags, downed trees, or both

Common name	Uses Snags or Decayed Live Trees	Uses Downed Trees
American Mink	N	Y
Coyote	N	Y
Ermine or Short-tailed Weasel	N	Y
Long-tailed Weasel	N	Y
Northern River Otter	N	Y
Western Spotted Skunk	N	Y
Harlequin Duck	N	Y
Barrow's Goldeneye	Y	N
Bufflehead	Y	N
Common Goldeneye	Y	N
Common Merganser	Y	N
Hooded Merganser	Y	N
Wood Duck	Y	N
American Black Bear	Y	Y

Common name	Uses Snags or Decayed Live Trees	Uses Downed Trees
American Marten and Pacific Marten	Y	Y
Bobcat	Y	Y
Northern Raccoon	Y	Y

Most of the animals identified in Table 289, with a few exceptions, are common without concern for their conservation status. Therefore, management of habitats for and on behalf of these species is primarily for social and economic purposes, and management considerations must be balanced with other resource uses. While management emphasis occurs because of social and economic reasons, their use is often contingent upon factors such as population size, growth, and distribution that are driven by their ecology. Big game populations attract the attention of the public and provide some of the largest economic and social benefits. The Nez Perce-Clearwater developed appropriate species-specific plan components for these species, which are discussed in more detail below.

Economic Contribution of Hunting, Fishing, and Wildlife Watching

The U.S. Fish and Wildlife Service periodically publishes the economic impact of wildlife related recreation in the United States. The most recent assessment was published in 2011 and was revised in 2014. The assessment is called *The 2011 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation* (U.S. Department of the Interior and U.S. Department of Commerce 2014). The following information originates from this publication. The document estimates the economic contribution of wildlife related recreation both nationally and by state. The total nationwide wildlife related recreation included 90.1 million participants and an estimated 144.7 billion dollars of expenditures. These included hunting, fishing, and wildlife watching. Because this analysis focuses on wildlife, it does not detail the economic impact of fishing, but that data is available in the 2011 report.

Nationally, in 2011, 13.7 million people 16 years old and older enjoyed hunting a variety of animals within the United States. They hunted 282 million days and took 257 million trips. Hunting expenditures totaled $33.7 billion. Big game hunting was the most popular type of hunting. Almost 11.6 million hunters pursued big game, such as deer and elk, on 212 million days. Big game-related expenditures for trips and equipment totaled $16.9 billion. There were 4.5 million hunters of small game, including squirrels and rabbits. They hunted small game on 51 million days and spent $2.6 billion on small game hunting trips and equipment. Migratory bird hunters numbered 2.6 million. They spent 23 million days hunting birds, such as waterfowl and doves. Migratory bird-related trip and equipment expenditures totaled $1.8 billion. Of the $33.7 billion spent by hunters in 2011, 31 percent was spent on trip-related expenses, equaling $10.4 billion. Food and lodging totaled $3.9 billion, or 37 percent of all trip-related expenses. Transportation spending was $4.8 billion, 46 percent of trip expenditures. Other trip expenses, such as guide fees, land use fees, and equipment rental, totaled $1.8 billion or 17 percent of all trip-related expenses. Expenditures for auxiliary equipment, including camping equipment, binoculars, and special hunting clothing, accounted for $1.8 billion or 13 percent of all equipment expenses. Special equipment, such as campers or all-terrain vehicles, amounted to $4.4 billion or 31 percent of all equipment expenditures. A large majority of participants, 94 percent or 12.9 million, hunted within their resident state in 2011.

Observing, feeding, or photographing wildlife was enjoyed by 71.8 million people 16 years old and older in 2011. Of this group, 22.5 million people took trips away from home for the purpose of enjoying wildlife, while 68.6 million stayed within a mile of home to participate in wildlife-watching activities. In 2011, wildlife watchers spent $54.9 billion. Trip-related expenses, including food, lodging, and transportation, totaled $17.3 billion, totaling 31 percent of all expenditures. A total of $27.2 billion was spent on equipment, equating to 49 percent of all wildlife-watching expenses. The remaining $10.5 billion, or 19 percent of the total, was spent on magazines, membership dues, contributions to conservation or wildlife-related organizations, land leasing and owning, and plantings.

Of all the wildlife in the United States, birds attracted the biggest following. Approximately 46.7 million people observed birds. Wildlife watchers spent $17.3 billion on trips pursuing their activities. Food and lodging accounted for $9.3 billion (54 percent of all trip-related expenditures), transportation expenses totaled $6.0 billion (35 percent), and other trip costs, such as land use fees and equipment rental, amounted to $1.9 billion (11 percent) for the year. These recreationists purchased $27.2 billion worth of equipment for wildlife watching and photography. The most-watched birds were waterfowl, primarily ducks and geese, which were watched by 13.3 million people. Next on the list of most-watched were birds of prey, which drew 12.9 million trip-takers, followed by songbirds with 12.1 million watchers. Herons, shore birds, and other water birds attracted 10.6 million recreationists. Land mammals, such as deer, bears, and coyotes, were observed, fed, or photographed by 13.7 million people, totaling 61 percent of all away-from-home participants. In 2011, the most visited areas for Americans to observe, feed, or photograph wildlife were publicly owned lands. Approximately 82 percent of all trip-taking wildlife watchers used public areas, while just 34 percent used private areas.

In 2016, the Rockville Institute for State Fish and Wildlife Agencies conducted a study using similar methods as those for the 2011 study identified above in preparation for the nationwide U.S. Fish and Wildlife Service survey in 2021. In 2016, 1,796,227 people age 16 and older fished, hunted, or watched wildlife in Idaho, including both residents and nonresidents. Of the total number of participants, 838,888 (47 percent) were sportspersons (hunted or fished) and 1,545,113 (86 percent) participated in wildlife-watching activities in Idaho. Of the sportspersons, 690,657 fished and 293,059 hunted in Idaho. The sum of anglers, hunters, and wildlife watchers is greater than the overall number of participants in wildlife-related recreation because many of the individuals engaged in more than one wildlife-related activity. Among the residents of Idaho age 6 to 15 who participated in the activity in their home state or elsewhere in the United States, there were 168,668 sportspersons, of whom 167,672 fished and 31,526 hunted. There were also 192,538 wildlife watchers, some of whom also hunted or fished.

In 2016, state residents and nonresidents spent a total of $4,704,808,660 on wildlife recreation in Idaho. Of that total, trip-related expenditures were $1,538,031,253 (33 percent), equipment expenditures were $2,898,210,584 (62 percent), and other expenditures were $268,566,823 (6 percent). Other expenditures include items such as licenses, contributions, land ownership and leasing. A total of 403,776 state residents and nonresidents hunted in Idaho in 2016, for a total of 5,000,897 days of hunting. That is an average of 12 days per hunter. Of these hunters, 229,928 (57 percent) were state residents. State residents hunted 2,980,307 days in Idaho (60 percent of all hunting days in the state). Among the 403,776 state residents and nonresidents who hunted in Idaho in 2016, a total of 389,230 (96 percent) hunted big game, 80,133 (20 percent) hunted small game, 41,132 (10 percent) hunted migratory birds, and 24,304 (6 percent) hunted other animals. A total of 4,397,881 days were spent hunting big game, 609,170 days hunting small game, 396,202 days hunting migratory birds, and 238,845 days hunting other animals. In 2016, hunting-related expenditures in Idaho totaled $1,051,222,570. The portion of expenditures related to taking trips for hunting in Idaho, such as food, lodging, transportation, and other expenditures, was $299,249,971 (28 percent of all hunting expenditures). Each hunter in Idaho spent, on average, $741 on trip-related costs during 2016. The portion of hunting-related expenditures spent on equipment in Idaho in 2016 was $694,731,062 (66 percent of all hunting expenditures). Expenditures on the subset of equipment specifically for hunting totaled $268,339,165, while expenditures on the subset of auxiliary equipment, such as tents and special hunting clothing, totaled $79,769,895. Expenditures on other items, such as magazines, membership dues, licenses, permits, and land leasing and ownership totaled $57,241,537 (5 percent of all hunting expenditures).

The Idaho Department of Fish and Game estimated the total amount spent locally in their Clearwater Region. They used their mandatory hunter survey data for hunter effort and the estimated expenditures per day from the Rockville Institute for State Fish and Wildlife Agencies study (2016, Idaho specific report Table 18 page 28 and Table 2 page 16), which includes trip related expenses and equipment for resident and non-resident hunters, to estimate the amount of expenditures by hunters in the Clearwater Region. Combining data of hunter effort from Game Units 8a, 10, 10a, 12, 14, 15, 16, 16a, 17, 18, 19, and 20, they estimated 52,378 hunters spent 335,035 days hunting and spent approximately $59,880,806 in the Region on deer and elk hunting in 2019. They estimated 13,594 hunters spent 61,920 days hunting upland game and wild turkeys for $3,559,781 of expenditures in the Clearwater Region in 2019. They only had data on waterfowl hunting efforts from 2009 but they estimated that 902 hunters spent 6,307 days hunting waterfowl, resulting in $1,093,192 spent on waterfowl hunting in the Region. These numbers were generated by wildlife biologists rather than by economists, but this is the best recent estimate of expenditures locally.

In 2016 in Idaho, 1,532,543 state residents and nonresidents participated in wildlife watching, which includes feeding, observing, or photographing wildlife. Of these wildlife watchers, 1,054,111 (69 percent) participated in away-from-home wildlife watching in Idaho, with activities occurring at least one mile away from home. Of these away-from-home wildlife watchers, 417,603 (40 percent) were state residents and 636,508 (60 percent) were nonresidents. State residents participated in away-from-home wildlife watching for 5,881,561 days in Idaho (71 percent of all away-from home wildlife watching days in the state) and nonresidents participated in away-from-home wildlife watching for 2,348,448 days in Idaho (29 percent of all away-from-home wildlife watching days in the state). In 2016, wildlife watching-related expenditures in Idaho were a total of $2,521,763,223. The portion of expenditures related to taking trips for wildlife watching in Idaho, such as food, lodging, transportation, and other expenditures during a trip, was $516,930,272 (20 percent of all wildlife watching expenditures). Each away-from-home wildlife watcher in Idaho spent, on average, $490 on trip-related costs during 2016. The portion of wildlife watching-related expenditures spent on equipment in Idaho in 2016 was $1,842,486,359 (73 percent of all wildlife watching expenditures). Expenditures on the subset of equipment specifically for wildlife watching, such as binoculars, totaled $255,585,794, while expenditures on the subset of auxiliary equipment, including tents and backpacking equipment, totaled $101,675,146, and expenditures on the subset of special equipment like campers and trucks totaled $1,485,225,420. Special and auxiliary equipment are items that were purchased for wildlife watching but could also be used in activities other than wildlife watching. Expenditures on other items, such as magazines, membership dues, plantings, and land leasing and ownership, totaled $162,346,592 (6 percent of all wildlife- watching expenditures).

In summary, wildlife related recreation is a multi-billion-dollar contribution in Idaho with millions of participants. Most expenditures are made by residents of the state, with additional revenues brought into the state from non-residents. These expenditures bring money into local communities that support businesses, such as sporting goods stores, grocery chains, restaurants, hospitality services, outfitters and guides, artists, photographers, transportation services, and manufacturing. Many of these people conduct their activities on public lands. Participation in big game hunting, the largest contributor to hunting related wildlife recreation, is inextricably tied to big game numbers and big game numbers in the plan area are related to habitat conditions. Habitat conditions also support populations of upland game and waterfowl for hunting and wildlife watching.

Bighorn sheep

Four bighorn sheep population management units contain a total of approximately 400 bighorn sheep on lands managed by the Nez Perce-Clearwater and the Wallowa-Whitman National Forests. The population management units include the Lower Salmon, Lower Panther-Main Salmon, Selway, and Hells Canyon. Bighorn sheep are managed as a trophy big game species by the Idaho Department of Fish and Game and efforts to increase population numbers include translocations. A limited number of bighorn sheep tags are offered to the public through a random drawing as a once in a lifetime opportunity. The highly sought after tags provide an opportunity for a backcountry bighorn sheep hunt in rugged terrain. Bighorn sheep are also popular for wildlife viewing and photography, and people seek out opportunities to do these as a primary activity or incidental to other recreational activities like river rafting.

The species also has importance to the Native American tribes, who since time immemorial have used bighorn sheep as a first food, clothing, shelter, tools, utensils and used the horns to fashion bows. Bighorn sheep have high ceremonial, cultural and spiritual value to tribes. As such they are considered sacred by tribes. Bighorn sheep are predominantly shown on petroglyphs throughout the western United States. Bighorn sheep hunters either hunt on their own or use a guide. Based on archeological evidence and verbal histories of tribal elders, prior to European settlement bighorn sheep were the primary game animal that sustained the Nez Perce way of life .

As bighorn sheep occupy remote, steep, and rugged habitats, especially within large river canyons like the Salmon River, habitat conditions have not been altered much by development. Herds in the Salmon River canyon are shared by the Payette National Forest, while herds along Hells Canyon are shared with the Wallowa-Whitmen National Forest. Non-native plants, especially non-native grasses, have invaded some of the dry river canyons occupied by bighorns. Forest succession as a result of fire exclusion has also reduced bighorn sheep in some areas. Hunting opportunities depend on the size of bighorn sheep populations, and bighorn sheep herd numbers are thought to be disease limited.

Black Bear

Black bears are found throughout the planning area. Black bears are important as both a target species for hunters and as a predator that may influence populations of large ungulates, like elk and deer, which are also popular hunted species. Black bear distribution in Idaho corresponds closely to the distribution of coniferous forests. Black bear populations respond to low berry production and hunting pressure. Black bears prey upon deer and elk fawns but rarely adults. Black bear populations are related to changes in birth rates associated with the availability of nutritious foods, especially late summer and fall berry production. Long-term trends are directly related to changes in habitat quantity and quality. Forest management practices, wildland fire, and plant succession influence black bear habitat quality.

Black bear populations are thought to be stable, but the Idaho Department of Fish and Game has been using long hunting seasons and liberal harvest to try to reduce black bear predation on elk, particularly in the Selway and Lolo Game Management Zones. Hunting of black bears includes baiting, hound hunting, and stalking. Most bears taken are over bait in the spring, followed by hound hunting, and the least effective method is stalking or still hunting. Some bears are taken opportunistically as people are hunting other species. Black bear hunting opportunities provides a recreational opportunity and a source of sustenance for those who participate. Many outfitter and guide operations have promoted and hosted black bear hunting opportunities to supplement income lost because of low elk numbers.

Elk

North American elk are among the most popular and iconic of wildlife species in North America. A broad spectrum of public land users places strong cultural, social, economic, and ecological importance on the species (Rowland et al. 2018). Native American tribes in the western United States focus much of their cultural and first foods traditions on elk, and tribal hunting depends on abundant elk populations on public lands for tribal uses. The 2014 Assessment estimated that, in Idaho, elk hunting generates more than $70 million annually in direct hunter expenditures like fuel, meals, and lodging. The combined economic impact of elk hunting in Clearwater County and Idaho County alone was in excess of $27.6 million in 2007 (U.S. Department of the Interior and U.S. Department of Commerce 2014). Elk hunting is more than just a recreational opportunity. Elk provide a source of sustenance for hunters. Many hunters from local communities, as well as those that come from across the state, rely on hunting big game, like elk, as a source of meat. Native American tribes use elk as a source of sustenance and other uses when exercising treaty reserved rights. Bull elk can weigh in around 700 pounds while cow elk weigh in around 500 pounds, so successful harvest can provide a substantial amount of meat. These benefits are sourced largely from public lands where recreational uses of elk compose a major land use. Rural communities throughout the western United States not only benefit economically from hunting and viewing but have social and cultural networks built on elk as part of rural lifestyles. Conversely, elk use of private lands is increasing, is often undesired, and can have substantial economic costs from crop depredation, competition with livestock forage, and damage to reforestation efforts. Maximizing elk use on public lands while minimizing use on private lands meets the desires of land use stakeholders because the vast majority of recreational uses of elk occur on public lands and many private landowners are intolerant of resident populations (Rowland et al. 2018).

Elk herd numbers are influenced by a combination of forage availability, habitat quality, predation, and hunter harvest. Their distribution is influenced by disturbance from roads and hunting pressure. The Assessment (U.S. Department of the Interior and U.S. Department of Commerce 2014) for the Nez Perce-Clearwater described the condition and trend of elk populations in the plan area, the economic impacts that elk have in Idaho, threats and stressors to elk, factors that influence vulnerability to hunting, and detailed information about the effects of roads on elk. Identified threats and stressors included invasive weeds, departed fire return intervals and forest succession, timber management and associated roads, loss of hiding cover, livestock grazing, human development, energy development and mining, reduced winter forage, disturbance, roads and motorized trails, and vulnerability to hunters. Within the last few years, several publications using large datasets from multiple study areas have been analyzed together and been published. This existing condition section focuses on new publications since the 2014 Assessment was produced. This section recaps the population trends and describes the effects and need for change from management direction in the 1987 Plans.

Prehistoric numbers of elk are not known, though archeological evidence shows that elk were consistently found at archeology sites throughout the region (Peek et al. 2020). Historically, elk herds on the Nez Perce-Clearwater were much lower than today. In 1805, Lewis and Clark reported that their indigenous guides noted the presence of elk in parts of the plan area. During the late 1800s and early 1900s, elk were rarely reported on the Nez Perce-Clearwater. The causes of these low numbers could be a combination of use by people, predators, and lack of forage. Beginning after the 1910, 1919, and 1934 fires, which burned vast areas of the Nez Perce-Clearwater, elk herds began to increase rapidly until in the 1930s when herds developed that were large enough to raise concern that they were damaging the winter ranges (Space 1981). This increase in numbers was presumably because of a combination of high amounts of forage created by the fires, intensive predator control of bears and lions, the institution and enforcement of hunting regulations between 1897 to 1903, and the establishment of a game preserve where hunting was not permitted (Space 1981, Parsell 1990, Cochrell 1970). Between 1954 and 1957, the first helicopter flights to count elk were conducted on the Clearwater National Forest. A total of 8,577 elk were counted on winter range by helicopter. Estimating that 80 percent were counted, the total population in the

Clearwater National Forest alone was estimated at 10,700 (Space 1981). On the Nez Perce National Forest, the elk herd in the Selway-Bitterroot was considered the largest in the United States at one time.

Following a decline in early seral habitats, elk populations declined through the 1970s. Increased timber management in the 1970s and 1980s, along with changes in game regulations, once again led to an increase in elk populations during the 1980s through early 1990s. Decreases in timber harvest beginning in the late 1980s and early 1990s correspond to a decrease in elk populations since that time when herds again began to decline in response to increasing loss of early seral habitat. These declines started before wolves were introduced into the plan area in the 1990s. Elk herds have continued to decline or have remained lower since.

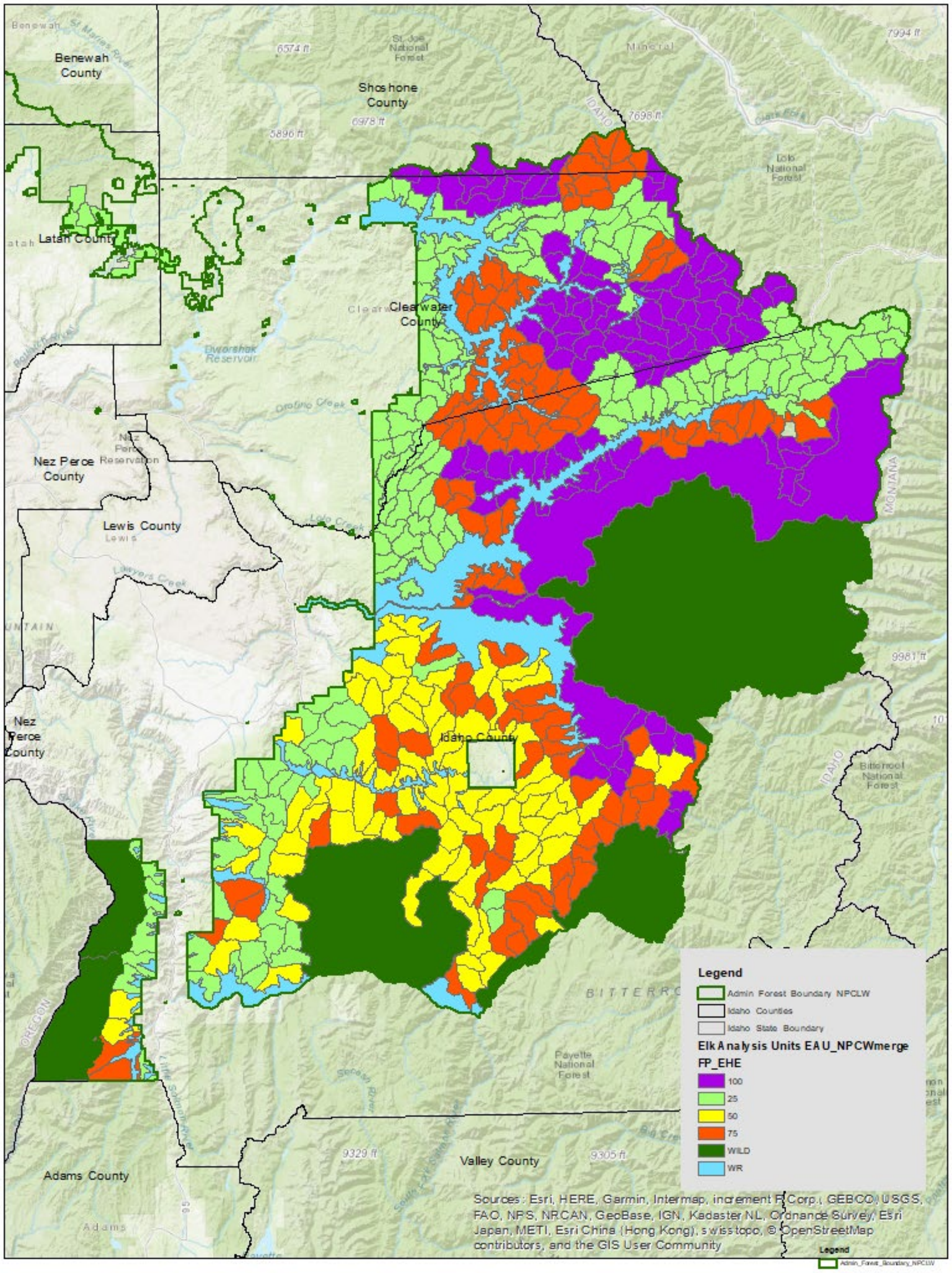


Figure 110. Elk analysis units used in the 1987 Nez Perce and Clearwater Forest Plans

Light green = elk analysis units that require maintaining a minimum of 25 percent habitat security
Yellow = elk analysis units that require maintaining a minimum of 50 percent habitat security
Orange = elk analysis units that require maintaining a minimum of 75 percent habitat security
Purple = elk analysis units that require maintaining a minimum of 100 percent habitat security
Dark green = wilderness
Light blue = elk winter ranges

Elk habitats under the 1987 Forest Plans consisted of an emphasis on enhancing winter habitats though active management and managing elk habitat effectiveness and elk vulnerability through road density management. The plans required analysis of factors such as road building, livestock grazing, elk habitat preferences, cover, forage, road density and security areas. The Clearwater Plan was later amended and emphasized elk habitat effectiveness and reducing elk vulnerability. The 1987 Plans used elk analysis units as the scale for which effects were analyzed. The plans also required that elk analysis units maintain a minimum amount of elk habitat effectiveness of 25 percent, 50 percent, 75 percent, or 100 percent. These correspond to roughly 4.2 miles per square mile for 25 percent, 1.8 miles per square mile for 50 percent, and 0.8 miles per square mile for 75 percent habitat effectiveness. An elk habitat effectiveness (EHE) model computed habitat effectiveness using the density of open roads; quantity and distribution of cover; availability of forage; access to security areas; and livestock use. The number and acres of elk habitat effectiveness objectives in the 1987 Plans are shown in Table 290. Elk analysis units are not delineated within wilderness nor within elk winter range. Elk habitat effectiveness is calculated using open motorized roads and trails but not closed motorized routes The elk vulnerability (EV) model estimated the effects of access and hunter effort activities during fall hunting seasons on elk at the game management unit scale. It considers both open and closed roads. The amount of winter habitat manipulation proposed as objectives in the 1987 Plans were achieved generally as projected (FACTS data, accessed August 2019).

Table 290. Number and acres of elk analysis unit habitat effectiveness objectives under the 1987 plans

% Objectives	Number	Acres
25%	155	748,273
50%	81	496,186
75%	117	614,401
100%	103	10,300
Total	456	1,869,160

The total number of roads on the Nez Perce-Clearwater have been steadily decreasing since 1999 (Table 291Table 292). A total of about 1,625 miles of National Forest System roads and non-National Forest System roads have been decommissioned during this time. Most of this decommissioning took place on the non-system roads from former timber harvest practices, which were no longer needed because of new harvest techniques, or roads in unstable terrain or with failing drainage structures. However, there have been additions to National Forest System roads during this time as well. These additions include the construction of approximately 46 miles of new roads for vegetation, special uses, recreation management, and watershed improvements by relocating roads away from stream habitats. Many of the increases were to roads that were better located roads to provide a more stable, less impacting road system. The cost of decommissioning was estimated at $5,491 per mile in 2010. Yet, despite these measures, the trend in elk populations has continued downward sharply since 1987.

Table 291. Miles of roads decommissioned from 1999 to 2018 on the Clearwater National Forest

Year	Miles	Year	Miles
1999	127.8	2009	127.0
2000	67.3	2010	138.3
2001	92.0	2011	90.1

Year	Miles	Year	Miles
2002	42.7	2012	154.9
2003	41.9	2013	194.4
2004	156.9	2014	97.4
2005	29.6	2015	60.5
2006	55.0	2016	65
2007	52.1	2017	30
2008	114.4	2018	46

Table 292. Miles of roads constructed from 1999 to 2018 on the Nez Perce National Forest

Year	Miles	Year	Miles
1999	13.62	2009	1.58
2000	2.33	2010	1.13
2001	0.65	2011	0
2002	0.5	2012	4
2003	0.45	2013	6.6
2004	0.38	2014	9.88
2005	0	2015	0.13
2006	2.08	2016	2.4
2007	0	2017	0.1
2008	0	2018	0

Table 293. Estimated acres of habitat within and outside of a half mile from an open road or motorized trail by management area (MA) under the No Action Alternative

Location half mile from a road	MA1 Total Acres	MA1 Percent	MA2 Total Acres	MA2 Percent	MA3 Total Acres	MA3 Percent
Outside	1,147,690	93.0%	1,190,873	80.0%	353,442	29.0%
Within	83,719	7.0%	298,457	20.0%	863,722	71.0%
Grand Total	**1,231,408**	**100.0%**	**1,489,330**	**100.0%**	**1,217,164**	**100.0%**

Table 294. Miles of road per square mile by HUC 12 watershed

Watershed Name	Miles of road per square mile
Copper Creek-Rapid River	0.00
Upper East Fork Moose Creek	0.01
Fivemile Creek-Clearwater River	0.01
Little Moose Creek	0.01
Suttler Creek-Middle Fork Clearwater River	0.02
Otter Creek	0.03
Stoney Creek	0.05
Chapman Creek-White Bird Creek	0.07
Threemile Creek	0.07
Headwaters Pine Creek	0.07
Wind Lakes Creek	0.08
Boulder Creek	0.08

Watershed Name	Miles of road per square mile
Lower Crooked Creek	0.10
Stanley Creek-Lochsa River	0.10
West Fork Rapid River	0.17
Sheep Creek	0.17
Collins Creek	0.20
Indian Creek-Salmon River	0.21
Upper Kelly Creek	0.22
Upper Johns Creek	0.22
Lower Bargamin Creek	0.23
Minnesaka Creek-Little North Fork Clearwater River	0.23
Lower Running Creek	0.26
Storm Creek	0.30
Gospel Creek	0.34
Lower American River	0.34
Sable Creek	0.42
East Fork American River	0.42
Upper Sabe Creek	0.46
Lower Fish Creek	0.46
Middle Colt Killed Creek	0.49
East Fork Potlatch River	0.50
Upper Skull Creek	0.51
Johnny Creek	0.53
Headwaters Meadow Creek	0.57
Breakfast Creek-Stanton Creek	0.58
Bimerick Creek-Lochsa River	0.66
Salmon Creek-North Fork Clearwater River	0.68
Trout Creek-Salmon River	0.72
Bald Mountain Creek-Lochsa River	0.75
Boulder Creek-Crooked Fork Creek	0.76
Spruce Creek	0.83
Gedney Creek	0.87
Middle Elk Creek	0.88
Rabbit Creek-South Fork Clearwater River	0.89
Sheep Creek-Little Salmon River	0.98
Pinchot Creek-Selway River	1.00
Vanderbilt Creek-North Fork Clearwater River	1.05
Silver Creek	1.09
Lower Cayuse Creek	1.12
Headwaters Hangman Creek	1.15
Middle Cayuse Creek	1.15

Watershed Name	Miles of road per square mile
Rhett Creek	1.16
Upper Orogrande Creek	1.18
Middle Bargamin Creek	1.18
Lower Meadow Creek	1.23
Upper Running Creek	1.24
Post Office Creek	1.28
Anchor Creek-Wind River	1.28
Lower Johns Creek	1.30
Lower Big Sand Creek	1.33
Tenmile Creek	1.39
Upper Weitas Creek	1.40
Deep Creek	1.42
Isabella Creek	1.43
Lower Weitas Creek	1.44
Upper Big Bear Creek	1.45
Middle Weitas Creek	1.48
Lower Clear Creek	1.53
Glade Creek-Lochsa River	1.61
Hungery Creek	1.64
Big Mallard Creek	1.64
Lower Kelly Creek	1.66
Weir Creek-Lochsa River	1.69
Upper Meadow Creek	1.75
McKinzie Creek-Salmon River	1.75
Cave Creek-North Fork Clearwater River	1.77
Bull Run Creek	1.77
Upper Brushy Fork Creek	1.77
Colt Creek	1.84
Upper Fish Creek	1.85
Twentymile Creek	1.87
Long Meadow Creek	1.88
Rock Creek-Palouse River	1.88
Long Creek	1.91
Glover Creek-Selway River	1.96
Corral Creek	1.97
Upper Cayuse Creek	2.01
Upper Bargamin Creek	2.02
Horse Creek	2.05
South Fork Clear Creek	2.19
Squaw Creek	2.34

Watershed Name	Miles of road per square mile
Berg Creek-Salmon River	2.38
Deer Creek	2.40
Jersey Creek-Salmon River	2.40
Upper Crooked Fork Creek	2.40
Little Weitas Creek	2.46
Carey Creek-Salmon River	2.46
Walton Creek-Lochsa River	2.48
Elk Creek	2.54
Wing Creek-South Fork Clearwater River	2.55
Lake Creek	2.66
Toboggan Creek	2.69
Rackliff Creek-Selway River	2.74
Rock Creek-North Fork Clearwater River	2.80
Lower Elk Creek	2.85
Upper Crooked River	2.92
Elizabeth Creek-North Fork Clearwater River	2.94
Lower Brushy Fork Creek	2.96
Goddard Creek-Selway River	2.97
Washington Creek	3.00
Lightning Creek-South Fork Clearwater River	3.00
Beaver Creek	3.10
Quartz Creek	3.20
Lower Rapid River	3.32
Cold Springs Creek-North Fork Clearwater River	3.42
Hog Meadow Creek-Potlatch Creek	3.43
John Day Creek	3.51
Fiddle Creek-Salmon River	3.67
Wendover Creek-Lochsa River	3.76
Deadman Creek	3.81
Sherwin Creek-Salmon River	3.82
Whiskey Creek-South Fork Clearwater River	3.86
Ohara Creek	3.88
Lower Crooked River	3.89
Lower Colt Killed Creek	3.96
Big Smith Creek-Middle Fork Clearwater River	3.98
Gravey Creek	4.00
Upper Newsome Creek	4.00
Legendary Bear Creek	4.15
Upper American River	4.16
Lower Crooked Fork Creek	4.23

Watershed Name	Miles of road per square mile
Upper Red River	4.29
Deadwood Creek-Moose Creek	4.33
Middle Creek	4.47
Middle Lolo Creek	4.60
Lower Little Slate Creek	4.71
Mill Creek	4.71
Lower Newsome Creek	4.73
Sneak Creek-North Fork Clearwater River	4.79
Lower Slate Creek	4.84
Gold Creek	4.86
Upper Slate Creek	4.94
Musselshell Creek	4.98
North Fork White Bird Creek	5.11
Hemlock Creek	5.20
Upper Clear Creek	5.31
Fishing Creek	5.49
Upper Elk Creek	5.52
Lower Skull Creek	5.67
Middle Red River	5.82
Leggett Creek-South Fork Clearwater River	5.91
West Fork Potlatch River-Potlatch River	5.96
Allison Creek	6.06
Osier Creek	6.09
Lower Red River	6.20
Kelly Creek-Salmon River	6.34
Upper Crooked Creek	6.48
South Fork Red River	6.49
Peasley Creek-South Fork Clearwater River	6.49
Big Creek	6.51
Cow Creek-Salmon River	6.90
Race Creek	7.03
Pete King Creek	7.07
Canyon Creek	7.17
Skookumchuck Creek	7.45
Upper Little Slate Creek	7.68
Upper Orofino Creek	8.08
Little Washington Creek-North Fork Clearwater River	8.31
South Fork White Bird Creek	9.26
Big Sand Creek-Palouse River	9.29
French Creek	10.09

Watershed Name	Miles of road per square mile
Headwaters Palouse River	10.27
Lower Orogrande Creek	10.42
Grouse Creek-South Fork Clearwater River	12.53
Eldorado Creek	12.81
Upper Lolo Creek	13.86
Meadow Creek	22.09

Elk populations in the Clearwater Basin have declined substantially across large areas of the eastern portion of the basin during the past three decades. These declines have coincided with a loss of early-seral habitat, increased human pressures, and increasing predator population (Cook et al. 2018). The outcomes of management strategies in the 1987 Plans for elk have not maintained or increased elk herds. Since 1987, when the plans were signed, elk populations in game management zones with low quality or declining forage, high amounts of hiding cover, and low road densities, such as the Lolo Zone, the Selway Zone, and some game management units in the Elk City Zone, have declined. Meanwhile, those with high quality and quantity of forage, such as in the Palouse, Dworshak, some portions of the Elk City, and Hells Canyon zones, have increased or remained at the Idaho Department of Fish and Game objective, despite having high road densities and high vulnerability (Cook et al. 2018)). In these units, elk can often find refuge from hunting pressure on private lands, or extremely rugged terrain, which allows these areas to support elk despite higher road densities.

The importance of high-quality nutritional resources is increasingly thought to be important to elk population performance. Higher amounts of high quality dietary digestible energy during the summer has been correlated to faster calf growth, better winter survival, increased calf production, earlier breeding phenology, and better calf survival. Lukacs et al. (2018) studied elk population trends in 101 elk management units from 7 states in the western United States. They tested the effects of predator richness, forage productivity, and precipitation on elk population performance. Forage productivity on summer and winter ranges had the strongest effect on elk recruitment relative to other factors.

Spring, summer, and fall encompass the life stages of calf birth (spring, early summer) and calf growth and survival (summer, fall) to weaning (Cook 2014). These life stages include the critical phase of summer and fall calf growth, when nutritional limitations can be severe for lactating females (Cook 2014). Without adequate summer and fall nutrition, females cannot successfully produce a healthy calf to weaning and a calf cannot enter the winter period in adequate condition to withstand prolonged periods of severe weather. A substantial number of elk use the forest year-round within the Nez Perce-Clearwater.

Nutrition influences productivity of ungulates by affecting many aspects of animal performance, including nutritional condition, ovulation, timing of breeding and subsequent parturition, juvenile growth, primiparity, and susceptibility to a variety of causes of mortality (Cook et al. 2013). Nutritional condition is defined as the state of body components, principally fat and lean mass, controlled by nutrition, which influences an animal's future fitness. Studies have highlighted the importance of summer nutrition in influencing ungulate recruitment through changes in maternal and calf body condition (Middleton et al. 2013a, Bonenfant et al. 2002, Parker et al. 2009, Cook, Cook, and Mech 2004).

Increased precipitation, especially in late summer, improves forage productivity, which increases nutritional condition and pregnancy rates of females (Cook, Johnson, et al. 2004). Site productivity may also affect nutrition abundance and quality (Cook et al. 2018). The effects of spring and summer habitat conditions on maternal body condition may carry forward for greater than or equal to one-year and influence calf recruitment the following spring (Wilmers and Levi 2013). Following birth, the summer conditions juveniles experience will influence growth and the ability to survive the following winter (Portier et al. 1998). Elk recruitment is affected by factors influencing maternal body condition and the probability of females becoming pregnant (Cook et al. 2013, Bonenfant et al. 2002, Proffitt et al. 2014, Cook, Johnson, et al. 2004), the birth mass of elk calves, and additional factors, such as forage availability, weather conditions, and predators, affecting the probability of calf survival in their first year (Griffin et al. 2011). There is increasing evidence from detailed studies of maternal nutrition that summer forage conditions may be more important than winter conditions in some settings (Middleton et al. 2013b, Cook et al. 2013, Rowland et al. 2018, Cook, Johnson, et al. 2004). A relatively small difference in the forage quality consumed by elk in the summer and autumn can have strong effects on fat accretion, timing of conception, and the probability of pregnancy for lactating cows, calf growth, yearling growth, and yearling pregnancy rates.

The Clearwater Basin Collaborative's elk project initiated a long-term monitoring and habitat restoration project for elk in the Clearwater basin. This project aims to understand elk population dynamics by assessing animal fitness, nutritional status, and habitat use across the Clearwater basin. To date, approximately 250 cow elk have been captured and radio collared. Radio-collars allow collaborators to evaluate explicit habitat use and connections to winter and summer ranges, facilitate cause-specific mortality, and promote recapture to compare seasonal body condition assessments. Upon capture, other information collected includes age, pregnancy rate, body fat measurements, genetic information, internal parasite loads, and trace elements and selenium. Body condition and pregnancy rates of elk in the Clearwater basin indicate that limitations in animal condition are primarily associated with summer nutrition, as opposed to winter. Variation in body fat levels of female elk followed a northeast-to-southwest geographic gradient of study areas, with body fat highest on the North Fork Clearwater, lowest on Craig Mountain and the South Fork Clearwater, and intermediate in the Dworshak Reservoir area. Elk populations and their distribution in the Clearwater basin are highly variable. The populations and productivity of herds have declined during the past 20 to 30 years in eastern wildlife zones, which are largely associated with roadless and wilderness areas. Examples of these eastern areas of decline include the Lolo and Selway Zones (Cook et al. 2018). Elk populations and their productivity in the central and western parts of the basin have increased during the past two decades, sometimes substantially. Examples of these western areas of growth include the Palouse and Hells Canyon Zones, where elk numbers were low or nonexistent a few decades ago (Cook et al. 2018).

The Clearwater Basin Collaborative's study modeled nutritional resources within the Clearwater basin and tested six model versions to predict dietary digestible energy of elk, a key currency of nutritional status of elk habitats during summer (Cook, Cook, et al. 2016, Cook et al. 2018). Models were tested by evaluating selection by radio collared elk, wherein the best model was determined by increased selection through increased elk dietary digestible energy. While there were differences among the performance of models among elk herds, the best model overall was Model 6, which was a modified expert opinion model of dietary digestible energy.

In general, the predictions of body fat of lactating elk during the month of December from the four Idaho herds increased, with increasing estimates of the percentage of area providing levels of dietary digestible energy greater than 2.75 and 2.90 kilocalories per gram. The data also indicates that the herds in the Clearwater basin have relatively low levels of autumn body fat, body size, and pregnancy rates. The autumn body fat level and the pregnancy rate of lactating females are measures of summer nutrition, and low values for these two measures generally are indicative of reduced performance of other measures of productivity, such as calf and yearling growth rates, age at first breeding, and timing of breeding in autumn (Cook et al. 2018, Cook, Johnson, et al. 2004).

The Clearwater Basin Collaborative's study also produced a forage potential spatial layer that predicts the dietary digestible energy expected in the event of disturbance. Generally, high-quality nutrition on the Nez Perce-Clearwater exists mostly in disturbed forested habitats and shrub fields. The plan area has very few areas of non-forested habitats and few natural meadows. Nutritional response is greater on the Clearwater portion of the national forest and lower on the Nez Perce side. Areas with ash cap and more moisture produce the best nutritional responses at low-to-mid-elevations. Higher elevation sites tended to have lower nutritional potential than lower elevation sites. Many winter ranges tend to have lower nutrition potential, especially along the Salmon River. Some winter ranges along the Lochsa have high nutrition potential. The plan does not emphasize treatments within winter ranges, but it should be within the best nutrition potential sites when doing so. While still important, treating winter ranges does not appear to provide conditions that would improve reproduction based upon nutrition. The elk nutrition model was run through the SIMPPLLE model to predict the changes in the amount of area that has high nutrition forage under the plan components and alternatives. This allowed the national forest to understand the relationship between the desired conditions and elk vital rates and will become a valuable tool when managing elk habitats.

Good summer nutrition is important for the survival of cow and calf elk over winter (Cook, Johnson, et al. 2004). When nutrition during the summer and autumn is poor, cow elk are likely to breed later than cows with good body condition, or not at all (Cook et al. 2001). Recent research by Rowland et al. (2018) suggests that the percentage of elk ranges providing higher levels of dietary digestible energy was highly correlated with the pregnancy rates of lactating females and that autumn body fat levels were highly correlated with the percentage of elk ranges providing higher dietary digestible energy levels. The results further illustrated the importance of managing for nutrition in combination with other covariates, such as roads, slope, and cover-forage edges, which affect elk use of nutritional resources to achieve desired distributions of elk. Cook et al. (Cook et al. 2018) suggests substantial emphasis on summer range management is probably warranted. The results from other studies on elk in forested communities (Cook, Cook, et al. 2016, Cook 2014) also identified a key role of active habitat management for improving nutritional conditions across landscapes.

Calf mortality during winter most often reflects prior summer and fall nutritional limitations. Cook et al. (2014) found that 18 of 21 elk populations sampled across the western United States showed strong summer and fall nutritional limitations rather than winter limitations. Of the additional seven elk populations monitored in the Clearwater basin, all showed summer and fall nutritional limitations (Rowland et al. 2018). By inference, most landscapes in the western United States appear inadequate to fully meet the maintenance needs of lactating female elk during summer and fall (Cook 2014), including those landscapes associated with the seven elk populations monitored in the Clearwater basin (Cook et al. 2018).

Cook et al. (2013) showed winter range conditions had little influence on body fat conditions of elk. Similarly, they found that winter severity has little influence on the body fat dynamics of female elk (Cook et al. 2013). Instead, the body fat levels in spring were strongly correlated to the body fat levels the previous autumn, a relationship that was generally the same across all winter ranges included in Cook et al. (2013). In the Clearwater basin, the pattern of body fat loss over winter relative to autumn body fat was similar to the herds sampled in Cook et al. (2013), and autumn body fat accounts for greater than 70 percent of the variation in spring body fat found in the Clearwater herds (Cook et al. 2018).

In western Oregon and Washington, pregnancy rates and body fat of lactating female elk were positively correlated with the landscape composition (percent area) of dietary digestible energy that met or exceeded summer and fall lactation needs (Rowland et al. 2018). Proffitt et al. (2016) also found a positive correlation of landscape composition of digestible forage biomass and performance of female elk in Montana. In the Clearwater basin, preliminary results show that the body fat of lactating females is related positively to increasing the landscape composition of higher levels of late-summer dietary digestible energy predicted by the nutrition models evaluated thus far (Cook et al. 2018). Results from the spatially explicit nutrition model can then be used to predict the pregnancy rates and body fat of lactating female elk in a given summer range based on the percentage of the analysis area occurring in the higher nutritional classes of dietary digestible energy (Rowland et al. 2018).

In western Oregon and Washington, female elk showed strong selection for and higher habitat use of those areas within landscapes that met or exceeded their nutritional lactation maintenance needs (Rowland et al. 2018, Cook et al. 2018). The habitat use models built from the nutrition models evaluated for the Clearwater basin also showed an increasing selection by elk for increasing levels of dietary digestible energy by lactating females during late summer (Cook et al. 2018). Clearly, management of summer-fall nutrition on public lands is an essential foundation for sustaining productive, abundant elk populations to address the currently unmet but highly desired opportunities for tribal and public uses of elk.

Management of summer-fall nutrition to meet the maintenance needs of lactating females, however, may not ensure that elk use areas of higher nutrition. A variety of non-nutrition factors, including physical topography, vegetation, and roads, combined with available nutrition to account for elk use of landscapes. Non-nutrition factors can have a strong effect on habitat use, particularly roads and trails open to any type of public motorized use. Motorized uses could render many areas of high-quality nutrition unusable by elk because of displacement.

Vales et al. (2017) describes elk habitat management on a 93,000-acre forest managed by the Muckleshoot Indian Tribe. This area is managed intensively for both forestry and elk production. An Elk Foraging Index used to develop management plans is derived from forage abundance, forage quality, and forage intake. Their system uses a nutrition-derived index based on the annual number of lactating and nonlactating cow elk the forage could support founded on sound biological relationships. Management of this area has resulted in a high adult survival of cow elk less than or equal to 16 years old, few malnutrition mortalities, pregnancy rates of 85 percent, and high spring calf-to-cow ratios of 35 calves per 100 cows. In contrast, habitat limitations on adjacent federal lands have reduced the carrying capacity due to the Northwest Forest Plan, which restricts timber harvest to promote late successional stands. The Tribe’s Tomanamus Forest, however, is managed intensively and has numerous clearcuts with stands of varying age that support elk. Access on the Tomanamus Forest is limited. This study is evidence that nutrition-based management of elk can successfully support higher elk populations.

Over 30 studies conducted during the past 40 years on public lands have shown consistently strong avoidance by elk of roads and motorized trails open to the public (Wisdom and Rowland 2018, Wisdom et al. 2018). It is perhaps the most studied aspect of elk habitat selection and use. These studies have universally and consistently shown avoidance of motorized use by elk. Example studies include Lyon (1979), Lyon (1983), Leege (1984), Wisdom (1986), Thomas et al. (1988), Hillis et al. (1991), Lyons and Christenson (1992), Unsworth et al. (1993), Unsworth et al. (1998), Rowland et al. (2000), Rowland et al. (2005), Rumble et al. (2005), Proffit et al. (2014), Bergen (2016), Ranglack et al. (2017), Wisdom (2018), and DeVoe et al. (2019). Rowland et al. (2000) showed that elk habitat selection response related to the distance from open motorized access is a strongly linear relationship. Avoidance behavior occurs at distances between 0.5 to 2.4 miles from open roads, meaning that landscape use by an elk population can be substantially diminished within these distances from open roads and trails (Rowland et al. 2018). In some cases, areas without sufficient space away from roads exclude elk altogether. Elk avoidance of all-terrain vehicles and dirt bikes on motorized trails has been shown to be similar to or greater than the avoidance of forest roads open to public motorized access (Wisdom et al. 2004), with flight responses reported at a distance of 0.93 miles away. Rowland et al. (2005) concluded that the reduction in effective habitat for elk is the ultimate effect of elk displacement; however, substantial reductions in elk habitat use are typically confined to less than one-half miles from an open road.

Many studies are described and referenced in the Assessment (U.S. Department of the Interior and U.S. Department of Commerce 2014) in relation to the effects of roads so a discussion about the effects of roads is not detailed extensively here. Rowland et al. (2005) evaluated the published literature on the effects of roads on elk and summarized the following: 1) Elk avoid areas near open roads, 2) Elk vulnerability to mortality from hunter harvest, both legal and illegal, increases as open roads increase, and 3) In areas of higher road levels, elk exhibit higher levels of stress and increased movement rates. Elk may be displaced from otherwise usable habitats and may be displaced from public lands onto private lands where they are not accessible to public uses. Intuitively, loss of usable area due to displacement would reduce the total capacity of the landscape to provide for elk perhaps lowering overall carrying capacity. Travel management inevitably involves tradeoffs between the benefits that increased road and motorized trail access provides versus their ecological and economic costs.

The effectiveness of Forest Service practices, such as elk habitat effectiveness measures, has been tested empirically. Rowland et al. (2000) tested the hypothesis that elk selected habitats farther away from roads and then compared whether relative elk habitat selection versus elk habitat effectiveness corresponded with the observed values of varying levels of road density. Rowland et al. (2000) also evaluated the effects of different spatial patterns of roads on elk habitat selection. While selection increased with the distance to open roads, habitat effectiveness corresponded only weakly to elk habitat use (Rowland et al. 2000). Instead, Rowland et al. (2000) suggested that elk are responding to the spatial distribution patterns of roads as an important factor, which is not necessarily measured by road density or habitat effectiveness. Simulations of road spatial patterns suggested that evenly spaced roads had the greatest negative effect on habitat, while randomly spaced roads and clumped patterns of roads allowed for less influence on habitat selection (Rowland et al. 2000). Thus, distance from roads, or the spatial distribution of roads, is a more important measure for elk habitat selection than road density per se. The management direction for elk in the 1987 plans, especially within Management Area 3, resulted in a current road system that is relatively evenly spaced with few gaps large enough to provide for elk use, even though many elk analysis units meet the elk habitat effectiveness requirements.

Ranglack et al. (2017) studied elk habitat selection during the fall in Montana. They demonstrated elk avoid hunting pressure. The response of elk was similar for rifle and archery season but differed in which variables were more important. During both hunting seasons, elk selected areas that restrict public hunting access and had higher values on the normalized difference vegetation index, an index of photosynthetic activity which could indicate higher forage quality. Elk also selected for higher canopy cover, areas with greater distance from open motorize routes, but avoided areas of high hunter effort. Selection differed when they were on lands not accessible to hunters. While on public lands, the mean distance to motorized routes for elk locations was 1.61 miles and 1.28 miles during the archery and rifle seasons, respectively. These distances are largely within the ranges of elk responses from studies across the west. For publicly accessible lands, elk responses to distance to motorized routes, canopy cover, and hunter effort quickly reached pseudo thresholds at greater than or equal to 0.95 miles from motorized routes, greater than or equal to 9 percent canopy cover, and greater than or equal to 3.44 hunter days per mile with respect to hunter effort, after which further increases in distance to motorized routes, canopy cover, and hunter effort resulted in only small increases in elk resource selection. The mean canopy cover of the elk locations was

27.7 percent and 19.6 percent for the archery and rifle seasons, respectively. These canopy cover amounts are far below those in on the Clearwater National Forest.

Ranglack et al. (2017) analyzed telemetry data from nine elk populations that ranged from Yellowstone National Park along the Idaho-Montana border north to near Missoula, Montana. Some of these populations are adjacent to or border parts of the plan area and, in some cases, have vegetation conditions similar to those here. Ranglack et al. (2017) found an interaction of road distance and forage availability. At high normalized difference vegetation index values, there was little difference in elk selection for areas near versus far from motorized routes, but at low normalized difference vegetation index values (NDVI), elk were more likely to use areas far from motorized routes. High normalized difference vegetation index values indicate potentially higher nutrition, while lower values indicate lower nutrition, suggesting that elk were selecting areas of potentially higher nutrition even when those nutrition sources were closer to roads. Ranglack et al. (2017) did not find support for traditional elk security measures. Rather, they found that less canopy cover and more distance from roads were better fitted to their data and suggested that the influence of motorized routes is more important than canopy cover to female elk resource selection. They recommended retaining 5000-acre sized blocks without motorized access. The distances at which Ranglack et al. (2017) showed avoidance behaviors to roads are similar to those reported in other studies. For example, their recommended distance from motorized use was 0.953 miles. Declines in elk habitat use have been reported within 0.25–1.8 miles of open roads (Lyon and Christensen 2002). Rowland et al. (2018) reported that avoidance behavior at which elk no longer responded to motorized disturbances was up to 2.4 miles. Given that the distances of avoidance behavior reported by Ranglack et al. (2017) are comparable to those in multiple other studies, the fact that Ranglack used data from nine elk populations from a variety of habitat conditions, and that some of the areas these populations use are adjacent to the plan area, the Land Management Plan adopted Ranglack's recommendations for 5,000-acre block sizes in Management Area 2's guidelines. Ranglack's results suggest that during hunting seasons, female elk still seek out areas of high nutritional value even when they are closer to motorized routes. Ranglack et al. (2017) cautioned that extrapolation of their results beyond the study area may or may not be appropriate, as results generated in one area may perform extremely poorly when applied in areas that are geographically distant or dissimilar ecologically.

The Idaho Department of Fish and Game modeled elk habitat selection from several datasets of radio collared elk across the state (Bergen et al. 2016). Habitat selection using the statewide dataset results differed from those of regional populations. Two regional populations in this study occurred within the Nez Perce-Clearwater. The northern portion of the national forest fell within the Bitterroot Mountain regional population area and the southern portion of the national forest fell within the Idaho Batholith population. Elk habitat selection differed in the two areas but also had some similarities.

Habitat in the Bitterroot area had the following variables as important: the average amount of canopy cover within two kilometers, the sum of non-forested normalized difference vegetation index values within two kilometers, the amount of deciduous shrub within two kilometers, terrain position index, the amount of fire occurrence within two kilometers between 2005 to 2015, and land-use types deemed to be excluded from elk use in developed areas, as well as talus, cliffs, and open water. In the Idaho Batholith selection, variables include the following, in order of importance: maximum non-forested normalized difference vegetation index recorded value within two kilometers, the amount of evergreen forest within two kilometers, the amount of mesic sage and shrub within two kilometers, the amount of fire occurrence within two kilometers between 2005 to 2015, and land-use types deemed to be excluded from elk use in developed areas, as well as talus, cliffs, and open water. In both areas, factors that influenced habitat selection were variables that suggest nutrition is important. For example, both areas included the sum of non-forested normalized difference vegetation index within two kilometers, which is thought to be an indicator for higher nutrition. Similarly, the number of deciduous shrubs and mesic sage and shrubs within two kilometers would suggest elk are seeking forage resources in both areas. Both areas also contain selection for fire occurrence within two kilometers. Once again, this metric suggests selection for conditions that promote nutrition but the amount and distribution at a landscape scale were also important. In both areas, elk avoided land-use types deemed to be excluded from elk use, which were defined as developed areas including roads, talus, cliffs, and open water.

The findings of Bergen et al. (2016) suggest that landscape scale characteristics influence habitat selection by elk. For example, elk in the Bitterroot population area select for deciduous shrub composition within two kilometers at the landscape scale in a power function shape to where deciduous shrubs compose slightly less than half of the surrounding landscape, after which elk selection decreases rapidly. Elk have a quadratic selection for increased canopy cover averaged within two kilometers where selection increases dramatically at 33 to 42 percent, then plateaus and decreases beyond 65 percent. In the Idaho Batholith population area, elk select for deciduous shrub composition where selection increases logarithmically to approximately where deciduous shrubs compose 50 percent of the surrounding land use within two kilometers, after which selection decreases with higher compositions but still maintains a positive selection. Elk were less likely to select for land uses that are considered to be excluded, such as open water, road, developed areas, talus, and cliffs. Elk selected for areas that are not developed, talus, cliffs, or open water (excluded class) ten times more than these habitat types (Bergen et al. 2016).

Elk selection increases quadratically for areas that have greater amounts of evergreen forest to where 60 percent of the surrounding area is evergreen forest, afterwards elk selection drops as the percent of evergreen forest increases in the landscape within two kilometers. Mesic sage and shrub communities are increasingly selected for until they comprise approximately 28 percent of the vegetative composition within two kilometers, after which there is a logarithm decline in this selection with increasing composition (Bergen et al. 2016). These findings suggest the interspersion of habitat patches at the landscape scale are an important consideration when managing elk habitats. These selection patterns suggest landscape characteristics, as well as their habit of using edges between forage and cover.

It has long been recognized that elk seek ecotones or habitat edges. Rowland et al. (2018) found that elk select for areas close to cover-forage edges, reporting an 8.1 percent decrease in use for each 100-meter increase in distance to edge within an opening because of their preference for foraging sites with secure patches of cover nearby. Several elk habitat models reflect elk selection for sites close to cover-forage edges, presumably for security (Wisdom et al. 1986, Thomas et al. 1988, Benkobi et al. 2004). As forage and cover areas become larger than optimum, less of the total area is used by elk (Wisdom et al. 1986). Wisdom (1986) suggested that most elk use of forage occurs within 100 yards of forested edges and the use of cover is within 300 yards of the edge of open foraging areas. Management to benefit elk should arrange the shape and size of forage and cover patches to increase edges by creating irregularly shaped forage areas with high edge to interior ratios that are interspersed at a landscape scale. Patches of forest retained within openings can facilitate use more than larger openings. The term habitat interspersion used in MA3-GDL-ELK-01 is meant to capture the concept of the spatial arrangement of patches at a landscape scale and cover to forage edges.

Several studies suggest elk select habitat based on slope, with milder slopes selected more than steeper slopes. Preference by elk for gentle to moderate slopes has been documented previously in Wisdom et al. (1986), Edge et al. (1987), and Sawyer et al. (2007). Rowland et al. (2018) used telemetry datasets from across the west to identify habitat use by elk. They found that elk selected mild slopes and that slope was one of the most important factors predicting habitat use, finding a 5.3 percent decrease in use for each percent increase in slope. Predicted use decreased sharply in all areas as slope increased between 0 and 40 percent, with a very low probability of use predicted for slopes greater than 60 percent. They recommended that slope remains an important consideration in planning habitat improvements for elk. For example, road closures on mild terrain may improve habitat use more than a closure of a road on a steep slope. Similarly, a silviculture prescription to enhance elk forage habitat positioned on mild slopes would have higher use than those positioned on steep slopes.

Rowland et al. (2018) provided an example of habitat management for elk on forested lands. This study evaluated the effects of elk habitat use on a National Forest landscape from the combination of nutrition and open roads management. The study demonstrated how habitat use can be improved through silviculture and how areas of enhanced nutrition may not be used by elk are displaced by effects of open roads that encompass the areas of higher nutrition. They recommended addressing four variables that determine elk habitat use: distance from roads, the amount of higher quality nutrition, forage to cover edges, and slope. These principles were incorporated into management approaches to form the basis and framework for elk habitat management.

Moose

Moose are an important big game animal in the planning area. Moose populations are in serious decline in some parts of the plan area, particularly from the Lochsa River south and especially in the Selway River and South Fork Clearwater River drainages. Moose were evaluated in the 2014 Assessment (U.S. Department of the Interior and U.S. Department of Commerce 2014), which speculated on causes of moose decline. Even as some moose populations in the plan area are suffering drastic declines, the population in other parts of the plan area appear to be increasing, apparently in response to extensive habitat alteration by silvicultural and agricultural practices that increase early seral browse favored by moose. Forage is increasingly thought to be important to moose.

Moose are hunted in the plan area and permits are issued through a drawing as a controlled hunt, which limits participation. Moose hunting is considered a once in a lifetime hunt. Hunters who draw moose tags and successfully harvest may not apply for these tags again. Moose are of high interest and importance to Native American tribes. Moose are also of interest to wildlife watchers.

Schrempp et al. (2019) evaluated moose population trends and forage condition trends across Idaho. They found that the quantity of forage shrubs was estimated to have declined over the past 30 years in about half of the population management units, with the greatest declines predicted for high-energy forage species. The population trend index was correlated with the percent change in availability of moderate-energy forage shrubs, indicating that the availability of forage shrubs and change in availability over time might be affecting population dynamics for moose in northern Idaho. The role of summer nutrition in regulating reproduction and survival has been documented for moose via twinning rates, recruitment, and survival (Franzmann and Schwartz 1985, Monteith et al. 2015, Sand et al. 2012). Results from Schrempp et al. (2019) indicate that variation in the quantity of forage for moose across northern Idaho is likely correlated with moose population trends statewide. This suggests that fire suppression, lack of disturbance, and forage quality and quantity are likely important threats to moose populations.

Factors identified by the Assessment (U.S. Department of the Interior and U.S. Department of Commerce 2014) as causing declines in moose populations include roads, predators, climate change, parasites, and the loss of Pacific yew. Multiple-use wildlife plan components were designed to provide for many big game species, including moose. For example, FW-DC-WLMU-03 and FW-DC-WLMU-04 pertain to moose habitat conditions, including the desire to maintain Pacific yew as a winter food. Winter habitat selection favors subalpine fir and Pacific yew plant communities. The vegetation desired conditions for riparian areas and forested and non-forested habitats would contribute to moose habitats.

Moose migration or seasonal movement patterns are not well understood in the plan area. It is suspected that there is movement from higher elevations to lower elevations during winter. However, moose have been observed during winter flights wintering in fairly high elevations in deep snow. They tend to stay in relatively small areas when doing this.

Mountain Goat

Unlike many areas in the west, mountain goat populations in the plan area are native. Lewis and Clark noted that their guides indicated that there were mountain goats in the Blacklead area while passing through. Mountain goats are hunted in the plan area but on a very limited basis. A hunter is allowed only one opportunity to hunt for mountain goats in his lifetime. Demand for a mountain goat hunting opportunity is high, with 400 to 500 applications submitted for the 40 to 50 mountain goat permits available annually statewide. Many of the historic mountain goat hunting areas in the Clearwater region are currently closed to hunting because of low population levels or the loss of mountain goats entirely from previously occupied ranges. The mountain goat is recognized as a Species of Greatest Conservation Need (SGCN), priority Tier 3, in the Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b). It is not identified as a species of conservation concern for the plan area because most populations occur in wilderness, recommended wilderness, or Idaho Roadless Rule areas, which results in a lack of threats.

The Nez Perce-Clearwater Assessment (U.S. Department of Agriculture 2014f) evaluated the status and threats to mountain goats in the plan area and described their biology, population dynamics, mortality factors, diseases and parasites, response to human disturbance, roads in goat habitat, and population status in the plan area. Recently, the Idaho Department of Fish and Game published their Mountain Goat Management Plan (Idaho Department of Fish and Game 2019b). It identifies climate change as a threat to mountain goats.

Historically, in Idaho, there were many more mountain goats than there are today. Open seasons with unlimited tags through the 1950s reduced mountain goat populations in many areas. Mountain goats are now lost from previously occupied ranges (Wakkinen, Wolf, et al. 2017). Increasingly, conservative hunting season structure with controlled hunts has helped stabilize some populations but others continue to decline (Wakkinen, Wolf, et al. 2017).

Mountain goats inhabit rugged landscapes characterized by steep rocky cliffs, talus slopes, grassy ledges, and alpine meadows. Such inaccessible terrain offers unexploited food resources and protection from predators. Mountain goats are generalists with a diet that includes grasses, sedges, rushes, forbs, low growing shrubs, woody shrubs, conifers, mosses, and lichens, depending on the season. Migration to wintering areas occurs along well-traveled corridors with the first heavy snowfall. Winter ranges are typically at lower-elevation cliff complexes with south and west aspects where snow is less abundant and persistent. However, some populations in the plan area winter and summer in the same areas.

In areas where grasses are covered by snow, mountain goats readily switch to a diet of browse, including mountain mahogany and conifers. Mosses and lichens may also be eaten where available (Côté and Festa-Bianchet 2003). Smith (1976) reported a correlation between female nutrition and kid-nanny ratios and Bailey (1991) reported that the availability of summer forage was related to pregnancy rate. Winter forage is critical to adult over-winter survival and fetal development (Fox et al. 1989).

Populations of mountain goats have declined in the plan area and are absent in many areas of the Nez Perce-Clearwater that historically had populations. Causes of the decline are not fully understood but overharvest caused some of the goats in areas historically occupied to be eliminated and some have not yet been repopulated. It is possible that currently occupied mountain goat habitat is not well connected to areas historically occupied. In Idaho, many mountain goat populations are on isolated mountain ranges with limited dispersal opportunities across intervening valleys resulting in isolation and reduced gene flow between herds (Shafer et al. 2011). Because mountain goats in Idaho occur on the periphery of their range and in isolated areas with small population sizes, they have lower levels of genetic diversity compared to their counterparts in the core of their range (Idaho Department of Fish and Game 2019b, Shafer et al. 2011). Maintaining migration corridors and landscapes that are permeable to individual movements increases effective population size, genetic diversity, and adaptive potential while providing movement routes for mountain goats to respond to climate change (Sexton et al. 2011).

Threats identified in the Draft Idaho Mountain Goat Plan include road building, timber harvest, mining, power or infrastructure, oil and gas extraction, wildfire and fire suppression, or changing climate, which may reduce the limited habitat that currently exists (Idaho Department of Fish and Game 2019b). Fire suppression could negatively affect mountain goat habitat by preventing late successional forests from being converted to early successional stages, reducing forage. Mountain goats are susceptible to disturbance by recreational activities, both motorized and non-motorized, and may abandon preferred high-quality areas because of disturbance. Several modes of backcountry recreation, including snowmobiling and heli-skiing, have the potential to disturb goats. Helicopters generate the disturbance of greatest concern. Repeated disturbance by helicopters, snowmobiles, logging, or road building can cause displacement from habitat, group dissolution, nanny-kid separations, and injury. The extent to which these disturbance threats are in effect in the plan area depends upon whether these activities are allowed where the herds are currently located. Nearly all existing herds are observed within either Idaho Roadless Rule areas or designated wilderness. Within the plan area, most mountain goat herds do not experience threats from road building, timber harvest, mining, power infrastructure, nor oil and gas extraction because of where they are located. There is local concern for impacts of winter motorized recreation on mountain goat populations in the plan area. Winter motorized recreational use is currently not allowed where it is occurring.

Climate change modeling in both coastal Alaska and the Washington Cascades suggest that mountain goat ranges will shrink up to 86 percent under some projected scenarios, becoming more fragmented and isolated by the end of the century (Johnston et al. 2012, White et al. 2018). A similar pattern could be expected for mountain goats in Idaho given that they already occur at the highest elevations available across most of the state, particularly in the Panhandle, Clearwater, and Southwest regions (Idaho Department of Fish and Game 2019b). As temperatures rise, mountain goats can adapt behaviorally, altering daily elevational movements and foraging times to select microsites, providing cooler or warmer conditions as necessary (DeVoe et al. 2015, Frederick 2015).

Flesch et al. (2016) argued that they possess sufficient physiological and ecological plasticity to deal with projected changes in climate. The Draft Idaho Mountain Goat Plan predicted a 0.9 to 1.6-meter decline in winter snow accumulation and about a 4.2 to 4.3 degree increase in temperatures in mountain goat habitat in the Black Snow, Lochsa-Selway, and Lower Salmon population management units, which are the Idaho Department of Fish and Game mountain goat units in the plan area (Idaho Department of Fish and Game 2019b).

Winter is a time of profound nutritional deprivation for mountain goats (Fox et al. 1989). Deep snow reduces food availability and increases energy expenditure (Dailey and Hobbs 1989). Mountain goats often constrain their movements and occupy small home ranges during winter (Keim 2004, Schoen and Kirchoff 1982, Smith 1982). Winter range is important to the long-term survival of mountain goats and should be identified and managed to reduce disturbance to mountain goats.

Mountain goat populations are distributed in many areas of the Nez Perce-Clearwater as metapopulations. A metapopulation structure is one composed of many disjointed populations that are maintained by immigration and emigration between populations. In the plan area, none of the subpopulations are large compared to other big game numbers. Some of the larger herds reach close to 200, while other herds occur in the number of 20 to 50 individuals. Larger subpopulations are found along the Salmon River breaks in the Frank-Church and Gospel-Hump wilderness areas, the Mallard-Larkins area, and the Hoodoo area. Smaller subpopulations are scattered in the Selway-Bitterroot Wilderness, along the Lochsa corridor, and in the South Fork Clearwater area. The status of some of these smaller populations was recently in question but actual flight counts are lacking. The most acute decline based on limited survey effort is within the Blacklead subpopulation within the Hoodoo Recommended Wilderness Area, where the Idaho Department of Fish and Game has documented sharp declines in mountain goat numbers.

A winter habitat model was produced by the Idaho Department of Fish and Game that was analyzed by for the Land Management Plan (Figure 111). While well distributed, many of the suitable habitats in the Nez Perce-Clearwater are unoccupied because of over harvest in the past. The observation data provides a relative distribution of occupied areas. The mountain goat observation records provided line up well with the modeled habitats, but it should be noted that the mountain goat observations are over a time spanning from 1956 to 2018 and do not reflect current population numbers or status. Idaho flight efforts have only been conducted sporadically in the plan area in the last decade because of low numbers, the size of the Nez Perce-Clearwater, and the expense and danger associated with flight counts. Most observations are those incidentally observed during elk surveys. The population number and winter habitat model was used in delineating recommended wilderness for the Preferred Alternative, which include mountain goat habitat in the Hoodoo recommended wilderness even though the boundaries were altered to accommodate recreation.

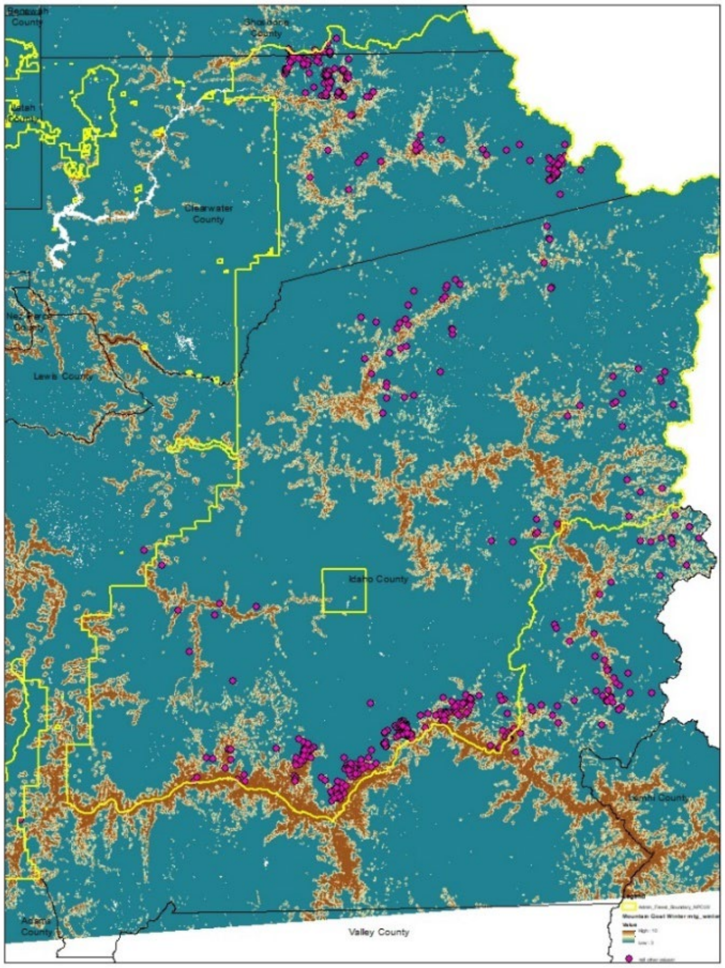


Figure 111. Modeled mountain goat winter habitat. Mountain goat locations in are shown as purple dots, and winter habitat is shown in brown. Green represents non-winter habitat for mountain goats.

Mountain goat migration in the plan area is not well understood. While mountain goats may move to slightly lower elevations in winter, in general, the Idaho Department of Fish and Game has witnessed them staying at higher elevations, above alpine, with movement restricted to areas with rocky escape cover perhaps close to wind swept ridges.

In July of 2017, during an in-person conversation, Clay Hickey stated recent flight counts by the Idaho Department of Fish and Game in areas occupied by goats in the Great Burn area, also known as the Hoodoo recommended wilderness area, documented snowmobile tracks near historic mountain goat areas and counted less than twenty individuals where past winter counts were in the low one-hundreds. The alternatives for recommended wilderness and whether snow mobiles are suitable in recommended wilderness could affect some populations of mountain goats in the plan area.

Black Snow Population Management Unit

Mountain goat habitat in the Black Snow Population Management Unit is located on the Idaho Panhandle and Nez Perce-Clearwater National Forest (Figure 112). Most of the currently occupied mountain goat habitat is covered under the Idaho Roadless Rule. Mountain goats are arranged in a metapopulation system with mountain goats living on isolated rocky areas among a sea of heavily forested areas. The mountain goats between Snow Peak and Black Mountain reside in the Mallard-Larkins primitive area. The most recent survey, in 2017, counted 128 mountain goats in the Black Snow Population Management Unit; however, the eastern portion of the population management unit showed a substantial decline from the previous survey. There are concerns with increasing snowmobile and snow bike access to mountain goat habitat in both the western part of Game Management Unit 9 and the eastern portion of Game Management Unit 10 in the Black Snow Population Management Unit.

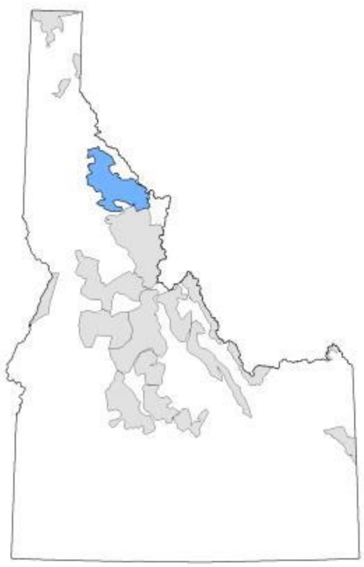


Figure 112. Black Snow mountain goat population management unit

Lochsa-Selway Population Management Unit

The mountain goats in the Lochsa-Selway Population Management Unit are found primarily on the Idaho-Montana border and in rocky cliffs on the Lochsa and Selway River drainages in Game Management Units 12 and 17 (Figure 113). Nearly all these lands are managed by the Forest Service and much of the mountain goat habitat is located within wilderness. Areas in Game Management Units 16 and 16A would have been included in this population management unit, but forest encroachment has eliminated much of the habitat and mountain goats have not been observed there in decades. Mountain goats in this population management unit are accessible within Game Management Unit 12 but largely inaccessible to hunters in Game Management Units 17, 16, and 16A. The Lochsa population varied from a high of 85 mountain goats in 1987 to 48 in 1996, the last year surveyed. Mountain goats are still observed through much of the area at low numbers and may still have similar population levels. The Selway population last had a complete survey in 1994, where 151 mountain goats were observed. A smaller survey of high grading mountain goat habitat in the same area in 2014 only observed 19 mountain goats. There has not been a hunt in the Lochsa-Selway Population Management Unit since the 1980s, and mountain goats have continued to decline in the Selway. Timber encroachment on small islands of habitat due to fire suppression has likely impacted mountain goat distribution over the last 60 years.

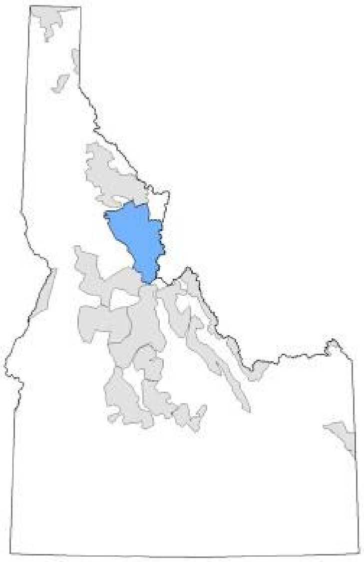


Figure 113. Lochsa-Selway mountain goat population management unit

Lower Salmon Population Management Unit

The Lower Salmon Population Management Unit includes mountain goats along the South Fork Clearwater River in Game Management Unit 15 from Mill Creek to Tenmile Creek, drops south to include both sides of the Salmon River from the mouth of Wind River in Game Management Units 19 and 19A, and east to the mouth of Disappointment Creek in Game Management Units 20 and 20A (Figure 114). It also contains the east side of the South Fork Salmon River up to Elk Creek. This population management unit falls within parts of the Nez Perce-Clearwater, Bitterroot, and Payette National Forests and much of this unit is located within the Gospel-Hump and Frank-Church River of No Return wilderness areas. Mountain goat habitat in the Lower Salmon Population Management Unit consists largely of broken river canyon cliffs but also includes several subalpine basins. Mountain goats in this unit are very sparsely distributed in small groups and connectivity is very low. It is estimated that there were around 160 mountain goats in this unit in the mid-1950s (Brandborg 1955). The first Idaho Department of Fish and Game flight records began in 1961. Much of this data comes from partial, intermittent mountain goat surveys or from incidental observations during elk surveys. The first full mountain goat survey in the Lower Salmon Population Management Unit was conducted in 1982. Forty-two mountain goats were observed on the lower South Fork Salmon River (South Fork) and the south side of the main Salmon River (South Main) and 92 goats were counted on the north side of the Main Salmon River (North Main) in Game Management Unit 15. In 1990, another full mountain goat survey was conducted on the South Fork and South Main Salmon where 36 mountain goats were observed. In 1993, a full survey of the North Main Salmon yielded 49 mountain goats. No mountain goat specific surveys have occurred along the North Main Salmon since that time. The last full survey of the South Fork and South Main Salmon occurred in 2003, where observers counted only three mountain goats. Most of the habitat in this unit is remote and unroaded. The potential impacts of motorized and non-motorized recreation are minimal.

Figure 114. Lower Salmon mountain goat population management unit

Across the Nez Perce-Clearwater

Observations of mountain goats from 1956 to 2018 show that 49 percent of the observations of mountain goats in the plan area have been documented in Idaho Roadless Rule areas, 46 percent have been observed in designated wilderness, and about 4.2 percent have been observed within the general forest portion, or Management Area 3, of the Nez Perce-Clearwater.

Mountain Lion

Historically, mountain lions were viewed as a predator to be eliminated as a threat to livestock herds. Mountain lions were reclassified as a game animal in 1972, which gave the Idaho Department of Fish and Game management authority over the species. Mountain lions are important as both a target species for hunters and as a predator that may influence populations of large ungulates, like elk and deer, which are also popular hunted species. The energetic needs of female lions with kittens limit viable populations to areas with enough deer and elk. Thus, land use or habitat management practices that impact ungulate prey will also impact mountain lions. The Assessment (U.S. Department of Agriculture 2014f) outlines mountain lion biology, factors leading to vulnerability, and population trends. Mountain lion hunting is offered in over-the-counter license sales in and around the plan area to reduce numbers and increase other big game animals. Populations appear stable in the Palouse Zone, Hells Canyon Zone, Elk City Zone, and Selway Zone. Mountain lion populations in the Lolo Zone are thought to be declining due to low elk populations.

Mule Deer

The plan area is on the northern edge of good mule deer habitat, but mule deer can be found throughout the plan area in suitable habitats. Mule deer populations on the Nez Perce-Clearwater are located in the Snake, Salmon, and Selway River drainages. They are found in steeper habitat that contains browse for food and a mix of chaparral or forest for cover mixed with open areas. They can also be found in open habitats with few or no trees. Mule deer mostly eat browse, but a smaller portion of their diet contains grasses and forbs. The proportion of these foods varies seasonally, with the proportion of grasses and forbs increasing during the spring and summer. In winter, they travel to lower elevations on western or southern facing aspects to avoid deep snow. Winter is thought to be the most challenging season for them, and protection of winter habitat has been a mainstay of mule deer habitat management across the west.

Agents of change in mule deer habitat include fire exclusion and the reduction in habitat quality because of invasion by exotic weeds and grasses. Restoration of fire regimes can benefit mule deer by increasing forage quality and quantity. The coarse filter plan components in the Forestlands; Meadows, Grasslands, and Shrublands; and Invasive Species sections of the plan can contribute to mule deer habitat. Their populations are controlled by hunting, predators, and habitat conditions.

Mule deer are economically important to the Idaho Department of Fish and Game and many small rural economies in Idaho. Cooper and Unsworth (Idaho Department of Fish and Game 2000) estimated mule deer hunting resulted in a direct expenditure of $42 million in trip-related expenses, not including equipment purchases. Many of these expenditures were for fuel, meals, and lodging in rural towns. Using a typical economic multiplier of 2.5, the Idaho Mule Deer Plan estimated that the total estimated economic impact of mule deer hunting in Idaho exceeded $100 million. Additionally, more than 1,000 jobs in Idaho are directly supported by mule deer hunting-related expenditures (Idaho Department of Fish and Game 2000). In 2006, direct revenues to the Idaho Department of Fish and Game from mule deer license and tag sales were nearly $6.3 million, representing nearly 20 percent of the total license and tag revenues used to implement important wildlife conservation programs, including enforcement, population monitoring and research, and habitat conservation. Guide services in backcountry areas, including within designated wilderness areas, offer highly valued mule deer hunting opportunities where clients will pay upwards of $5,000 for the services. Additionally, parts of the Nez Perce-Clearwater above the Salmon River canyon offer trophy mule deer hunting opportunities. Mule deer could be considered the third most pursued big game species in the plan area behind whitetail deer and elk.

Mule deer are more common in the southern portion of the Nez Perce-Clearwater than they are in the northern part. Mule deer are primarily browsers and shrub fields are an important component of their habitat. While whitetail deer are ubiquitous, mule deer in most areas of the Nez Perce-Clearwater occur in limited pockets of suitable habitats, which includes grasslands and shrublands, often on steeper slopes. Mule deer populations in the plan area are generally stable compared to those in other parts of the state, which exhibit a wide range of variability. Mule deer populations across the region, including in the plan area, appear to be increasing, partly in response to very conservative harvest management. Populations probably did not change much until the large fires of the early 1900s that converted vast expanses of unbroken forest into a mosaic of successional vegetation types and large numbers of domestic livestock altered grass-dominated habitats into shrub cover. They make up less than 10 percent of the deer harvest over most of the Nez Perce-Clearwater. Weather, fire, and plant succession have ultimately played a much larger role in mule deer populations than efforts of wildlife managers.

Mule deer movements or migration are not well understood in the plan area. It is thought that they migrate down drainages from higher to lower elevations in the winter, though they show higher fidelity to river breaks. Habitats where they occur face few threats to migration or movement routes from forest management because of where they occur.

Whitetail Deer

White-tail deer are one of the most sought-after big game animals in the Clearwater region and in the state. Whitetails are abundant north of the Salmon River. The highest densities of white-tailed deer in the state are thought to occur in the lower Clearwater and Salmon River drainages. Whitetail deer movements or migration patterns are not well understood in the plan area. Harvest records from the Idaho Department of Fish and Game confirm that, from 1994 through 2003, Clearwater region white-tailed deer have averaged 43 percent of the total statewide deer harvest (Idaho Department of Fish and Game 2019b). The percentage is likely to be much higher in the planning area due to the high number of whitetails compared to mule deer.

Whitetail deer are an important source of subsistence for tribal members exercising their treaty reserved rights. White-tailed deer hunting is also economically important in Idaho. Deer hunting, including both white-tailed and mule deer, provided 840,000 hunter days and generated $109 million in retail sales in 2001 (International Association of Fish and Wildlife Agencies 2002). Approximately 2,000 jobs were tied directly to deer hunting in 2001 and resulted in $1.3 million in state income tax. Forest Service lands in the plan area that are popular for deer hunting comprise substantial portions of Clearwater, Latah, and Idaho Counties. Based on Cooper et al. (2002), the combined economic impact of deer hunting in those three counties alone was in excess of $31 million in 2007. Whitetail deer are a source of meat for many living within the local communities and others who travel into the area for whitetail deer hunting.

The Assessment (U.S. Department of Agriculture 2014f) describes winter and summer habitats, predation, disease, and biology. Essentially, whitetail deer seek out forested areas in winter for thermal cover and seek out open areas for forage quality in the summer. The Assessment outlines the population trends and threats to whitetail deer. Summer range quality has also been linked to productivity, recruitment, and growth rates in deer (Cheatum and Morton 1946, Julander et al. 1961). Consequently, deer select spring, summer, and fall habitats with the most nutritious forages available. As summer progresses, deer initially follow spring green-up to higher elevations and make extensive use of clear-cuts, burns, and open forest areas but eventually shift to more mesic northerly aspects and forested habitats in late summer and fall. Whitetail deer would benefit from a variety of stand size classes and a mosaic pattern of disturbance offering hiding and foraging cover. Whitetail deer populations are generally healthy in most of the Nez Perce-Clearwater but may have declined in Game Management Units 16A, 17, 19, and 20 due to forest succession.

Gray Wolf

Wolves are managed as a big game species in Idaho and are actively hunted and trapped in the plan area. They were introduced in the mid-1990s to recover their populations after federal listing. They can exert a large response on other big game populations. Wolf population size and productivity is determined by the abundance of their prey, which in Idaho is primarily elk, though they will also take deer, moose, mountain goats, and bighorn sheep. Wolf populations are distributed throughout the plan area. Wolves are a factor in the declines of elk herds in some parts of the planning area, particularly in the Lolo and Selway Elk Management Zones. Wolves are a charismatic wildlife species that are popular to watch. Wolves are very mobile and are now expanding their range outside of what has been considered optimal habitat. Most mortality of wolves in Idaho is human caused. The Assessment (U.S. Department of Agriculture 2014f) outlines causes of wolf mortality, impact on big game populations, the ecological effect of wolves, and the Idaho Department of Fish and Game wolf management, status, and trends. Wolf populations have likely decreased in some parts of the plan area. The Idaho Department of Fish and Game controls wolf populations through the availability of hunting tags.

Furbearers

Thirteen species that occur on the Nez Perce-Clearwater are considered furbearers. Furbearers include the long-tailed weasel, short-tailed weasel, mink, red fox, bobcat, river otter, beaver, muskrat, coyote, northern raccoon, American marten, badger, and spotted skunk. The Nez Perce-Clearwater has an extensive history of fur trapping, both before and after European settlement. Furbearers provide recreation and economic contributions for people in the plan area. Lynx, fisher, and wolverine were also considered furbearers but hunting and trapping for those species is currently prohibited in Idaho. Bobcat and marten (both Pacific and American combined) are, by far, the most valuable furbearers in the plan area as they consistently bring high dollar value for their pelts. Species such as badgers, skunks, weasels, and sometimes otters are often trapped incidentally while targeting other species. The Idaho Department of

Fish and Game tracks furbearer populations of many species through an index of catch per unit effort. They estimate that the species trend is up if the catch per unit effort is higher and estimate it is declining if there is a decline in catch per unit effort for that species. Bobcats and river otters require mandatory reporting and tagging of trapped individuals.

Furbearers use a variety of habitats in the plan area, and plan components that provide for ecosystem integrity provide for most furbearing species. Furbearers that use aquatic and riparian habitats include beavers, river otters, muskrats, mink, skunks, and raccoons. Badgers tend to use non-forested habitats like shrublands, grasslands, and meadows. Long-tailed and short-tailed weasels use the interface between forested and non-forested habitats. There are two species of marten present—the Pacific marten and the American marten—and both would be considered mature forest species. Coyotes, red foxes, and bobcats are generalists that use a variety of habitats so long as prey populations are abundant.

Fur trapping is an activity that produces economic benefits to individuals and industry because the primary motivation for trapping is to sell furs for money, which are then used in the manufacturing of clothing. Fur prices fluctuate because of market demand and vary by species. The State of Idaho produces an annual fur bearer report with economic values of fur trapping (Idaho Department of Fish and Game 2018). The 2018 report identified that the state sold 1830 trapping licenses for the 2017-2018 season, an increase of four percent over the previous year. Idaho trapping licenses sell for $29.75 per resident adult and $8.25 for youth trappers. Trappers reported harvesting (trapping and hunting) 20,452 animals, up from 15,969 for 2016-2017. A total of 10,853 pelts were reported sold for a value estimated at $372,572.26. The number of pelts sold, and their estimated value, increased to 7,545 pelts reported sold for a value estimated at $195,250.77 during 2016-2017.

The statewide rank by dollar value per species pelt was wolf, bobcat, coyote, otter, marten, red fox, beaver, badger, skunk, spotted skunk, raccoon, mink, weasel, and muskrat. The price per pelt for all harvested species ranged from an average of $299.35 for wolves to $2.98 for muskrat. The top five furbearers based upon total dollar value of pelts sold were coyote, bobcat, marten, muskrat, and red fox. Bobcat trappers and hunters checked 1,360 animals, up from 921 animals the previous season. Based on an average pelt price of $34.33 and 14 pelts sold per trapper, trappers earned an average income of $480.62, up from $284.68 the previous season. Using an approximation of 65 percent reporting, the Idaho Department of Fish and Game estimated harvest for all trappers, including those who did not submit a report, was 31,465 animals taken and 16,697 pelts sold. The estimated statewide value of pelts sold is $1,041,696, up from $657,501 the previous season. Furbearer pelt revenue by county was calculated using the Idaho Department of Fish and Game furbearer report. The dollar value was estimated by using the average price per pelt and multiplying that by the number of animals harvested in each county for each type of fur bearer. During the 2017-2018 season, pelts from Idaho County generated approximately $38,348.09, and Clearwater County generated $14,270.88. The 2012–2013 total market value of all furbearers harvested in the Idaho Department of Fish and Game's Region 2 was $115,096; however, most of the plan area harvest would have occurred in Clearwater and Idaho County. The total market value of furbearers in Clearwater and Idaho County for the 2012–2013 season was $94,746. Bobcat and marten were, by far, the most valuable furbearers in the plan area in 2012–2013, having combined market values from Idaho and Clearwater Counties of $53,793 and $34,391, respectively (Idaho Department of Fish and Game, unpublished data, see project record file).

Different fur bearers each use unique habitats and they are represented in habitat groups like the aquatic and riparian habitats, open or non-forested habitats, ecotone or forest edge habitats, and forested habitats. Many of these species do not face significant threats to their habitats. These species are secure in the plan area. Perhaps the most significant threat to most of these species includes over trapping, which occurred in the past but has not typically been a challenge in Idaho since trapping regulations were established. While over trapping can be a threat, the state monitors furbearer populations and regulates trapping of these species to ensure their persistence. Furbearers are primarily provided for through ecosystem plan components. Furbearers are provided for through aquatics plan components, forestlands plan components, and the plan components in the Meadows, Grassland, and Shrubland section of the plan.

Martens (Pacific martens were considered subspecies of American martens previously) have been a species of conservation interest overtime and marten habitat was modeled in SIMPPPLLE to ensure that the plan will provide for long term peristence. Camera trap surveys, as well as fur harvest trends, suggest martens are common and abundant (Krohner 2020). Krohner (2020) conducted a camera trap study evaluating fisher occupancy but also detected martens in many fisher cells. Marten were detected on camera in 31 of the 54 cells, which were distributed across the plan area excluding wilderness areas. Genetic samples from this study detected both American and Pacific martens, and both species occur across most of the plan area. Overall marten occupancy was estimated at 0.63, and it was estimated that marten occupied 97 of 154 (approximately 63 percent) total grid cells. Habitats for martens are typically mature, old coniferous forests with complex structural features. Preferred conifer types have included subalpine fir and Engelmann spruce stands, lodgepole pine, and sometimes Douglas-fir, but martens have been observed in other forest types as well. Baker (1992) reported martens using younger age classes but denning was reported in residual old structures from previous forests, suggesting that legacy trees and retained large diameter snags can provide for martens even when age classes are changed through management.

Upland Game

The Nez Perce-Clearwater has an abundant population of upland game species. Upland game are distributed in many areas of the Nez Perce-Clearwater. Upland game includes species like California quail, cottontail rabbits, snowshoe hares, chukars, wild turkeys, mourning doves, ring-necked pheasants, gray partridges, and three grouse species. Of these, wild turkey, chukars, and grouse are the most popular species to hunt within the plan area. Upland game species are dependent upon early seral or non-forested habitats, ecotone habitats, and forest habitats. Some species, such as California quail, chukar, and pheasants, are distributed at lower elevations in the non-forested habitats. Snowshoe hares, spruce grouse, dusky grouse, and ruffed grouse are found forestwide. Populations of most of these species are thought to be secure and abundant. Primary threats include invasive weeds, fire suppression or succession, and grazing. The state monitors and regulates harvest of these species to help ensure their continued availability for use. Upland game species are primarily provided for through the ecosystem plan components. In particular, those that facilitate increased early seral habitats and healthy non-forested habitats and a mosaic pattern of forest and non-forested habitats. Plan direction that provides for these species can be found in the Forestlands and the Meadows, Grassland, and Shrubland sections.

Waterfowl

Waterfowl occur in the plan area but probably receive limited hunting pressure. These include a variety of duck and geese. They are all grouped into aquatic habitats, with some occurring in wetland habitats, others in open water, and others in riverine habitats. The most abundant aquatic habitats are the large rivers in the plan area, though there are some small lakes, reservoirs, and wetlands in limited quantities. Waterfowl have value as viewable wildlife or for photography. Species like the harlequin duck can draw bird watchers from afar, seeking to check that species off their life list. Feathers from waterfowl can be used in tribal clothing. Plan direction in the in the Aquatic Ecosystem section would provide well for these species.

Environmental Consequences of Plan Direction

Ecosystem Plan Components

The ecosystem plan components would help provide the ecological conditions to provide for species that are commonly used by the public for hunting, fishing, gathering, viewing, subsistence, and other uses. The way these plan components provide for the species depends on the specific ecology of each species. Most of these species are common and abundant in the plan area. Plan components that seek to restore the natural range of variability should provide for many species, even though some species may decline in numbers while other species increase. Plan components for terrestrial wildlife habitats are integrated with the vegetation plan components. Vegetation plan components are specified for potential vegetation types, which are groupings of individual habitat types (Pfister et al. 1977). Habitat types are an aggregation of ecological sites of like biophysical environments, such as climate, aspect, and soil characteristics, that produce plant communities with similar composition, structure, and function. Potential vegetation types serve as a basis for describing certain ecological conditions across the Nez Perce-Clearwater and are useful in understanding potential productivity, natural biodiversity and the processes that sustain these ecosystem conditions. The potential vegetation types are the warm-dry, warm-moist, cool-moist, and cold coniferous forest types. Because wildfire, insects, and disease have historically created a mosaic of habitats that range from young, open forest with shade-intolerant conifer species to dense, old forest with shade-tolerant species, most of the associated wildlife species are adapted to a complex of successional stages and species compositions that are based on the natural range of variation. This complex of successional stages meets their needs for nesting or denning, foraging, resting, cover, and connectivity. Fire and regeneration harvest in coniferous forest create early-successional habitat on a temporary basis. The plan components do not vary by alternative and were designed to provide the ecological conditions to provide for all the plan's wildlife. So in most cases for the species below, the plan effects do not vary by alternative. Where they do, the different effects are specified.

Several game species are dependent upon early seral or non-forested habitats. Non-forested habitats can be persistent but may be encroached by forest growth and some of them are susceptible to invasion by exotic vegetation. Mountain meadows and parklands, persistent shrublands, and lower elevation grasslands are examples of these types of habitats. The important features of these habitats are native vegetation in good condition and a distribution that reflects the natural disturbance regimes. Plan direction in Forestlands section for early seral habitats and those in the Meadows, Grasslands, and Shrublands section provide for these species.

Several game species use the interface between non-forested or early seral habitats and forested habitats. The plan direction in the Forestlands section contains direction on how to arrange these features on the landscape and should provide for the mix of forested and non-forested habitats needed by many big game and upland game species.

Many waterfowl species and some fur bearers depend upon aquatic and riparian habitats. Plan direction for aquatic and riparian habitats are extensive in the plan and would provide for these species by protecting these systems. The plan also contains direction to restore succession for some aquatic habitats to restore hardwood and deciduous vegetation in riparian habitats encroached and shaded out by coniferous forests as a result of fire suppression. Species such as beavers would benefit from restoration of hardwood or deciduous vegetation in riparian areas because they serve as a food source.

Plan components for forest dwelling species must consider the needs of a variety of wildlife species. Some species, like American and Pacific martens, prefer mature and old forest in cold and cool moist potential vegetation types, while black bears use a variety of habitats for their subsistence. Black bears, for example, select mature forest with high canopy cover and riparian areas but are highly dependent upon fruit bearing shrubs as an important source of nutrition at certain times of the year. Shrubs, such as huckleberries, grow best in open forests that provide some shade but let ample light into the understory. Black bears also use riparian habitats and avalanche paths for habitats. Thus, a variety in ages benefits bears. Similarly, ruffed grouse are forest dwelling birds that are most often found in early seral habitats. Thus, ecosystem plan components that provide for a variety of age classes are necessary for providing for a variety of forest species. Plan components that contribute to black bear habitat include those that speak to desired size classes in each broad potential vegetation type and retain legacy trees snags and downed wood, which would provide for denning and hibernation habitat.

The wildlife section includes plan components that provide for a variety of multiple use wildlife. Desired condition FW-DC-TE-05 states habitat conditions in the plan area provide ecological conditions that support the diversity of plant and animal communities and provide ecosystem integrity. FW-DC-TE-06 addresses the desire to provide for a diversity of habitats that would meet the needs of multiple use species by providing a mix of habitat patches of various size classes that would meet the needs of species that use edges and ecotones, species that use forested habitats, and species that use early seral or non-forested habitats. These will be effective because most of the ungulates depend upon ecotones or forest edges for their preferred habitats.

A goal of the plan is that the Nez Perce-Clearwater provides habitat conditions to meet Idaho Department of Fish and Game management plan objectives. Similarly, it is a desired condition that habitat supports opportunities for hunting, fishing, trapping, gathering, observing, photography, subsistence, cultural interactions, and the exercise of treaty reserved rights, as in FW-DC-WLMU-01. Language in FW-DC-WLMU-01 indicating a desire that “wildlife is distributed in habitats within their respective seasonal ranges” suggests desired conditions have a wide distribution of these species in the plan area but is not to be construed to mean that all wildlife occurs forestwide at all seasons of the year. Since wildlife species use a variety of habitats, FW-DC-WLMU-02 is a desired condition that habitats in each potential vegetation type function within a desired range of variation to contribute to multiple use wildlife needs. FW-DC-WLMU-03 provides an emphasis that the habitats in the plan area provide for ungulate species that meet their life history requirements year-round, including both summer and winter. This desired condition is adequate for the management of winter ranges to promote winter range restoration as needed.

As noxious weeds are a challenge throughout the west and in the plan area, FW-DC-WLMU-03 has language desiring that big game habitats are composed of native vegetation. This language applies to all the ungulates in the plan area, including elk, mule deer, whitetail deer, bighorn sheep, and mountain goats. FW-DC-WLMU-04 is a plan component emphasizing Pacific yew as an important feature of moose habitat. FW-DC-WLMU-05 is a desired condition emphasizing the role natural processes have in maintaining or improving the mosaic habitats needed for many game species. FW-DC-WLMU-06 was added in response to comments addressing the desired emphasis on social, cultural, and economic contributions of big game in the plan area.

There are three guidelines included in plan direction for the management of multiple use wildlife species. FW-GDL-WLMU-01 recognizes the impact that unauthorized routes have on game species and seeks to minimize these impacts and emphasizes that closures of these features should be effective. FW-GDL-WLMU-02 is a guideline that requires new fence installation be designed to reduce impacts on wildlife movements unless the intent is to exclude wildlife. Situations where this exception would be needed occur where wildlife would hinder efforts to restore habitat and need to be fenced out for that purpose. Another example would be in the event that fencing might be needed to prevent vehicle-wildlife strikes. These and other situations where wildlife fencing are appropriate would not be restricted; however, these situations are not expected to be common.

FW-GDL-WLMU-03 is a guideline designed to reduce disturbance during critical time periods of the lifecycle of big game species. Winter range restoration is not discouraged within the plan and FW-DC-WLMU-03 would encourage consideration of winter habitat management for ungulates. Additional emphasis on winter range was added to FW-DC-MLMU-02 to suggest added protection of disturbance to wintering big game. When treating winter range, it is encouraged to target areas that would provide the best nutritional response as with summer range.

Elk

Elk are identified as a focal species in the plan and are a management emphasis. As elk received much interest from both government agencies and the public, they are emphasized in the plan as a key focus for improving their habitat conditions and populations in the plan area. While the focus was on elk, many of the other multiple use species will also benefit from habitat management for elk. The Nez Perce-Clearwater collaborated extensively on plan components for elk based upon the best available scientific information.

Conceptual Basis for Management of Elk on the Nez Perce-Clearwater National Forest

In a collaborative effort, plan components were drafted to improve the condition of elk habitats in the plan area base upon increased awareness about the factors that most importantly influence elk populations. Participants included representatives from the Idaho Department Fish and Game and the Nez Perce Tribe, researchers from the Pacific Northwest Research Station, and members of the Land Management Plan interdisciplinary team. The framework for elk habitat management is described in detail within the management approaches section of the plan. Management approaches outlines agency intent related to elk habitat management.

Two concepts, nutrition and habitat use, provide the foundation for managing elk populations, encompassing both hunting and non-hunting periods on the Nez Perce-Clearwater under the proposed plan. Forest plan direction is most logically built on these two concepts incorporating best available science to ensure that elk populations are productive and abundant to meet land use desires from a wide spectrum of stakeholders who place high cultural, social, economic, and ecological importance on the species on public lands.

The desired condition FW-DC-MLMU-06 emphasizes these two concepts as a management framework for elk. Nutrition is defined as the dietary nutrients needed by a lactating female elk to meet its maintenance needs during summer and fall, a period of nutritional stress in response to demands of a calf at heel. Adequate summer-fall nutrition of a lactating female ensures survival of her calf through winter and allows the female to be in sufficient condition after weaning to again produce and recruit a calf the following year, avoiding alternate-year calf production by a female.

Habitat use is defined as the relative probability of elk use of a specified landscape and areas within the landscape. The size of the specified landscape is assumed to be an area large enough to encompass that used by a summer-fall population of elk. Sub-watersheds typically meet this definition, but other boundaries and spatial extents can also be used. Compatibility with the size of area occupied by an elk population or another ecologically meaningful management unit is key. The Nez Perce-Clearwater selected HUC12 for the scale at which to apply these measures in the proposed plan because HUC12s are commonly used as an unbiased sized area delineated by landscape features and are used by a variety of resource specialists in managing the Nez Perce-Clearwater and would be compatible for integration.

HUC12s also meet or exceed the size criteria to meet summer fall use. In comparison, HUC12s are about twice the size of the elk analysis units used in the 1987 Plans. Rowland et al. (2018) provided example applications of nutrition and habitat use evaluations for regional and local landscapes for elk management.

An additional consideration is the desired harvest and hunter opportunity during fall hunting seasons and associated effects on elk distribution and population performance. Past management has addressed this issue through the concept of elk security or habitat security, which has been defined and used in a wide variety of ways, many of which are contradictory and confusing. Importantly, past definitions do not recognize the important role of nutrition and habitat use as foundational to management of elk hunter harvest and hunter opportunity. See Christensen et al. (1993) for an example of this misunderstanding where security is appropriately identified as a measure of conservation in relation to harvest but without recognition that elk must be present on a landscape via appropriate management of nutrition and habitat use to have something to hunt or conserve.

This view largely reflects landscape conditions of the 1980s and early 1990s when concepts of elk security were developed at a time when early seral habitat was abundant from a legacy of intensive timber harvest and nutritional conditions were vastly better than current conditions on public lands. Current conditions in the plan area suggest the limiting factor is a lack of adequate nutrition and high predation rates, rather than hiding cover, as cover is abundant in the plan area.

This is not intended to disparage the concept of elk security, but its use needs to be updated to reflect contemporary concepts of producing and sustaining a productive and abundant elk population based on nutrition and habitat use. Furthermore, the research cited above suggests these concepts require updating to consider the spatial arrangement of roads, rather than a simplified density estimate without considering the interaction of nutrition and roads. Without sufficient summer-fall nutrition and high habitat use, there will be few elk that can be hunted and conserved via the traditional concepts of elk security.

The framework emphasizes the distance from roads rather than road density and integrates nutrition and other factors widely known to influence elk habitat use, such as slope and arrangement of seral conditions at a landscape scale. The framework is flexible enough to provide what elk need within watersheds. For example, a given watersheds may have ample distance from roads but lack nutritional resources, another might have a road distribution that precludes use, and other watersheds might lack the spatial arrangement of seral conditions to provide for forage to edge cover and meet the needs of elk selection at landscape scales and might benefit from a diversity of seral patches of appropriate size or shape to provide edges spatially arranged across the watershed.

Elk select habitats on milder slopes compared to steeper slopes, so features that affect habitat use, such as nutrition, are more effective for elk when they occur on milder slopes. Similarly, factors that increase disturbance to elk, like open motorized roads and trails, are more detrimental if located on milder slopes preferred by elk. Some watersheds might benefit more from these factors if forage resources are created on mild slopes or disturbance factors were removed from mild slopes. Adjusting one or more of these four factors to increase or maintain predicted female elk body fat at a landscape scale could have direct positive effects on elk vital rates. Rowland et al. (2018) showed that it is possible to predict female fat based upon the proportion of a landscape that has high quality nutritional forage usable by elk. The amount of predicted female fat can be dramatically increased by small percent changes in the amount of area that contains greater than 2.6 kcal/g dietary digestible energy. Female reproductive output is correlated with higher levels of percent body fat.

Goals that underlie management of elk habitat use and nutrition include a public land manger’s desire to:

- Minimize distributional shifts to private lands.
- Meet Tribal First Food objectives.
- Meet hunter harvest objectives or avoid overharvest.
- Meet hunter opportunity desires.
- Minimize non-consumptive effects.
- Meet fall nutritional needs of lactating females and associated habitat use objectives.

Management for elk habitat use will vary substantially according to which of the above objectives are specified by public land managers in a given watershed in collaboration with state wildlife agencies, tribes, and other public lands stakeholders. These factors could be manipulated to positively improve conditions or reduce impacts through evaluation of alternatives during projects. Importantly, all these goals relate to achieving desired levels of habitat use as a basis for managing ecological conditions for elk. Habitat use includes nutrition to ensure that there is an elk population to manage for hunting.

During the collaborative effort, it was recognized that elk in the different management areas of the Nez Perce-Clearwater have different needs related to nutrition and habitat use and the ability to manage habitats differ as well. Elk within Idaho Roadless Rule areas have ample security or distance from roads but may lack abundant high-quality nutrition. Idaho Roadless Rule areas are composed of large blocks of land without motorized access. These areas may lack nutritional resources due to fire suppression. Thus, in the plan components for Roadless Rule areas, emphasis is on higher nutrition at a landscape scale under MA2-DC-ELK-01 and objective MA2-OBJ-ELK-01 while maintaining the large areas without motorized access that could be impacted by development of new motorized trails. MA2-DC-ELK-02 and FW-GDL-WL-05 emphasize retaining areas of 5000 acres or larger without motorized access consistent with Ranglack et al. (2017).

Watersheds within Management Area 3 might lack nutritional resources or have areas not used by elk because the distribution of open motorized routes, which may not provide enough distance from roads to be usable. Similarly, they may have abundant nutritional resources but lack habitat uses because they do not provide enough distance from open roads. Management Area 3 is the least restrictive management area for habitat alteration to improve elk habitats from a nutritional standpoint. Therefore, the ability to provide abundant nutritional resources is enabled in this management area. Watersheds in Management Area 3 could benefit from increasing high quality nutrition to help alleviate the effects of roads. A manager might select to keep roads created during timber harvest from being open to the public after project completion or choose to strategically close a road segment to increase the distance elk have to use habitats between roads, especially if roads impact areas of mild slopes with high nutrition. Alternatively, a decision maker might choose to locate roads in areas so that habitats farther from roads are not impacted or where roads will have less disturbance on areas with milder slopes. This framework gives flexibility to decision makers for a variety of measures that can be used to measurably change conditions for female elk, which will improve predicted body fat. Percent body fat is tied directly to known factors that most influence elk population growth, such as calf survival, winter survival, pregnancy rates, and calf to cow ratios. FW-DC-MLMU-06 and MA3-GDL-WLMU-01 are intended to help managers move ecological conditions towards higher habitat use and increasing nutritional resources for elk. Additional detail and agency intent on implementing this elk plan direction can be found in the Management Approaches section of the Forest Plan which lays out the intended framework for elk habitat management and project analysis.

All these plan components are designed to be used in consideration with the best available science on an elk forage response spatial layer. The nutritional response layer is a geographic information system map layer derived from a combination of physical and biological conditions across the Nez Perce-Clearwater that predict the nutritional response that would occur following disturbance (Cook et al. 2018). This spatial data was created based upon science and verified through measurement of nutritional resources on the ground and evaluated through telemetry-based elk habitat selection (Cook et al. 2018). A total of six potential nutritional models were evaluated and one was identified as best representing nutritional responses across the region, though some of the other models performed better in individual herd areas. Model 6 performed better overall across all study areas than all the other models, showing a positive relationship of increasing elk use with increasing dietary digestible energy, and is the recommended model (Cook et al. 2018). Management designed to increase nutritional resources for elk should be targeted in areas expected to provide higher quality nutritional resources, which are mapped in the nutritional response spatial layer. High quality nutritional resources are defined as areas that produce vegetation with greater than or 2.6 kilocalories per gram of dietary digestible energy.

Dietary digestible energy levels near or above 2.6 kilocalories per gram meet the basic nutritional requirements of elk and were highly correlated with pregnancy rates of lactating females (Rowland et al. 2018). Autumn body fat levels were highly correlated with the percentage of elk ranges or landscapes providing dietary digestible energy levels above this basic requirement (Rowland et al. 2018). It is not likely sufficient to create early seral conditions in areas with a poor nutritional response if the expected outcome is to provide elk forage. Small percentage changes in the amount of high-quality nutritional resources at a landscape scale can have dramatic effects on predicted elk fat (Rowland et al. 2018). Thus, language in the desired condition plan components and in the objectives direct the location of management to achieve desired vegetation conditions towards areas predicted to have higher nutritional response. Objectives MA2-OBJ-ELK-01 and MA2-OBJ-ELK-02 and direct treatments to restore vegetation. These would be targeted towards areas with the highest nutritional responses to increase the area within the landscape that provides higher quality nutrition. These locational considerations line up well with departures from the natural range of variation that should be restored through the vegetation desired conditions found in the Forestlands section of the plan.

The Nez Perce-Clearwater contracted with Ecosystem Research Group to run the elk nutrition model through SIMPPLLE to predict the response of disturbance, including wildland fire, timber harvest, and insects and diseases to estimate how the amount of high-quality forage would fluctuate through time under the alternatives. The model evaluated the benefits to elk pregnancy and elk body fat within the three management areas by combining simulated vegetation treatments with predicted nutritional potential data layers. The model evaluated only the response of the treatments without consideration of the travel system.

Results suggest that nutrition sufficient to benefit pregnancy and body fat would occur within Management Area 3 under all alternatives over the next 50 years (Figure 120 and Figure 123). These increases, while they appear modest, represent a significant increase in the landscape that provides high quality nutrition for elk. These modest gains in high quality nutrition represents large increases in potential body fat and to support higher pregnancy rates. Nutrition sufficient to benefit body fat and pregnancy was static or only had modest changes within Management Areas 1 and 2 (Figure 118, Figure 119, Figure 121, Figure 122, Figure 123). This was likely because of a few factors. First, much of Management Areas 1 and 2 has limited areas that have productive site potential to provide a high nutritional response. Second, the ability of the agency to treat these areas are limited because of restrictions imposed by wilderness and the Idaho Roadless Rule. Third, natural disturbances such as fire have been operating within Management Area 1 and has already created a lot of early seral conditions within that area.

Within Management Area 3, results are very favorable and show that the amount of high-quality forage increases throughout the 50-year timeframe modeled under all alternatives. The results suggest about a 17 percent increase in the area of nutrition that produces greater than 2.58 kilocalories per gram of dietary digestible energy over the 50-year timeframe compared to current conditions. This is the amount that contributes to pregnancy. There is about a 100 percent increase in the area that produces greater than 2.75 kilocalories per gram of dietary digestible energy in the excellent category. This is the amount of nutrition that supports higher body fat. As these areas are highly selected by elk, these areas should increase elk habitat use. Studies on elk from the Clearwater Basin Collaborative Elk Project suggest that an increase from 5 to 20 percent of the landscape having more than 2.75 kilocalories per gram of dietary digestible energy can increase percent body fat from about 8 up to 12 percent and increase pregnancy rates for female elk from approximately 40 percent to nearly 100 percent. With approximately a 6 percent change in areas with greater than 2.9 percent of dietary digestible energy, the predicted percent body fat can change from 6 to 8 percent up to above 12 percent. These changes in body fat should improve both calf and female elk survival during winter. The largest jump in elk nutritional resources is in Management Area 3, with Management Area 2, and Management Area 1 remaining relatively static.

Within Management Area 3, alternatives that provide a quicker pace to achieve desired vegetation conditions provides more high quality nutrition than alternatives that achieve desired vegetation conditions at a slower pace. The Preferred Alternative provides a seventeen percent increase in nutrition that would provide for increased pregnancy rate in Management Area 3. The Preferred Alternative also would provide a thirty six percent increase in nutrition that would contribute to higher body fat. This alternative is intermediate compared to the fastest and slowest pace for achieving desired conditions in other alternatives. The six figures below compare the alternatives by how much habitat is projected in SIMPPLLE to produce sufficient dietary digestible energy sufficient to provide for elk body fat and pregnancy. Habitat that provides for greater than or equal to 2.75 kilocalories per gram dietary digestible energy provides for body fat while habitat that provides greater than 2.58 kilocalories per gram dietary digestible energy provides for higher elk pregnancy rates.

The best nutritional response is projected to occur within Management Area 3 (see Figure 115 through Figure 123). Whether habitats with high quality nutrition are usable by elk would depend upon whether they would be located within about a half mile or more from motorized routes open to the public. If located closer than about a half mile from open motorized routes, they would receive less use by elk and have lower benefits to elk pregnancy, body fat and elk habitat use. There is currently about 29 percent of Management Area 3 located more than one half mile away from open motorized routes, therefore areas that can provide both high quality nutrition and that are farther than a half mile from open motorized routes are limited. The road system likely also limits the carrying capacity of Management Area 3 to provide for elk population growth. Intuitively, when less area supports elk habitat use, the result is lower elk population potential. The desired conditions for increase nutrition that is usable by elk should help encourage conditions that will better provide for elk in forestwide including Management Area 3.

The integrated approach to evaluating nutrition and open motorized uses outlined within Management Approaches could result in improvements in the capacity of the landscape to provide for elk populations, especially within Management Area 3 because it would provide a mechanism to strategically locate high quality nutrition away from open motorized routes. This can happen through a combination of increasing nutrition while also increasing distances from open motorized roads and trails through strategic travel decisions. Plan direction and the framework within management approaches would encourage this integrated framework to provide for elk habitat use and nutrition. The specific process is spelled out in the management approaches section of the plan. The spatial layers for nutrition potential used in conjunction with the travel management system will allow strategic placement of elk habitat treatments.

The integrated framework outlined within management approaches provides an analytical framework through which to base decisions to evaluate tradeoffs of the combined effects of nutrition and motorized access for the benefit of elk. The framework would provide alternatives within projects to evaluate the road system concurrently with the production of nutritional resources to maximize elk use of nutrition. The steps to the management approach framework for elk essentially takes the following steps: 1) calculate all nutritional resources within a HUC 12 watershed or watersheds where the project is located, 2) use the nutrition potential map to identify the areas for treatment, 3) calculate the change in area of high quality nutritional that would result from the project, 4) subtract out any nutritional resources not usable by elk because of proximity to open motorized roads or trails, and also evaluate how slope, nutrition and the arrangement of nutrition across the watershed would provide habitat use 5) provide alternatives and outcomes for motorized use, nutrition, slope, and the arrangement of nutrition on the landscape to evaluate how much additional usable nutrition is created by the project by alternatives. More specifically, the project would evaluate how existing open roads impact use of high quality nutrition; evaluate how new road segments might affect the use of high quality nutrition if they remain open to the public; and identify which roads, new or existing, might have the most impact to nutrition use and high quality nutrition and offer decision makers the opportunity to consider alternatives that strategically closing new or existing roads to the public where appropriate to increase elk habitat use especially of high quality nutritional resources. The deciding official could then weigh the alternatives and potentially select those that would maximize elk habitat use and nutrition production to the benefit of elk fat accretion and pregnancy. Guideline MA3-GDL-ELK-01 would require decision makers to improve predicted cow elk body fat when conducting treatments to benefit elk habitat. Specifically, the term predicted body means to change habitat conditions to improve predicted body fat and support higher pregnancy rates using four covariates that have been found to influence habitat use and sufficient nutrition (Rowland et al 2018). These include the amount of high-quality nutrition, distance to nearest road open to motorized use by the public, distance to cover-forage edge, and slope.

Management Areas 1 and 2 provide more areas without open motorized roads and trails but are projected to have areas of high nutrition remain static in the model. However, the nutritional response layer and objective MA2-OBJ-ELK-01 would provide the ability to target the best nutritional resources. New roads are restricted by the Idaho Roadless Rule. However, two plan components constrain motorized use to the benefit of elk in Management Area 2. FW-DC-MLMU-07 is a desired condition that motorized access does not preclude use of high-quality nutritional resources or winter ranges. FW-GDL-WL-05 constrains the establishment of new motorized roads and trails unless areas 5000 acres or larger can be maintained without motorized access. The guideline includes a few exceptions, from which it does not apply. The guideline does not apply to Community Protection Zones as defined by the Idaho Roadless Rule: Areas with existing motorized access that are currently less than 5,000 acres; and existing trails that are relocated or reconstructed to mitigate negative impacts to ecological resources.

These plan components would maintain both large areas without motorized uses and prevent motorized trails from impacting habitat use of nutritional resources.

It is important item to note that the SIMPPLLE model simulations were not programed to prioritize the areas of highest nutritional response; rather, we projected treatments randomly within constraints of Management Areas to achieve desired vegetation conditions. Therefore, it only shows the response of achieving desired vegetation conditions.; In reality, projects could be strategically directed to areas that have higher potential nutritional response to result in greater benefits to elk nutrition than SIMPPLLE model results suggest.

A forestwide analysis was conducted to evaluate whether the desired conditions for elk could be achieved and how much treatment would be needed to achieve higher body fat levels in elk within each HUC 12 watershed. All HUC 12 watersheds within the plan area have the nutrition potential to produce at least 20 percent of their area in nutrition categories of 2.6 kilocalories per gram or higher (Figure 115). Some watersheds, despite having sufficient total nutrition potential, do not have enough potential nutrition outside of the influence of open motorized routes (farther than one-half mile) to allow the watershed to achieve 10 percent area with high quality nutrition to enable elk use (Figure 115). For example, 38 out of 238 watersheds in the plan area do not have enough high-quality nutrition potential outside one-half mile from a road to reach 10 percent usable nutrition. Most of these watersheds are those within Management Area 3. Treatments within these watersheds would not be the most effective for elk enhancements.

Watersheds where roads preclude use of high-quality nutrition could be improved by strategic and surgical changes to the travel system in conjunction with improvements in existing nutrition in high potential areas. The treatments could include relocation of existing motorized routes to areas with low nutrition potential or surgical closures of open motorized routes in areas with high quality potential nutritional resources. The total area that would need to be increased to enable potential nutrition outside of one-half mile from an open road to reach at least 10 percent amounts to about 40,283 acres within the 38 watersheds identified above. Assuming, that 1 mile of road closure is approximately 640 acres of habitat per mile of road closed, then it would take about 63 miles of open motorized route closures or relocation to allow each watershed to achieve a minimum of 10 percent usable nutrition potential. However, this number of closures or any closures for that matter may not be feasible given the road system is a minimum needed for forest management. In these cases, nutrition could be improved as far from open motorized routes as possible as identified by site specific analysis. Additional nutrition could potentially offset some effects of motorized routes as suggested by Ranglack (2016, 2022).

The travel system of open motorized routes (roads or motorized trails open to the public) complicates whether the nutrition currently available is useable by elk (Figure 116). Seemingly, the road system would reduce use of high-quality nutrition below 10 percent of the landscape even when the total area with this level of nutrition is present. When the system of motorized routes is considered, 78 watersheds currently do not provide at least 10 percent of the area of watersheds outside of one-half mile from an open motorized route. A total of 53 watersheds has between 10 and 20 percent of their area producing at least 2.6 kilocalories per gram dietary digestible energy (DDE), and about 107 HUC12 watersheds provide more than 20 percent of their area with at least 2.6 kilocalories per gram DDE (Table 295). These conditions leave many areas of the Nez Perce-Clearwater without adequate available nutrition to support good body condition and pregnancy from a habitat use perspective. A total of 95,195 acres of treatment would be required outside of one-half mile from a road to allow the 78 watersheds to reach a minimum of 10 percent area with adequate nutrition. The treatments would likely need to be either treatments outside one-half mile of open motorized routes, or an increase in the space outside one-half mile of the motorized route system with high nutrition or both concurrently in some watersheds.

A total of 33 watersheds has high amounts of nutrition total (≥20 percent) but not more than 10 percent of the nutrition exists outside of one-half mile. An additional 27 have between 10 and 20 percent but not enough outside of one-half mile from a road to provide 10 percent available nutrition (compare Figure 116 with Figure 117). Twenty-seven watersheds have enough nutrition total to exceed 20 percent but have only 10 percent of it outside one-half mile from a road. Twenty-six watersheds have between 10 and 20 percent currently with between 10 to 20 percent outside of one-half mile from a road. A total of 107 watersheds has a total amount higher than 20 percent and also have more than 20 percent outside of one-half mile from a road.

Table 295. The number of HUC 12 watersheds with various percent ranges of areas with nutrition equal to or higher than 2.69 kcal/g of dietary digestible energy (DDE)

Percent of area that has 2.6 kcal/g DDE	Number of Watersheds	Status
Watersheds that have 0-10%	18	Insufficient to support elk
Watersheds that have 10-20%	53	Supports pregnancy
Watersheds 20-40%	81	Supports high levels of pregnancy
Watersheds with ≥40%	86	Supports High Levels of pregnancy

In the Nez Perce-Clearwater landscape treatments produce high quality nutrition for about 20 years post disturbance (Rowland 2018). In terms of total treatments needed to maintain adequate nutrition on the landscape as a basis for a forestwide objective, approximately 10 percent of the total forest would need to be treated every 10 years or approximately 20 percent every 20 years to achieve 10 percent nutrition at the landscape scale. That would equate to about 393,906 acres of treatment every decade, which is well within the amount needed to achieve desired vegetation conditions (recall the plan objectives for total disturbance was 530,000 to 645,000 acres of treatment per decade). These treatments could occur as part of treatments to meet desired conditions for vegetation, via wildfire, or through treatments specifically to benefit elk, but would not exceed the total disturbance amounts per decade specified in description of the alternatives in the Final Environmental Impact Statement. To have the greatest effect, these treatments would have to occur within areas with high nutrition potential. Thus, under the plan the main consideration is whether those treatments occur within areas with high nutrition potential and particularly whether that nutrition will be usable by being located outside of one-half mile from an open motorized route. SIMPPLLE modeling suggests that the greatest change in nutritional response under the plan would occur within Management Area 3 and these are also the areas with the highest nutrition capacity. Treatments within Management Area 3 accounted for nearly all the increase in total nutrition within the plan area. This information formed the basis of objectives for elk habitat treatments. A technical guide was developed by Pacific Northwest Research Station to enable practitioners to better recognize areas that would support high nutrition potential and select areas for treatments. This technical guide is due out in 2023.

A few brief observations are in order. First, some watersheds are not capable of producing a minimum of at least 10 percent nutrition. These watersheds would not be a priority for treatments towards elk habitat improvements but it would be appropriate to provide as much high quality nutrition as the landscape allows or provide more areas of moderate or lower quality nutrition to compensate. Some watersheds might have a travel system which makes it possible to achieve at least 10 percent away from open motorized uses. In these watersheds, it may not be possible to close roads because the travel system in some of these watersheds support main access points into the Nez Perce-Clearwater and could not be closed. These watersheds would be lower priority for treatments to enhance elk habitat, and the strategy might be to provide more high-quality nutrition, even if it cannot be located away from open motorized routes. In watersheds that have adequate total nutrition, but not enough away from open motorized routes, the strategy could include a careful evaluation of the travel system to determine if improvements could be made, or by increasing high quality nutrition in places located away from open motorized routes. These watersheds would be a higher priority for treatments. The highest priority watersheds for treatments to improve elk body fat at the landscape scale, are those with inadequate nutrition and a motorized travel system with secure habitats sufficient to allow the creation of high-quality nutrition located away from open motorized routes. This could be accomplished by nutrition enhancements alone and measures to maintain the road system at current levels would be appropriate. The watersheds that have adequate nutrition away from roads would benefit from a strategy to periodically maintain or renew nutrition.

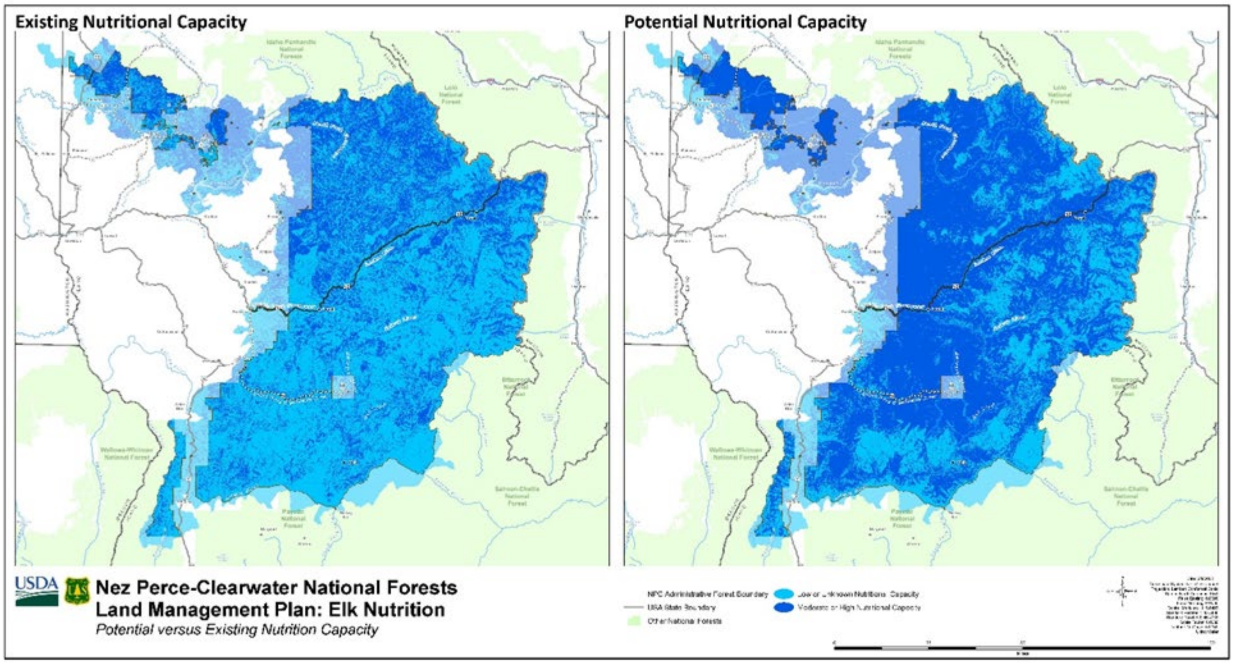


Figure 115. The existing (map A on the left) and potential nutrition (map B on the right). The map on the right shows the areas in dark blue that would produce a ≥ 2.6 kcal/g of dietary digestible energy if the canopy was reduced. The map on the right shows the estimated areas that currently have ≥2.6kcal/g dietary digestible energy shown in dark blue based on National Land Cover Canopy Data as of 2016. Light blue colors represent areas that produce less than 2.6 kcal/g of dietary digestible energy.

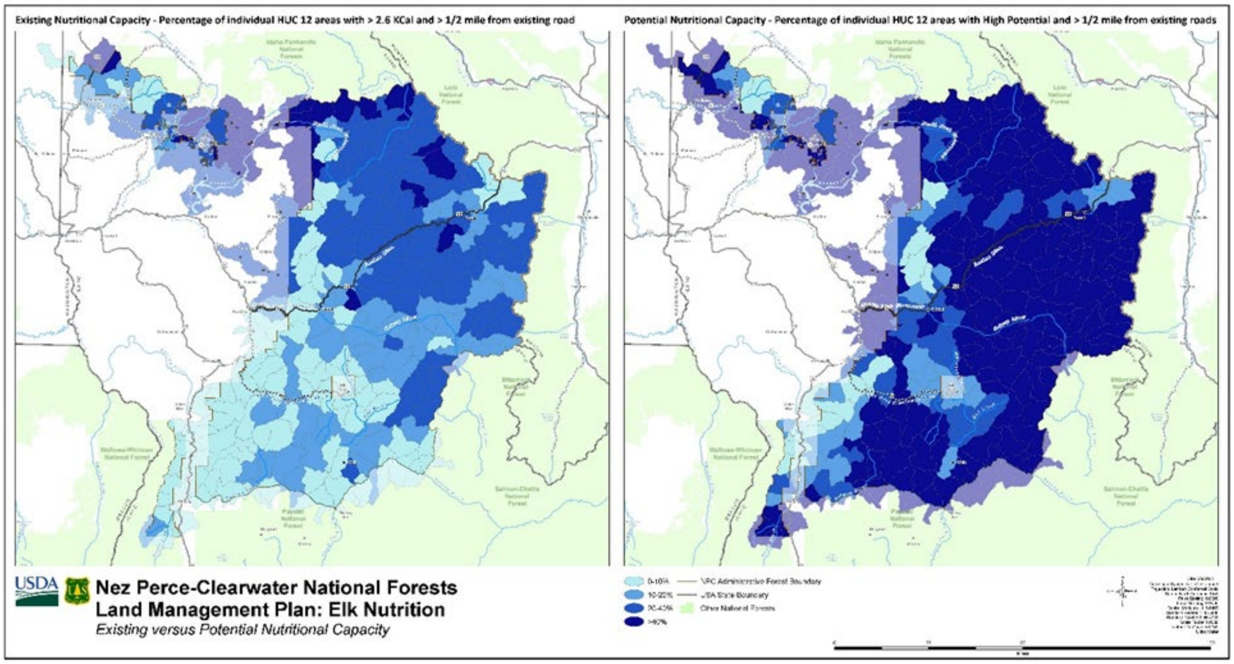


Figure 116. The existing (Map A on the left) and potential nutrition (Map B on the right) outside 1/2 mile from an open motorized route. The colors represent the amount as a percent of the watershed that contains one of four ranges ≥40 percent, 20 to 40 percent, 10 to 20 percent, 0 to 10 percent located outside one-half mile from an open motorized route. The darkest blue represents watersheds with ≥40 percent of their area having 2.6kcal/g located outside of one-half mile from an open motorized route, whereas the lightest blue represents watersheds that have less than 10 percent of their area with ≥2.6kcal dietary digestible energy outside of one-half mile from an open motorized route.

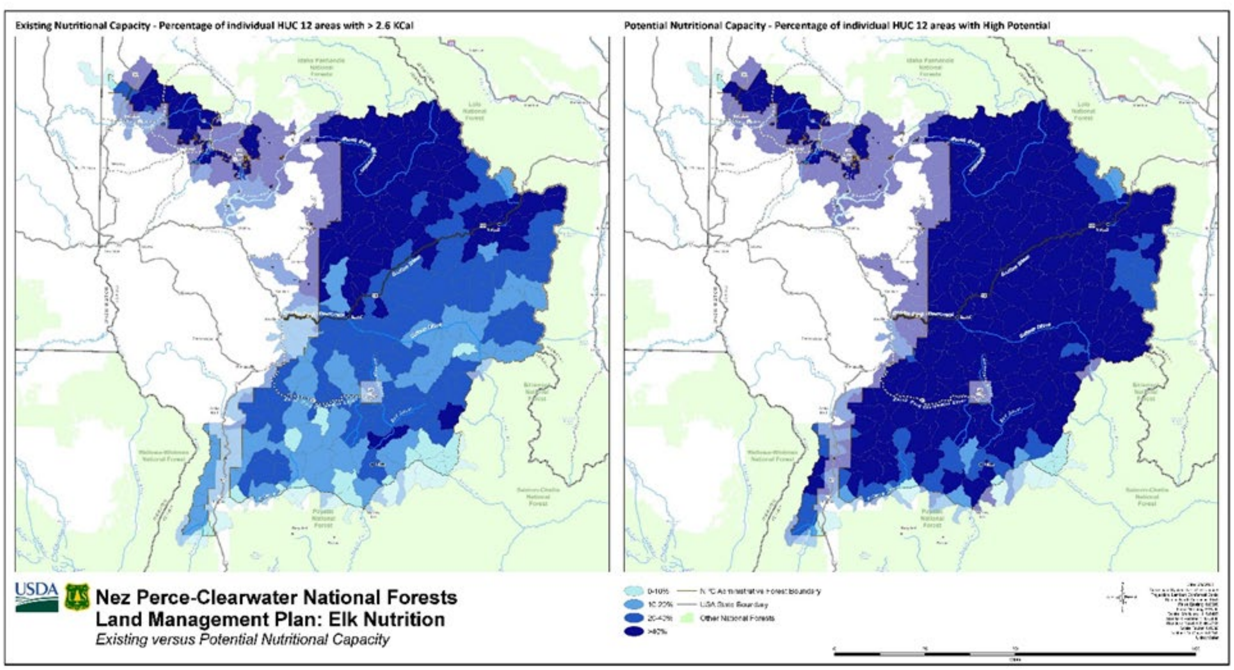


Figure 117. The amount of existing (Map A on the left) and potential nutrition (Map B on the right) within HUC 12 watersheds. The watersheds are colored to represent amount as a percent of the watershed that contains one of four ranges ≥40 percent, 20 percent to 40 percent, 10 to 20 percent, 0 percent to 10 percent. The

darkest blue indicates potential to produce 40 percent or more, lighter blue indicates areas that have the potential to produce between 20 and 40 percent, lighter blue indicates the potential to produce between 10-20 percent while the lightest blue watersheds indicate the potential to only produce less than 10 percent high quality nutrition.

Current estimates of body fat measured on captured female elk suggest they are currently below 8 percent on herds in the South Fork Clearwater samples, just below 10 percent on North Fork Clearwater elk herd, just above 9 percent on the Lochsa elk samples, and about 8 percent on the Riggins population samples. Pregnancy rates are between 70 to 95 percent in these herds. Increasing body fat, which should lead to improved pregnancy rates among female elk would directly increase reproductive performance of elk populations.

Figure 118 through Figure 123 show the change in the acres of various levels of dietary digestible energy by management areas as modeled in SIMPPLLE. These predictions suggest a positive change in nutritional quality, body condition, and reproduction across most alternatives, with alternatives that have a quicker schedule for restoring vegetation desired conditions having more benefits to elk.

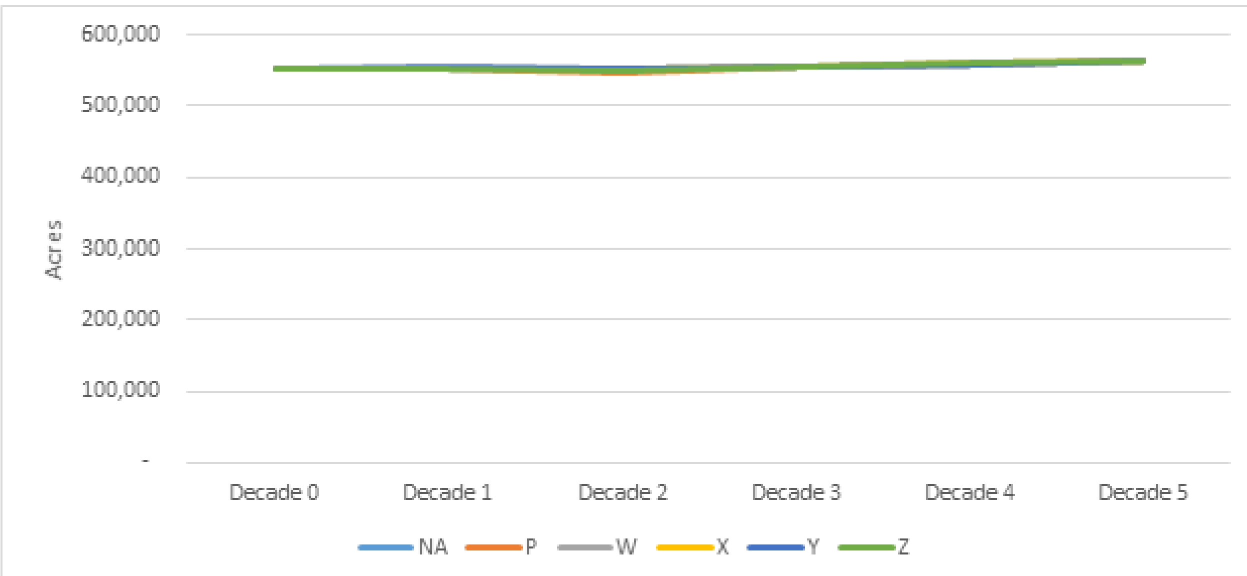


Figure 118. Acres of elk habitat projected to provide 2.58+ kcal/g dietary digestible energy (sufficient for higher elk pregnancy rates) by alternative and decade within Management Area 1, which is composed of protected areas such as wilderness, wild and scenic rivers, and the National Historic Landmark

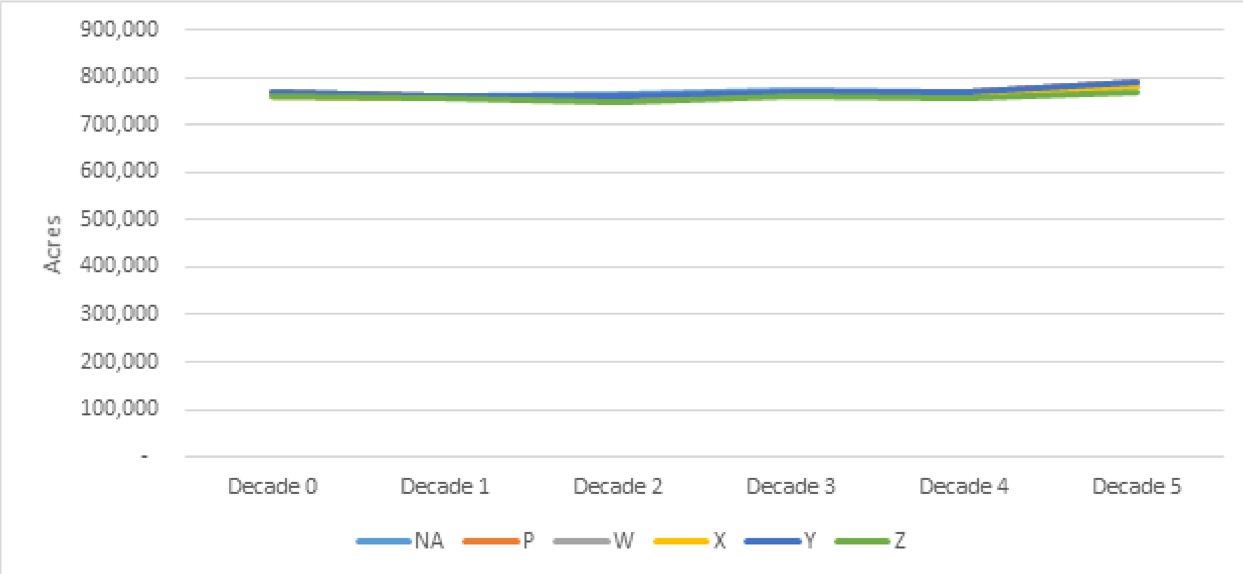


Figure 119. Acres of elk habitat project to provide 2.58+ kcal/g dietary digestible energy (sufficient for higher elk pregnancy rates) by alternative and decade in Management Area 2, which is composed primarily of Idaho Roadless Rule areas and recommended wilderness area

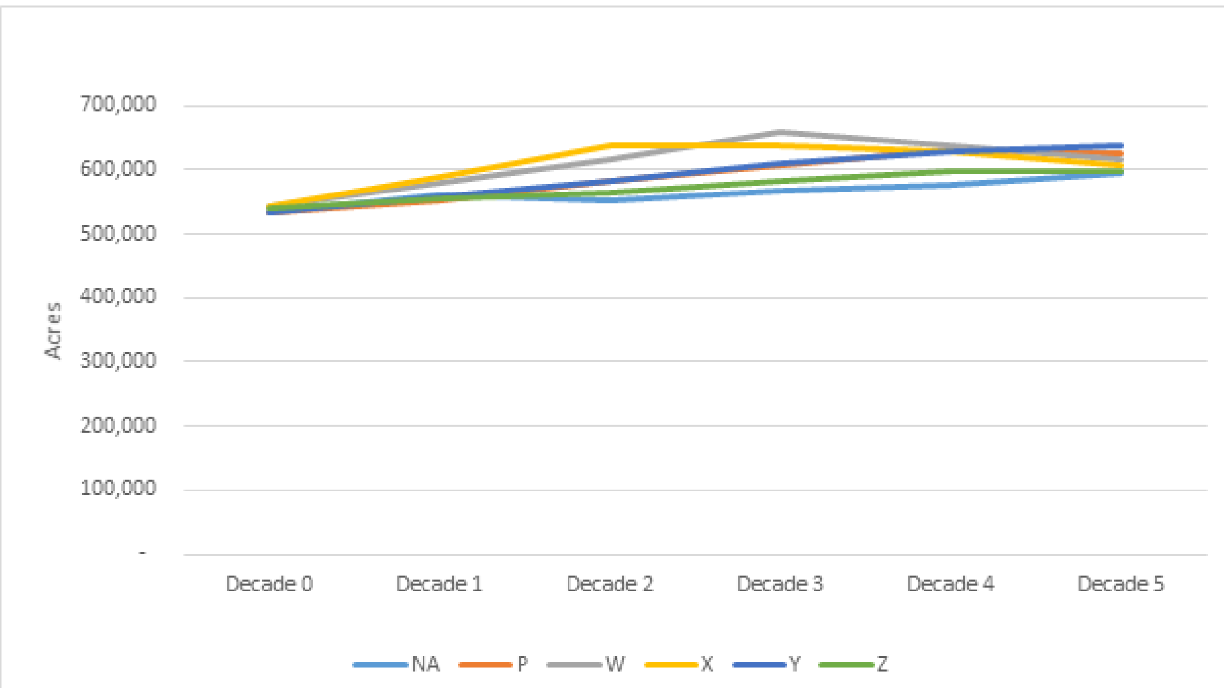


Figure 120. The trend in projected elk habitat acres predicted to provide ≥2.58 kcal/g dietary digestible energy (sufficient for higher elk pregnancy rates) by alternative and decade in Management Area 3, which is composed primarily of non-designated areas

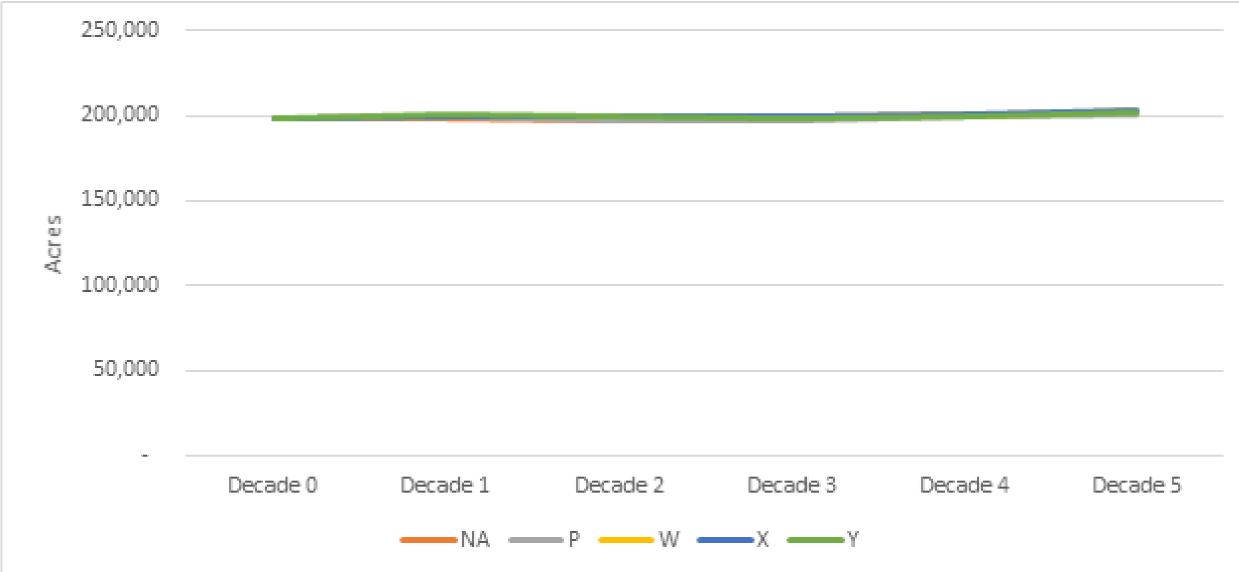


Figure 121. Projected elk habitat acres needed to provide 2.75+ kcal/g dietary digestible energy (sufficient to promote elk body fat) by alternative and decade for Management Area 1, which is composed of protected areas such as wilderness, wild and scenic rivers, and the National Historic Landmark

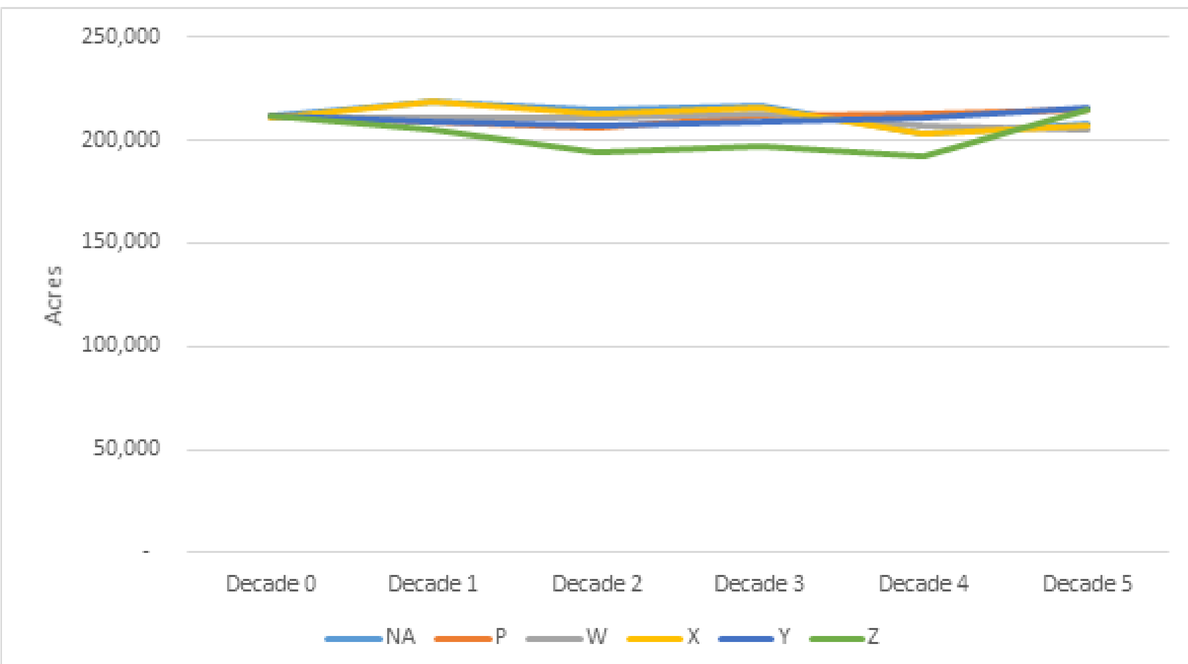


Figure 122. Projected elk habitat acres needed to provide 2.75+ kcal/g dietary digestible energy (sufficient to promote elk body fat) by alternative and decade for Management Area 2, which is composed largely of Idaho Roadless Rule areas and recommended wilderness

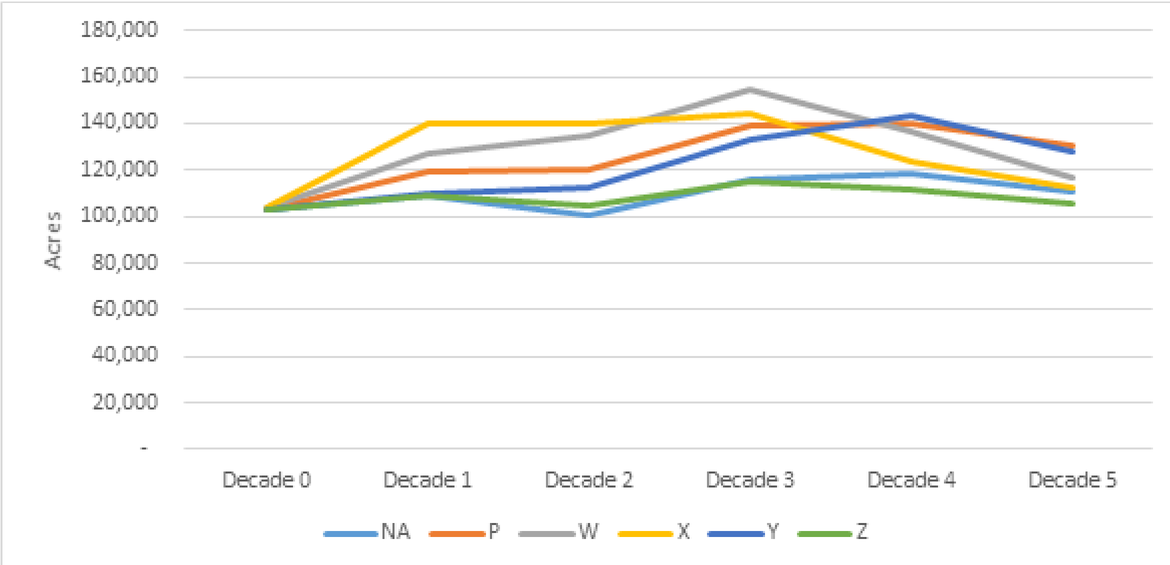


Figure 123. Projected elk habitat acres needed to provide 2.75+ kcal/g dietary digestible energy (sufficient to contribute to elk body fat) within Management Area 3, which is composed primarily of non-designated areas

Calf survival is influenced by size at parturition, which is influenced by nutrition. Thorne (1976) studied the relationship between adult nutrition, calf weight, and survival in captive elk. This study showed weight loss during pregnancy was significant and directly correlated to calf weight at birth and at four weeks of age. Thorne (1976) found that calves that weighed 35 pounds at birth survived better than calves that weighed 25 pounds at birth. The data indicated that cow elk that lost three percent of their body weight during pregnancy did not produce calves that weighed 35 pounds at birth. Thus, better elk nutrition can provide for better calf survival.

Some commenters were concerned about the shift from an emphasis on winter habitat to an emphasis on summer nutrition. According to the nutritional response spatial layer, some of the poorest areas for predicted nutritional response are on winter ranges because of thinner soils and drier conditions. Therefore, while winter habitats are important to big game, these areas often do not produce the desired nutritional response. The plan emphasizes reducing disturbance in desired conditions FW-DC-WLMU-01 and FW-DC-WLMU-07, which expresses a desire to provide for big game habitats in their respective seasonal ranges and reduce disturbances in winter range. The intent of these guidelines is meant to reduce disturbance during winter. FW-GDL-WLMU-03 is intended to prevent disturbance to wintering big game to achieve the desired conditions for winter habitat.

FW-DC-WLMU-06 is a desired condition that desires maintain or improve elk habitat use and provide nutritional resources sufficient to support productive elk populations. In some areas, treatments could produce both high quality summer and winter nutrition concurrently. The collaborative elk group voiced concern to prevent habitat management for elk from extending beyond the vegetation desired conditions in the terrestrial ecology plan components, which are based on the natural range of variation. Therefore, desired condition FW-DC-WLMU-06 contains language that would direct management to operate within the framework of the terrestrial vegetation components. Similarly, there is a recognition that noxious weeds adversely impact some important wintering areas, so the plan also included a desired condition that elk habitat are composed of native vegetation for early seral states.

MA3-GDL-WLMU-01 is a constraint that requires improvement in predicted cow elk body fat. The requirement is meant to improve predicted cow elk body fat which would require improving one or more of four factors that either provide nutritional resources or improve habitat use, or both. These factors include increasing distance from roads to improve habitat use, increasing high quality nutritional resources, increasing habitat interspersion, or either increasing habitat use or nutritional resources on slopes less than 40 percent. It is anticipated that this framework will tie habitat conditions directly to increased elk vital rates over time. MA3-GDL-ELK-01 only applies to Management Area 3. This guideline would provide a long-term improvement in elk habitat conditions in Management Area 3. It was selected to apply to Management Area 3 only because areas in Management Areas 1 and 2 have fewer factors that affect habitat use, so the focus in those areas is on improving nutrition.

Guidelines FW-GDL-WLMU-01 is intended to ensure motorized route closures remain closed. FW-GDL-WLMU-02 is designed to reduce or prevent fencing from creating a barrier to wildlife movements for game animals. Perhaps the change that would affect elk the most are plan components that identify where some types of uses are suitable to occur. Suitability is a new type of plan component allowed within the 2012 Planning Rule. Identifying lands as suitable for specific uses is a way to identify if lands are suitable for that use. For example, the plan must determine where motorized uses would be suitable. A suitability determination does not authorize anything specific on the ground but identifies where those uses are suitable in future decisions. It should be noted that, even though an area is identified as suitable, does not necessarily mean that the use would occur there, only that it could after a site-specific analysis and decision.

The alternatives vary the types and amounts of areas that are suitable for a variety of uses, including motorized and non-motorized uses, which are determined by the recreation opportunity spectrum settings. Three settings, the rural, roaded natural, and semi-primitive motorized settings, are suitable for motorized uses, while the primitive and semi-primitive non-motorized settings are not suitable. Under the existing condition, approximately 45 percent is suitable for summer motorized use, while 55 percent of the Nez Perce-Clearwater is not suitable for motorized uses. Similarly, about 39 percent of the Nez Perce-Clearwater is suitable for winter motorized travel, whereas 61 percent is unsuitable.

The components for elk do not vary by alternative as they were designed to increase elk herds, a goal common to most parties and desired by most elk comments. Elk habitat management has been a focus and priority in the plan. Several commenters requested constraints in the plan to protect elk calving areas. The Nez Perce-Clearwater evaluated elk calving models provide by the Idaho Department of Fish and Game and determined that calving areas and needs are similar to those used for female elk nutrition. The models are not specific enough to use in Forest Plan guidance.

Whitetail and Mule Deer

The plan components address habitats for deer by addressing the needs for ungulates, as noted above. Other than those plan components, the plan does not specifically address whitetail or mule deer. It is anticipated that plan components to increase high-quality forage for elk will also benefit deer. Similarly, plan components that restore forest habitats are also expected to benefit deer because they emphasize increasing the amount of early seral habitat conditions. Whitetail deer use forested habitats in the winter while mule deer use non-forested habitats in winter. In the summer, deer seek areas with good forage, such as meadows, shrub lands, and early seral habitats. Plan components for forest size class provided diversity of age in size classes to provide hiding cover, forage, and winter habitat for deer. Guideline FW-GDL-WLMU-03 restricts disturbing activities on winter ranges, which will serve to reduce disturbance to these species during this challenging time. FW-GDL-WLMU-02 restricts creating barriers through fencing. FW-GDL-WLMU-01 also addresses impacting deer through motorized use outside of the national forest's designated road system. Plan components in the fire section seek to restore natural fire disturbance and reduce uncharacteristic wildfire. Plan direction in the Forestlands section of the document suggests an increase in early seral forests across the broad potential vegetation types. These increases would benefit both mule deer and whitetail deer. Modeling results indicate that wildfire is the biggest driver of forest condition in the plan area. Fire plan components help facilitate the increased use of wildland fire to restore vegetation conditions. Plan components found in the meadows, grassland, and shrubland section should contribute to habitats for deer. The effects of the plan direction are generally beneficial to deer populations.

Moose

Moose populations are increasingly thought to be responsive to the amount of forage available to them. Like deer, moose will benefit from increases in high quality nutrition provided by both ecosystem plan components and elk plan components. Plan components will help provide conditions to improve habitat conditions for moose and restore forest habitats, benefiting moose because they emphasize increasing the amount of early seral habitat conditions. Moose use forested habitats in the winter and particularly rely upon Pacific yew as winter forage. FW-DC-WLMU-04 emphasizes Pacific yew as a winter food for moose. In the summer, moose seek areas with good forage, such as early seral forest habitats, meadows, shrublands, and aquatic vegetation. Plan components for forest size class provide diversity of age in size classes to provide hiding cover, forage, and winter habitat for moose. FW-GDL-WLMU-03 restricts disturbing activities on winter ranges and will protect these species during this challenging time. Plan components in the multiple use wildlife section restrict creating barriers through fencing, which are known to affect calves. Fire plan components seek to restore natural fire disturbance and reduce uncharacteristic wildfire, which should benefit moose through increased early seral conditions and nutrition. Modeling results indicate that wildfire is the most influential driver of forest conditions. Plan components can help facilitate the increase of wildland fire to restore vegetation conditions, benefiting moose. Meadows, grassland, and shrubland plan components should contribute to habitats for moose.

Mountain Goats

Few plan components are directed towards mountain goats, as most habitats are inaccessible to anthropogenic threats and are protected in many ways by restrictions in wilderness, recommended wilderness, or roadless areas. FW-DC-WLMU-05 and FW-DC-WL-03 would help to increase connectivity for mountain goats. Lack of connectivity from current populations to unoccupied suitable habitats is suspected to have caused mountain goat habitats to remain unoccupied and is thought to be caused by fire suppression, which creates conditions unfavorable to mountain goat travel at high elevations. Connectivity between mountain goat populations and suitable habitats potentially prevents mountain goat distribution from increasing in areas formally occupied by mountain goats. FW-DC-GS-05 describes desired vegetation conditions in subalpine areas, including mountain goat habitat, and would direct management towards improved forage conditions for mountain goats. While there are few plan components specific to mountain goats, alternatives for recommended wilderness and motorized over-snow travel suitability within recommended wilderness has potential impacts to mountain goats. Mountain goats are sensitive to disturbance and tend to leave suitable habitats if disturbed. The effects are particularly acute during the winter when mountain goats may not be able to travel through deep snow. Alternatives for recommended wilderness in the Hoodoo area, the Mallard-Larkin area, Moose Mountain, and Bighorn Weitas would include several mountain goat herds, including some of the largest herds in the plan area. Allowing these areas to be open to motorized over-snow travel could potentially expose mountain goats to this disturbance.

In the Preferred Alternative, the Mallard Larkin and Hoodoo areas were identified as recommended wilderness with modified boundaries as compared to the No Action Alternative. These modified boundaries were a compromise between the desires of motorized winter recreationalists and providing protections for mountain goats. They excluded areas popular with recreational users from recommended wilderness so that use could be suitable for motorized winter recreation. However, areas of concentrated use by mountain goats were included in recommended wilderness and would not be suitable for summer nor winter motorized uses. This strikes a balance in providing for both the desires of winter recreational users and the protection of mountain goat populations. These recommended wilderness areas contain two of the three largest herds in the plan area. The other large herd is located in designated wilderness areas and is also protected from winter recreation disturbances. The Preferred Alternative does not include the Bighorn Weitas area nor the Moose Mountain wilderness area, which contains small herds of mountain goats. Additionally, winter motorized recreation in recommended areas were found not suitable so these measures would protect mountain goats in the plan area from disturbance.

To understand snowmobile use in the plan area, landscape characteristics selected by snowmobilers were modeled spatially to evaluate the overlap of mountain goat habitats and other wildlife habitats with modeled snowmobile preferences (Olson et al. 2017). Modeling was conducted by Lucretia Olson and used parameters similar to those she used in Olson et al. (2017). The model was validated by user data and Forest Service recreation staff who have expert knowledge of the use in the plan area. The snowmobile model is a function of terrain, access, canopy cover, and snow depth, which are features that may contribute to the ease of which snowmobilers can use an area. It creates a probability surface, at which values closer to one would be preferred for snowmobiling while those closest to zero would not be preferred. It does not necessarily predict where snowmobile use is occurring or the number of snowmobilers using an area because use also depends upon whether the areas are open administratively, have available access, or other factors. Rather, it predicts where snowmobiling might be desirable or easier to the average snowmobile user. The model appeared to represent well where most snowmobile use is occurring and performed better in the Clearwater side of the national forest than on the Nez Perce side.

Model results suggest low amounts of overlap between snowmobile use and known mountain goat population areas. This makes sense because most mountain goat habitat is too steep for comfortable snowmobile use. However, some areas predicted to have high probability values in the snowmobile model are in proximity and adjacent to known mountain goat herds, particularly the herd on Blacklead Mountain, which may leave them susceptible to access by highly skilled snowmobilers. Highly skilled snowmobilers can access steeper terrain and more rugged conditions that average snowmobilers. The model did not perform well at predicting use by highly skilled snowmobilers because it shows areas known to be used by advanced snowmobile users as not preferred by typical snowmobilers. The model only predicts snowmobiler preferences and does not predict snow bike use, which may have different use patterns than snowmobiles.

Bighorn Sheep

This section evaluates the effects to bighorn sheep as a species used by the public for multiple uses. Bighorn sheep in the plan area are provided for through plan components for ungulates. FW-DC-WLMU-03 emphasizes that the habitats in the plan area provide for ungulate species that meets their life history requirements in both summer and winter. As noxious weeds are a challenge throughout the west and in the plan area, FW-DC-WLMU-03 has language desiring that big game habitats are composed of native vegetation. Plan components in the invasive section of the document also serve to provide for bighorn sheep habitats. Fire plan components and those for forested vegetation would also help increase disturbance that would decrease encroachment of forested habitats into bighorn sheep habitats. FW-GDL-WLMU-03 restricts disturbing activities on winter ranges, which will serve to protect these species during this challenging time. Plan components in the Multiple Uses Wildlife section of the the plan would help provide for continued opportunities for hunting at harvestable and huntable populations of bighorn sheep.

Wolves, Cougars, and Black Bears

Wolves, cougars, and black bears are not emphasized in the plan specifically. The populations of wolves and cougars are dependent upon healthy ungulate populations, which are provided for in the plan. Black bears are dependent upon ungulate populations and resources such as berries, seeds, and vegetation for forage. A variety of forested successional stages and coarse filter ecosystem plan components for size class provide the vegetative forage for bears, as well as cover conditions. The primary factors influencing populations of these species is hunting pressure and ungulate populations. Plan alternatives provide some additional protection for these species though differing amounts of recommended wilderness, which can influence hunter access. Recommended wilderness would protect these species slightly better than Idaho Roadless Rule areas, but the differences are minor. Suitability of motorized uses also vary by alternative. The alternatives that find more area suitable could allow more motorized access in the future that could increase the area used for bear baiting. This would increase the opportunity for bear hunting but would also facilitate increased bear harvest. The primary benefit the plan provides for these species is that large remote areas provide refuge from hunter harvest. These characteristics are provided in Idaho Roadless Rule areas, recommended wilderness, and designated wilderness under all alternatives. The Idaho Department of Fish and Game regulates harvest of these species for their continued availability as a hunted resource. The Idaho Department of Fish and Game monitors population trend indicators and can apply appropriate measures to manage hunting to increase or decrease populations according to their management plans. Population objectives and hunting tag numbers, which are the primary drivers of hunter harvest, are not within the authority of the Forest Service. Current Idaho Department of Fish and Game objectives for populations of these species are lower than current population numbers and the Idaho Department of Fish and Game is managing for reduced numbers but persistent populations of these species.

Furbearers

Modeling results in SIMPPLLE suggest that both Pacific and American marten habitat remains within the the natural range of variation under all action alternatives and, while marten habitats decline slightly under the plan components over the next 50 years, martens should continue to persist in sufficient numbers to allow trapping (Figure 124) (Ecosystem Research Group 2021)(Ecosystem Research Group, LLC 2021). Marten habitat remains above the natural range of variability low and only declined slightly suggesting that martens will remain long term. Ecosystem plan components that can contribute to habitat for martens includes those in the cold and cool moist broad potential vegetation type group that speak to desired size classes, particularly those that pertain to larger size classes, large legacy trees and snags, downed wood and snags, multistory habitat for lynx, and the compositions of dominance types that will continue to provide for martens. Downed wood requirements in the plan provide for retention of downed wood for martens though the minimum size of three inches in these plan components would be too small. Still the desired conditions For forest size class and dominance type, requirements for live tree retention, and snag retention would still provide for marten habitat after disturbance. Timber production would only occur in Management Area 3, and a limited amount of timber harvest would occur outside Management Area 3.

Because the majority of marten habitat is within the Idaho Roadless Rule and designated wilderness areas, habitats should continue to function to provide for this species. Plan component MA1 and MA2-DC-FOR-05 would provide the patch and pattern at the landscape scale to continue to provide for marten. Guideline MA2 and MA3-GDL-FOR-01 would provide coarse woody debris for marten denning. MA3-DC-FOR-11 would generally provide for martens but some preferred forest types are not the old growth types emphasized in the plan (Ruggiero et al. 1994a). FW-DC-FIRE-01 seeks to allow wildfire to restore the structural characteristics of vegetation under a natural fire regime, and FW-OBJ-FIRE-03 is an objective to reduce uncharacteristic wildfire that potentially threatens marten habitats. FW-DC-WL-03 and FW-GDL-WL-01 would provide the arrangement of habitats on the landscape to provide connectivity for martens. Plan components for Canada lynx would also benefit martens. Marten prefer coniferous forest cover, but prey on a wide variety of small mammals, including those that have high densities in forest openings. Modeling results from PRISM and SIMMPPLE suggest that marten habitat will be relatively stable to slightly declining under the alternatives.

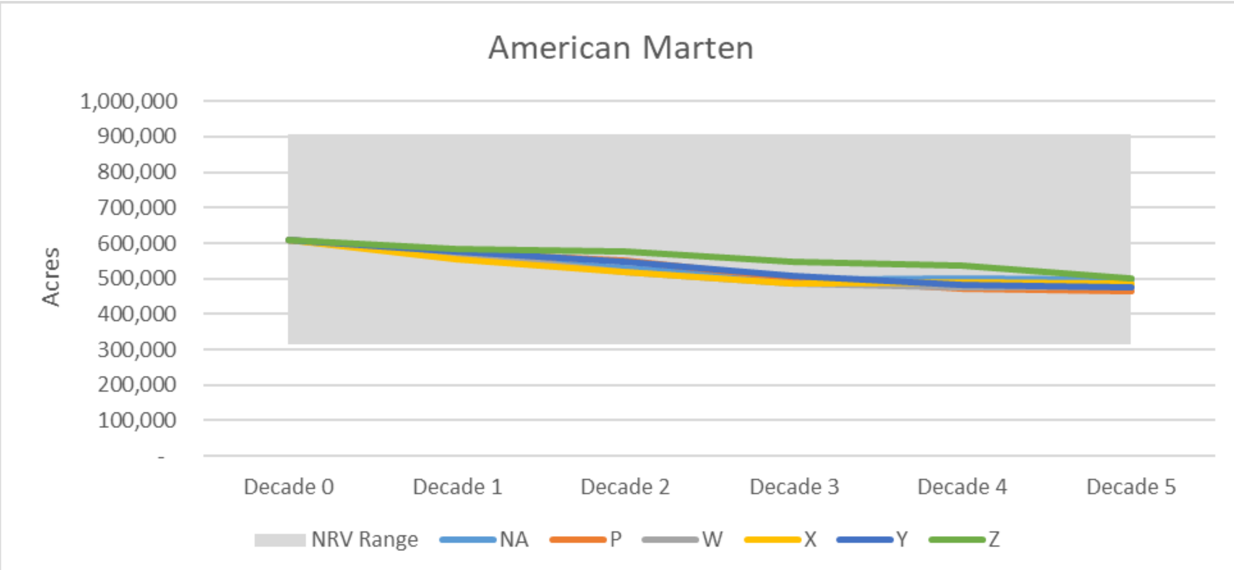


Figure 124. The trends in American marten habitat as modeled by SIMPPLLE and PRISM

The plans coarse filter ecosystem plan components would provide for species like coyotes and bobcats or other small to medium size carnivores. Plan components that would provide habitats are included in the forestlands, Meadow grassland and shrubland and aquatic plant components. The plan should continue to provide harvestable populations of furbearers.

Aquatics plan components in several sections of the plan would provide for species that use aquatic or riparian habitats, including rivers, open water, wetlands, and riparian habitats. They prevent many actions known to degrade aquatic habitats. Riparian areas evolved under disturbance regimes that promoted a variety of age classes in some riparian areas and naturally have more deciduous vegetation. Forest succession can allow conifer encroachment into riparian areas that crowd out deciduous woody plants. Disturbances, such as fire, kills encroaching conifers and allows for deciduous or hardwood species to become established again. Modeling in SIMPPLLE suggests that riparian areas have less hardwood dominated conditions than would occur under natural disturbance. Riparian habitats were modeled in SIMPPLLE and PRISM and the results suggested that disturbance within riparian habitat would increase over time, mostly as result of natural disturbance, to support increases in hardwood and deciduous vegetation in the riparian zones.

The plan has limited allowances but still has allowances in the aquatic ecosystem section that would allow restoration of these conditions to benefit a number of riparian and aquatic wildlife species. Beavers, for example, typically rely on deciduous trees and shrubs as a food source and do not tend to occupy stream reaches that are conifer dominated. A combination of natural disturbance and active restoration would increase or improve the amount of deciduous vegetation in the riparian area. These plan components provide a robust framework for managing aquatic and riparian habitats for waterfowl and furbearers that use aquatic habitats. They minimize or eliminate threats to these resources and provide ample protection against factors that alter these habitats. They include objectives that restore degraded conditions in the plan area. These plan components protect the vegetation surrounding water and reduce impacts that would affect flow, sediment, water quality, and geomorphology. These plan components are adequate to provide for the species that are grouped into the aquatic, wetland, water, and riparian habitat group, including the 32 species that are commonly used by people that use these habitats. These include all the waterfowl and several of the furbearers. American and Pacific martens have been reported to use riparian areas, and riparian management zone plan components will contribute to marten habitats. These areas should continue to provide the preferred forest types and structure that would provide for martens. Overall, the coarse filter ecosystem plan components would provide for furbearers.

No Action Alternative

Several species of wildlife used by the public would continue to experience declining habitat conditions due to forest succession and fire suppression. Emphasis for elk would continue to be on treating winter range and providing elk security addressing road density while not directly responding to the best available scientific information indicating that providing adequate summer nutrition usable by elk would increase elk vital rates. Elk security would remain high throughout Idaho Roadless Rule areas, wilderness areas, and recommended wilderness but elk populations would continue to be down in these areas. Management would continue with Elk Analysis Units as the scale and framework at which elk management is applied. These measures would continue to maintain the amount and intensity of elk security measures.

Modeling results suggest that, under all alternatives, the amount of high-quality forage greater than about 2.58 kcal/g of dietary digestible energy would increase. Forest conditions would trend towards increased nutrition and meet the needs of many multiple use species, especially upland game and ungulates. These changes are mostly driven by projections for increased wildfire under a changing climate, given our current fuels conditions. However, an emphasis on fire suppression in the 1987 Plans would continue and these results may not be realized. Management of natural fires would still be possible at similar rates as they have been. It was not possible for the model to account for the ability to target the areas that would produce the highest nutritional response; therefore, modeling only reflects the response to restoring vegetation back to the desired vegetation conditions. It may be possible through targeted restoration for elk to increase the amount of high-quality forage through strategic treatments.

This alternative did not use the recreation opportunity spectrum settings to identify suitability for motorized uses. Instead, motorized access was open unless closed by site specific projects or decisions. The 1987 plans impose other constraints on motorized uses that included constraints on roads imposed by fish conservation measures, elk habitat effectiveness measures, the identification of designated wilderness and more. The introduction of the Recreation Opportunity Spectrum to identify lands suitable for motorized uses is a new mechanism in the action alternatives that provides some constraints on motorized uses. These constraints cause a long-term decline in motorized access resulting in benefits to species that are sensitive to roads. Species like elk, black bear, and moose would benefit from motorized restrictions. However, the lack of motorized access has reduced the ability of the Idaho Department of Fish and Game and hunters to reduce predator populations. Alternatives that increase motorized access are better for predator reduction to help big game.

Waterfowl and furbearers that use aquatic habitats would be provided for in a similar manner as in the proposed plan components and alternatives because PACFISH and INFISH provide similar levels of protection for aquatic habitats as those in the Aquatic Ecosystems section of the Land Management Plan. Several rivers would remain eligible for wild and scenic status and management of these eligible rivers would continue to provide habitats for aquatic species. Eligible acres of wild and scenic river corridors would be 172,710 acres. These rivers would continue to be managed to protect the outstandingly remarkable values that make them eligible. This direction may help some multiple use wildlife species and may hinder active restoration for them in other areas. There would be no change in the amount of designated wild and scenic rivers.

Furbearers that use terrestrial habitats would be only affected by the amount of recommended wilderness and the amount of area suitable for motorized uses under the recreation opportunity spectrum under the alternatives and whether motorized over-snow travel was allowed. This is because trapping itself is the biggest factor in population changes for most of these species outside of prey abundance. The amount of recommended wilderness would directly influence accessibility during winter, which is when trapping is most effective and usually conducted. All Idaho Roadless Rule areas are suitable for winter motorized travel and these areas are not protected from the influence of trapping. Therefore, the amount of recommended wilderness and whether winter over-snow travel is allowed is the primary indicator for population trends of furbearers. In the No Action Alternative, over-snow motorized travel is not allowed in recommended wilderness and furbearers are less accessible to trappers than they are in other parts of the Nez Perce-Clearwater. The No Action Alternative is intermediate compared to the other alternatives in the amount of recommended wilderness. In all alternatives, furbearers would be provided for trapping and other uses and the Idaho Department of Fish and Game regulations, monitoring, and management would continue to sustain these species. For American and Pacific martens, the amount of habitat is estimated on the high end of the natural range of variation and preliminary modeling results suggest a decline in preferred mature subalpine fir and Engelmann spruce forests. However, these declines do not drop below those on the low end of the natural range of variation for marten habitat.

The amount of recommended wilderness would remain the same with the Hoodoo, Mallard-Larkin, and Selway additions remaining recommended wilderness. The Hoodoo area would stay intact in its current form and not be reduced, as in other alternatives. The amount of recommended wilderness would be intermediate compared to the other alternatives. Mountain goat populations in the Hoodoo recommended wilderness area would not be subject to motorized over-snow travel, as it is currently not allowed. In other alternatives, over-snow travel would be allowed. The amount proposed under the No Action Alternative is intermediate to other alternatives for recommended wilderness.

Within recommended wilderness, activities to restore vegetation would continue to be restricted. This would continue to inhibit most restoration activities in the current recommended wilderness. This would impact the national forest's ability to proactively restore these habitats and provide forage for ungulates or connect mountain goat habitat through disturbance. However, restoration activities in many other Idaho Roadless Rule areas that are currently in the backcountry restoration theme would remain in this theme, which allows restoration and improvements in big game habitat. Restoration would only be achieved in recommended wilderness through wildfire, which may not produce the best nutritional response. Under the 1987 Plans, the management direction for wildfire is to confine, contain, and control wildfire. Under the new plan direction, wildland fire would be more permissive in many areas of the Nez Perce-Clearwater.

Effects do not vary by alternative because the plan components were designed to provide for all species by providing ecosystem integrity. The plan does vary by alternative for species that require or use early seral habitats because the plan varies the pace at which desired conditions are achieved. For species that use early seral habitats, the No Action Alternative implements treatments to meet desired conditions at among the slowest paces among the alternatives. Species that use early seral conditions include ungulates and some furbearers. These species would not have habitat created for them at a faster pace compared to the other alternatives.

Both current recommended wilderness and Idaho Roadless Rule areas would continue to provide for wolf, black bear, and cougar populations. If the decline in high quality forage lead to low big game populations or continued downward trends, predator populations would also decline. Use of game carts, chainsaws, mechanized travel such as bicycles, and aircraft would continue to be prohibited in recommended wilderness.

Alternative W

Alternative W reaches desired vegetation conditions faster than the No Action Alternative and slightly slower than Alternative X. Thus, it has a relatively more aggressive schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation. For ungulates, this quicker paced schedule would improve forage resources quicker than the No Action Alternative. While the pace may be quicker, the total amount of high-quality forage does not differ much overall among the alternatives.

Modeling results suggest that, under all alternatives, the amount of high-quality forage greater than about 2.58 kilocalories per gram of dietary digestible energy would increase, especially within Management Area 3. This makes sense because the desired conditions for vegetation do not vary by alternative, rather the pace or the methods of achieving those desired conditions vary. However, vegetation management would contribute substantially to forage as well, especially within Management Areas 2 and 3. Under Alternative W, forest conditions would trend towards increased nutrition to meet the needs of many multiple use species. The more proactive schedule in Alternative W would allow more areas to be targeted to increase the amount of the highest quality forage while restoring forests to towards their natural range of variation. Proactive management through wildland fire would occur more proactively under Alternative W in Idaho Roadless Rule areas, especially within backcountry restoration themed areas. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative. The ability of the Nez Perce-Clearwater to achieve desired amounts of elk forage would be hindered within recommended wilderness as explained below.

In Alternative W, slightly more areas were identified as suitable for motorized uses compared to the No Action Alternative. This could reduce elk habitat use in some areas, especially those that would be suitable for motorized uses. The percentage of the planning area that is suitable for summer motorized uses would be 47 percent, an increase of about 2 percent suitable for motorized use from the No Action Alternative. Forty-eight percent of the plan area would be suitable for winter motorized travel, while 52 percent would be unsuitable. Maps of the alternatives for the summer and winter recreation opportunity spectrum can be found in the Appendix A. Areas suitable for motorized uses could displace elk, and winter motorized uses would allow about 10 percent more access to winter trapping of furbearers. Limited access to some areas has resulted in the inability of the State to manage wolf and other predator populations resulting in significant reductions in big game. Alternatives with more motorized uses could help hunters and wildlife managers access areas to reduce predator populations. This alternative is a slight improvement over the no action in this regard, but is worse than the Preferred Alternative in how it allows for predator control purposes.

Waterfowl and furbearers that use aquatic habitats would be provided for in a similar manner in all alternatives as measures in PACFISH and INFISH are similar to those in the aquatic ecosystem plan components. However, under a more aggressive schedule of treatments, more potential impacts could occur under this alternative. Alternative W proposes the most rivers as suitable wild and scenic rivers. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Eligible acres of wild and scenic river corridors would be 172,710 acres under the No Action Alternative versus 65,650 acres under Alternative W. This direction may help some multiple use wildlife species and may hinder active restoration for them in other areas under this alternative than in the No Action Alternative. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would increase the most under Alternative W. In addition to the Hoodoo, the Mallard-Larkin, and the Selway additions, this alternative would add Bighorn-Weitas, North Lochsa Slope, East Meadow Creek, Moose Mountain, Rapid River, North Fork Spruce-White Sands, Sneakfoot Meadows, Meadow Creek-Upper North Fork, and West Meadow Creek. This amount of recommended wilderness would be the most compared to the other alternatives. The amount of recommended wilderness would have environmental consequences on mountain goats, furbearers, elk, and other ungulates and predatory big game, as described below. As such, many species that do well away from humans would do better when more recommended wilderness is identified.

Under Alternative W, more mountain goat populations would be included in recommended wilderness than other alternatives with the addition of herds in Moose Mountain, the southern portion of the Mallard-Larkin Idaho Roadless Rule areas, and the North Lochsa Slope Idaho Roadless Rule area. These mountain goat populations would benefit from the additional recommended wilderness area because they would not be subject to motorized over-snow travel under Alternative W. Access to mountain goats by hunters would be more difficult. On the other hand, the ability to connect mountain goat habitats within the plan area or the ability to improve mountain goat habitat conditions through active management would be constrained within recommended wilderness under this alternative. Comparatively, in Alternatives X and Y, over-snow travel would be allowed.

Furbearers that use terrestrial habitats would mainly be affected by the amount of recommended wilderness and whether motorized over-snow travel was allowed. This is because trapping itself is the biggest factor for effects for most of these species outside of prey abundance. The amount of recommended wilderness and motorized over-snow travel would directly influence accessibility during winter, which is when trapping is most effective and usually conducted. Idaho Roadless Rule areas, except those identified as recommended wilderness, are suitable for winter motorized travel and these areas are currently accessible for trapping facilitated by this increased access. Therefore, the amount of recommended wilderness and whether winter over-snow travel is allowed is the primary indicator for effects to furbearers. In Alternative W, the amount of recommended wilderness dramatically increases, and furbearers would be much less accessible to trappers than they are currently. While this would serve furbearers well, it would also adversely impact the ability for people to use this resource effectively. In all alternatives, furbearers would continue to be available for trapping, but access and availability decreases under Alternative W. The Idaho Department of Fish and Game regulates, monitors, and manages furbearers and this management would continue to sustain these species.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be most constrained in this alternative compared to the others because of the high amount of recommended wilderness, which would make many areas that are currently in the backcountry restoration theme be managed more like the backcountry recreation theme. Active management for restoration purposes is strongly restricted in this theme. Therefore, the ability of the national forest to increase forage for elk and other ungulates in Management Area 2, as a result of restoring the natural range of variation, would be highly restricted under this alternative because so many of the Idaho Roadless Rule areas would be recommended wilderness. This would impact the national forest's ability to proactively restore these habitats for ungulates. Restoration would mostly be achieved in recommended wilderness through wildland fire, which may not occur in areas expected to produce the best nutritional response or would occur in areas with low nutrition potential. The limiting factor for elk in the plan area, particularly within the Roadless Rule areas, is the lack of forage because of lack of disturbance.

Both current recommended wilderness and Idaho Roadless Rule areas would continue to provide for wolf, black bear, and cougar populations. Under Alternative W, these species would be less accessible to the public in the recommended wilderness. Hunting is used by the Idaho Department of Fish and Game to reduce populations of predators and this alternative would provide for these species the most compared to other alternatives. However, if the decline in high quality forage leads to depressed or declining big game populations or continued downward trends, predator populations would also decline.

Under this alternative mechanized travel is prohibited in recommended wilderness, as well as game carts. The prohibition of mechanized travel, such as bicycles, would have slight benefits to big game because mountain bikes have been documented to displace elk (Wisdom et al. 2018). Bikes or other mechanized travel may have disturbance effects. Under this alternative, this activity would be prohibited in the largest amount of area. However, mechanized travel is not intensive in the plan area at the present time. The prohibition on the use of game carts might make some areas more difficult for people to remove game animal carcasses from recommended wilderness. The utility of game carts depends upon the terrain and vegetation conditions. In the plan area, game carts are not very useful unless there is a road or trail nearby or unless the terrain is fairly level. On the other hand, game carts allow some hunters to take animals farther away from roads or trails and transport game carcasses more effectively. Whether to allow or disallow game carts would have little effect on the wildlife, as most hunters have additional options that can allow removal of game carcasses.

Alternative X

Alternative X reaches desired vegetation conditions the fastest out of all the alternatives and slightly faster than Alternative W. Thus, it has the most aggressive schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation. For ungulates, this quicker paced schedule would improve forage resources quicker than any other alternative. While the pace may be quicker, all alternatives seek to achieve the same desired forest conditions.

SIMPPLLE modeling results suggest that, under this alternative, the amount of high-quality forage greater than about 2.58 kilocalories per gram of dietary digestible energy would increase the fastest rate, mostly within Management Area 3. Vegetation management would contribute substantially to forage. Under Alternative X, forest conditions would trend towards increased nutrition to meet the needs of many multiple use species. The more proactive schedule in Alternative X would allow more areas to be targeted to increase the amount of high-quality forage while restoring forests to towards desired conditions. Proactive management through wildland fire would occur more under Alternative X in Idaho Roadless Rule areas, especially within backcountry restoration themed areas. As no areas would be identified as recommended wilderness, this alternative has the least constraints on improving habitat for big game. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative.

In Alternative X, more areas were identified as suitable for motorized uses compared to the No Action Alternative. This could displace elk habitat use in some areas, especially those that would be suitable for motorized uses. The percentage of the planning area that is suitable for summer motorized uses would be 58 percent, an increase of about 13 percent suitable for motorized use compared to the No Action Alternative. Seventy percent of the plan area would be suitable for winter motorized travel, while 30 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum can be found in Appendix A. Areas suitable for motorized uses could displace elk, and more winter motorized uses would allow more access to winter trapping of furbearers. This would be good for trappers, but furbearers would be exposed to more trapping pressure. Species that are sensitive to motorized uses would not do as well under this alternative. Limited access to some areas has resulted in the inability of the State to manage wolf and other predator populations resulting in significant reductions in big game. Alternatives with more motorized uses could help hunters and wildlife managers access areas to reduce predator populations.

Waterfowl and furbearers that use aquatic habitats would be provided for in a similar manner in all alternatives as measures in PACFISH and INFISH are similar to those in the aquatics plan components. However, under a more aggressive schedule of treatments, more potential impacts could occur under this alternative. Alternative X proposes no rivers as suitable for wild and scenic rivers. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Eligible acres of wild and scenic river corridors would be 172,710 acres under the No Action Alternative versus 0 acres under Alternative X. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would be none under Alternative X, which would reduce the amount of recommended wilderness compared to the No Action Alternative. The Hoodoo, the Mallard-Larkin, and the Selway additions would no longer be recommended wilderness. The amount of recommended wilderness would be the least compared to the other alternatives. The amount of recommended wilderness would have environmental consequences on mountain goats, furbearers, elk, and other ungulates and predatory big game, as described below. The amount of designated wilderness would not change under this alternative.

Under Alternative X, no mountain goat populations would be included in recommended wilderness. All mountain goat populations currently in recommended wilderness would be subject to motorized over-snow travel, except for those in designated wilderness. This would be detrimental to some herds that are not in designated wilderness. On the other hand, the ability to connect mountain goat habitats or improve mountain goat habitat conditions through active management would be the most permissible in this alternative.

Furbearers that use terrestrial habitats would mainly be affected by the amount of recommended wilderness and whether motorized over-snow travel was allowed. This is because trapping itself is the biggest factor for effects for most of these species outside of prey abundance. Therefore, the amount of recommended wilderness and whether winter over-snow travel is allowed is the primary indicator for effects to furbearers. The amount of recommended wilderness and motorized over-snow travel would directly influence accessibility during winter, which is when trapping is most effective and usually conducted. Idaho Roadless Rule areas, except those identified as recommended wilderness, are suitable for winter motorized travel and these areas would be accessible for trapping facilitated by this increased access. In Alternative X, the amount of recommended wilderness dramatically decreases, and furbearers would be more accessible to trappers than they are currently. While this would serve to increase the ability for people to use this resource effectively, it could allow over trapping in some areas.

Preliminary spatial modeling of snowmobile probability of use suggests many areas of the Nez Perce-Clearwater will continue to be inaccessible during the winter, even if there is no recommended wilderness, because much of the national forest is too steep, has too much canopy cover, or is too far from access to be used by most trappers. In all alternatives, furbearers would continue to be available for trapping. The Idaho Department of Fish and Game regulates, monitors, and manages furbearers and this management would continue to sustain these species under this alternative.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be most proactive under this alternative. Therefore, the ability of the national forest to increase forage for elk and other ungulates as a result of achieving vegetation desired conditions would be the easiest. All big game species would benefit from higher amounts of nutrition, with ungulates benefiting from more nutrition and predatory big game benefiting from higher ungulate populations. Idaho Roadless Rule themes would remain the same and the ability to restore would be allowed to the extent allowed under the roadless rule. The limiting factor for elk in the plan area, particularly within the Roadless Rule areas, is the lack forage because of lack of disturbance. Both current designated wilderness and Idaho Roadless Rule areas would continue to provide for wolf, black bear, and cougar populations. However, under Alternative X, these species would be slightly more accessible to the public for hunting. Hunting is used by the Idaho Department of Fish and Game to reduce populations of predators and this alternative would allow greater access compared to other alternatives. The Idaho Department of Fish and Game manages and monitors the amount of harvest of predatory big game animals so that they persist on the landscape. This would continue under all alternatives.

Under this alternative all areas are open to mechanized travel, as well as game carts. Allowing mechanized travel, such as bicycles, would have slight detrimental consequences to big game because mountain bikes have been documented to displace elk (Wisdom et al. 2018). Under this alternative, this activity would be allowed in the largest amount of area. However, mechanized travel is not intensive in the plan area at the present time. The use of game carts in what is currently recommended wilderness might make game retrieval easier for people to remove game animal carcasses from these areas. The utility of game carts depends upon the terrain and vegetation conditions. In the plan area, game carts are not very useful unless there is a road or trail nearby or unless the terrain is fairly level. Game carts would allow some hunters to take animals farther away from roads or trails and transport game carcasses more effectively. Game cart use has little effect on wildlife, or habitat, whether they are allowed or not.

Alternative Y

Alternative Y would reach desired vegetation conditions faster than Alternative Z and the No Action Alternative but slower than Alternatives W and X. Thus, it has a relatively more relaxed schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation. For ungulates, this more moderate paced schedule would improve nutritional resources quicker than the No Action Alternative but slower than Alternatives W and X. While the pace may be quicker, at the end of five decades, the amount of high-quality nutrition is slightly less than in other alternatives. This is because desired conditions for vegetation do not vary by alternative, so management is directed towards similar outcomes. However, since the rate is slower, the elk herd would take more time to rebound towards higher levels desired by many of the public and partner agencies.

SIMPPLLE modeling results suggest that, under all alternatives, the amount of high-quality forage greater than about 2.6kcal/g of dietary digestible energy would increase throughout the plan area. This makes sense because the desired conditions for vegetation do not vary by alternative. Vegetation management would contribute substantially to forage, especially within Management Areas 2 and 3. Under Alternative Y, forest conditions would trend towards increased nutrition to meet the needs of many game species. The less proactive schedule in Alternative Y would allow fewer areas to be targeted to increase the amount of the highest quality forage while restoring forests to towards their natural range of variation. Proactive management through wildland fire would be moderate under Alternative Y in Idaho Roadless Rule areas compared to Alternatives W and X. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative.

In Alternative Y, slightly less areas were identified as suitable for motorized uses compared to the No Action Alternative. This could benefit elk habitat use in some areas, especially those that would not be suitable for motorized uses. Other species that are displaced or impacted by motorized uses would do better with this alternative. The percentage of the planning area that is suitable for summer motorized uses would be 44 percent, a decrease by about 1 percent suitable for motorized use from the No Action Alternative. Sixty-two percent of the plan area would be suitable for winter motorized travel, while 39 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum can be found in Appendix A. Areas suitable for motorized uses could displace elk, and more winter motorized uses would allow more access to winter trapping of furbearers. This would be good for trappers, but furbearers would be exposed to more trapping pressure. Limited access to some areas has resulted in the inability of the State to manage wolf and other predator populations resulting in significant reductions in big game. Alternatives with less motorized uses reduce the ability of hunters and wildlife managers to access areas to reduce predator populations as in this alternative.

Waterfowl and furbearers that use aquatic habitats would be provided for in a similar manner in all alternatives as measures in PACFISH and INFISH are similar to those in the aquatics plan components. Under a less proactive schedule of treatments, fewer potential impacts could occur under this alternative. Alternative Y proposes intermediate amounts of rivers as suitable as wild and scenic. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Suitable acres of wild and scenic river corridors would be 100,623 acres under Alternative Y. These acres would help some game species be neutral to others and hinder habitat enhancement efforts for others. There would be no change in the amount of designated wild and scenic rivers.

The amount of recommended wilderness would decrease under Alternative Y versus the No Action Alternative because the Hoodoo area would decrease from a boundary change. The change in the amount of recommended wilderness would have environmental consequences on mountain goats, furbearers, elk, and other ungulates and predatory big game, as described below. Species that do better in unpopulated areas or without human presence would do slightly better in this alternative.

Under Alternative Y, one of the larger mountain goat meta-populations in the Nez Perce-Clearwater and one of two core mountain goat areas within the Black Snow Population Management Unit would be excluded from recommended wilderness. Mountain goat populations in the Black Snow Population Management Unit were used as a source of goats to transplant into other portions of the state for 40 years (Idaho Department of Fish and Game 2019b). This population appeared stable to increasing during times when the transplants were occurring. The Idaho Department of Fish and Game counted these populations in 2017 and found the mountain goat population in the eastern portion of the unit, which would be those in the Blacklead areas of the Hoodoo recommended wilderness area, showed a substantial decline from the previous survey (Idaho Department of Fish and Game 2019b). In the past, Idaho Department of Fish and Game surveys in this area occurred in the late winter or spring (Idaho Department of Fish and Game 2019b). There are concerns with increasing snowmobile and snow bike access to mountain goat habitat in the east portion of Game Management Unit 10 in the Black Snow Population Management Unit (Idaho Department of Fish and Game 2019b). Changing the boundary for these mountain goats could have adverse environmental consequences for this metapopulation of mountain goats.

Furbearers that use terrestrial habitats would mainly be affected by the amount of recommended wilderness and whether motorized over-snow travel is allowed. This is because trapping itself is the biggest factor for effects for most of these species outside of prey abundance. The amount of recommended wilderness and motorized over-snow travel would directly influence accessibility during winter, which is when trapping is most effective and usually conducted. Idaho Roadless Rule areas, except those identified as recommended wilderness, are suitable for winter motorized travel. Therefore, the amount of recommended wilderness and whether winter over-snow travel is allowed is the primary indicator for effects to furbearers. In Alternative Y, the amount of recommended wilderness decreases, and furbearers would be slightly more accessible to trappers than they are under the No Action Alternative. In all alternatives, furbearers would continue to be available for trapping, but access and availability increases slightly under Alternative Y. The Idaho Department of Fish and Game regulates, monitors, and manages furbearers and this management would continue to sustain these species.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be similar to the No Action Alternative, more than Alternative W, and less than in Alternative X. The ability of the national forest to increase nutrition for elk and other ungulates in Management Area 2, as a result of achieving desired vegetation conditions, would be allowed under this alternative. Restoration would be achieved in recommended wilderness through wildland fire, which may not occur in areas expected to produce the best nutritional response. While prescribed fire is suitable within these areas, there is limited nutrition potential to elicit a nutritional response. The limiting factor for elk in the plan area, particularly within the Roadless Rule areas, is insufficient nutrition.

Current recommended wilderness, designated wilderness, and Idaho Roadless Rule areas would continue to provide for wolf, black bear, and cougar populations. Under Alternative Y, these species would be slightly more accessible to the public than in the No Action Alternative. These populations would forage upon the population of ungulates and big game populations would continue downward trends.

Under this alternative, mechanized travel is prohibited in recommended wilderness, as well as game carts. The prohibition of mechanized travel, such as bicycles, would have slight benefits to big game because mountain bikes have been documented to displace elk (Wisdom et al. 2018). Under this alternative, this activity would be prohibited. However, mechanized travel is not intensive in the plan area at the present time. The prohibition on the use of game carts might make some areas more difficult for people to remove game animal carcasses from recommended wilderness. The utility of game carts depends upon the terrain and vegetation conditions. In the plan area, game carts are not very useful unless there is a road or trail nearby or unless the terrain is fairly level or sparsely vegetated. On the other hand, game carts allow some hunters to take animals farther away from roads or trails and transport game carcasses more effectively. Whether to allow or disallow game carts would have little effect on the wildlife as most hunters have additional options that can allow removal of game carcasses. Game cart use would have minor to no effect on game species.

Alternative Z

Alternative Z would reach desired vegetation conditions at a similar rate to the No Action Alternative but slower than Alternatives W and X. Thus, it has a relatively more relaxed schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation. For ungulates, this more moderate paced schedule would continue to impair forage resources and cause continued declines in elk, deer, and moose populations due to forest succession and lack of forage. At the end of five decades, modeling results suggest that the amount of high-quality forage is less than in other alternatives. Since the rate is slower, the elk herd would take more time to rebound towards higher levels desired by many of the public and state agencies and tribal entities. As for big game nutritional improvements are often the result of efforts to achieve desired vegetation conditions, the alternatives that favor a faster pace favor big game to a greater extent than alternatives that rely on a slower pace.

Preliminary modeling results suggest that under all alternatives, the amount of high-quality forage greater than about 2.6 kilocalories per gram of dietary digestible energy would increase, especially within

Management Area 3, but do so more slowly in this alternative than in other alternatives. This makes sense because the desired conditions for vegetation do not vary by alternative. Vegetation management would contribute to nutrition within Management Areas 3 but does so more slowly than other alternatives. The less proactive schedule in Alternative Z would allow fewer areas to be targeted to increase the amount of the highest quality forage while achieving desired vegetation conditions. Proactive management through wildland fire would be similar to the No Action Alternative under Alternative Z but slower in Idaho Roadless Rule areas compared to Alternatives W and X. Management of natural fires in designated wilderness would still be possible at similar rates as they have been under the No Action Alternative.

In Alternative Z, slightly less areas were identified as suitable for motorized uses compared to the No Action Alternative. This could benefit elk habitat use in some areas, especially those that would not be suitable for motorized uses. The percentage of the planning area that is suitable for summer motorized uses would be 43 percent, a decrease of about 2 percent suitable for motorized use from the No Action Alternative. Seventy percent of the plan area would be suitable for winter motorized travel, while 30 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum can be found in Appendix A. Limited access to some areas has resulted in the inability of the State to manage wolf and other predator populations resulting in significant reductions in big game. Alternatives with less motorized uses reduce the ability of hunters and wildlife managers to access areas to reduce predator populations.

Waterfowl and furbearers that use aquatic habitats would be provided for in a similar manner in all alternatives as measures in PACFISH and INFISH are similar to those in the aquatics plan components. Under a less proactive schedule of treatments, fewer potential impacts could occur under this alternative. Alternative Z proposes the most amounts of rivers as suitable as wild and scenic. The proposed area of suitable wild and scenic river corridor is more than those eligible under the No Action Alternative. Suitable acres of wild and scenic river corridors would be 149,691 acres under Alternative Z. These acres would help some aquatic species be neutral to other upland game and terrestrial fur bearers and habitat enhancement efforts for big game within the corridors would be more difficult. There would be no change in the amount of designated wild and scenic rivers.

Alternative Z is the second highest alternative for the amount of recommended wilderness compared to the other alternatives. The alternative would include the Hoodoo, Mallard-Larkins, East Meadow Creek, Rapid River, Meadow Creek-Upper North Fork, North Fork Spruce-White Sands, Sneakfoot Meadows, Rawhide, and Pot Mountain Idaho Roadless Rule areas. This is the only alternative that would include Pot Mountain. The change in the amount of recommended wilderness would have environmental consequences on mountain goats, furbearers, elk, and other ungulates and predatory big game as described below.

Under Alternative Z, more mountain goat populations would be included in recommended wilderness than in all but Alternative W. However, the mountain goats in recommended wilderness under this alternative would still be subject to disturbance from motorized over-snow travel. Access to mountain goats by hunters would be more difficult in these recommended wilderness areas. The ability to connect mountain goat habitats within the plan area or the ability to improve mountain goat habitat conditions through active management would be constrained within recommended wilderness under Alternative Z. Thus, this alternative restricts hunter access but does not provide protections against over-snow travel.

Furbearers that use terrestrial habitats would mainly be affected by the amount of recommended wilderness and whether motorized over-snow travel is allowed. This is because trapping itself is the biggest factor for effects for most of these species outside of prey abundance. The amount of recommended wilderness and motorized over-snow travel would directly influence accessibility during winter, which is when trapping is most effective and usually conducted. Idaho Roadless Rule areas, except those identified as recommended wilderness, are suitable for winter motorized travel. Therefore, the amount of recommended wilderness and whether winter over-snow travel is allowed is the primary indicator for effects to furbearers. In Alternative Z, the amount of recommended wilderness is the second most among alternatives and furbearers would be accessible to trappers because winter motorized travel would be allowed. In all alternatives, furbearers would continue to be available for trapping, but access and availability increases a lot under Alternative Z. The Idaho Department of Fish and Game regulates, monitors, and manages furbearers and this management would continue to sustain these species.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be constrained in this alternative more than all but Alternative W because of the high amount of recommended wilderness, which would change many areas that are currently in the backcountry restoration theme to the backcountry recreation theme. Active management for restoration purposes is strongly restricted in this theme. Therefore, the ability of the national forest to increase forage for elk and other ungulates in 474,288 acres of recommended wilderness would be highly restricted under this alternative. This would not be an insignificant amount. This would impact the Nez Perce-Clearwater's ability to proactively restore these habitats for ungulates. Restoration would only be achieved in recommended wilderness through wildfire, which may not occur in areas expected to produce the best nutritional response. The limiting factor for elk in the plan area, particularly within the Roadless Rule areas, is the lack forage because of lack of disturbance. Modeling results from the elk forage potential spatial layer shows that Pot Mountain contains many areas of high and moderate forage potential. Similarly, East Meadow Creek has some of the higher amounts of forage potential for elk on the Nez Perce side of the national forest.

Current recommended wilderness, designated wilderness, and Idaho Roadless Rule areas would continue to provide for wolf, black bear, and cougar populations. Under Alternative Z, the higher amounts of recommended wilderness would be better for these species because of the limited access it would provide. These populations forage upon the population of ungulates and these species would decline as well if big game populations continue downward trends.

Under this alternative, mechanized travel is allowed in recommended wilderness, as well as game carts. Allowing mechanized travel, such as bicycles, would have slight detrimental effects to big game because mountain bikes have been documented to displace elk (Wisdom et al. 2018). Under this alternative, this activity would be allowed. However, mechanized travel is not intensive in the plan area at the present time. The allowance of game carts in recommended wilderness might make some areas more accessible for some people to remove game animal carcasses. The utility of game carts depends upon the terrain and vegetation conditions. In the plan area, game carts are not very useful unless there is a road or trail nearby or unless the terrain is fairly level or sparsely vegetated. On the other hand, game carts allow some hunters to take animals farther away from roads or trails and transport game carcasses more effectively. Whether to allow or disallow game carts would have little effect on the wildlife as most hunters have additional options that can allow removal of game carcasses. These two uses would have minor to no effect on game species.

Preferred Alternative

The Preferred Alternative adopts a quicker schedule to achieve desired vegetation conditions and would reach desired vegetation conditions faster than all alternatives but Alternative X. Thus, it has a relatively more aggressive schedule for restoring the system back to the desired conditions, which are based upon the natural range of variation. For ungulates, this more aggressive paced schedule would improve nutrition resources quicker than most other alternatives and would produce a higher amount of high-quality forage. Since the rate is faster, the elk herd would take less time to rebound towards the higher levels desired by many of the public and partner agencies. As objectives for big game forage improvements are nested within the efforts to restore the vegetation back to its natural range of variability, the alternatives that favor faster restoration activities favor big game to a greater extent than the alternatives that rely on a slower paced towards restoration.

Preliminary modeling results suggest that, under all alternatives, the amount of high-quality forage greater than about 2.6kcal/g of dietary digestible energy would increase throughout the plan area. This makes sense because the desired conditions for vegetation do not vary by alternative. Vegetation management would contribute substantially to forage, especially within Management Areas 2 and 3. While the increase in amount looks modest, it is sufficient to realize substantial gains in elk body condition likely leading to higher pregnancy rates, higher calf survival, better winter survival and overall better vital rates. Under the Preferred Alternative, forest conditions would trend towards increased nutrition to meet the needs of many game species. The more proactive schedule in the Preferred Alternative would allow more areas to be targeted to increase the amount of the highest quality forage while achieving desired vegetation conditions. Proactive management through wildland fire would be higher under the Preferred Alternative in Idaho Roadless Rule areas compared to all alternatives but Alternative W. Management of natural fires in designated wilderness areas would still be possible at similar rates as they have been under the No Action Alternative.

In the Preferred Alternative, more areas were identified as suitable for motorized uses which could affect elk habitat use in some areas, especially those that were not suitable for motorized uses in the 1987 Plans but would be found suitable in the Preferred Alternative. The percentage of the planning area that is suitable for summer motorized uses is 55 percent, a change of about 10 percent from the No Action Alternative. Sixty percent of the plan area would be suitable for winter motorized travel, while 40 percent would be unsuitable. Maps of the alternatives for summer and winter recreation opportunity spectrum can be found in Appendix A. Some areas were found not suitable for winter motorized recreation in this alternative to protect wintering big game animals. Limited access to some areas has resulted in the inability of the State to manage wolf and other predator populations resulting in significant reductions in big game. Alternatives with more motorized uses could help hunters and wildlife managers access areas to reduce predator populations.

Waterfowl and furbearers that use aquatic habitats would be provided for in a similar manner in all alternatives as measures in the Aquatic Ecosystem sections of the plan would provide adequate protections for these habitats. Under a more proactive schedule of vegetation treatments, more potential impacts could occur under this alternative; however, the aquatic plan components should prevent many impacts from sedimentation. The vegetation desired conditions should provide the coarse filter ecosystem plan components to sustain most furbearers that us upland environments. As many are carnivores, these conditions could provide for more prey that use early seral conditions. The Preferred Alternative proposes fewer rivers as suitable wild and scenic rivers. It includes Cayuse Creek, Fish Creek, Hungery Creek, Weitas Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Colt Killed Creek, and Meadow Creek. It also contains two eligible rivers—the Little North Fork and the Salmon River. Only the harlequin duck was identified as an outstandingly remarkable value for any of the rivers and is the only species sometimes hunted. Several of these rivers have had past observations of harlequin ducks. The proposed area of suitable wild and scenic river corridor is less than those eligible under the No Action Alternative. These acres would help some game species, be neutral to others, and hinder habitat enhancement efforts for others that need early seral conditions. There would be no change in the amount of designated wild and scenic rivers. It should be noted that the existing designated rivers also provide for the harlequin duck.

The amount of recommended wilderness would increase under the Preferred Alternative versus the No Action Alternative because the Meadow Creek area was identified as recommended wilderness. It is most similar to Alternative Y but with boundary changes. The Preferred Alternative would decrease the Hoodoo area through a boundary change, but protection of mountain goat use areas was retained and would not be open to winter motorized uses. Similarly, the Mallard Larkin area was retained as recommended wilderness and also protects mountain goats from winter motorized uses. The Preferred Alternative would change the boundaries of two recommended wilderness areas important to mountain goats. Those include the Hoodoo and Mallard Larkin recommended wilderness areas. Areas within these recommended wilderness areas will be suitable for summer motorized only in limited circumstances consistent with the Idaho Roadless Rule, and unsuitable for winter motorized uses. Therefore, the associated motorized suitability would help protect mountain goat habitat. The change in the boundary might facilitate or make enforcement of illegal winter motorized restrictions more challenging, however, illegal motorized use is enforced by law enforcement, and the Forest Service provides users with information about where winter motorized uses are allowed or prohibited. Note that the plan does not authorize motorized uses, and a subsequent decision with associated environmental analysis is required to authorize such uses. The increase in the amount of recommended wilderness would have beneficial environmental consequences on mountain goats, furbearers, elk, and other ungulates and predatory big game, as described below.

Under the Preferred Alternative, one of the larger mountain goat meta-populations in the Nez Perce-Clearwater and one of two core mountain goat areas within the Black Snow Population Management Unit would be included in recommended wilderness. Mountain goat populations in the Black Snow Population Management Unit were used as a source of goats to transplant into other portions of the state for 40 years (Idaho Department of Fish and Game 2019b). This population appeared stable to increasing during times when the transplants were occurring. The Idaho Department of Fish and Game counted these populations in 2017 and found the mountain goat population in the eastern portion of the unit, which would be those in the Blacklead areas of the Hoodoo recommended wilderness area, showed a substantial decline from the previous survey (Idaho Department of Fish and Game 2019b). In the past, the Idaho Department of Fish and Game surveys in this area occurred in the late winter or spring (Idaho Department of Fish and Game 2019b). There are concerns with increasing snowmobile and snow bike access to mountain goat habitat in the east portion of Game Management Unit 10 in the Black Snow Population Management Unit (Idaho Department of Fish and Game 2019b). Including the mountain goat population areas in recommended wilderness in the Preferred Alternative would help ensure that protections for mountain goats are adequate to provide for habitat conditions for healthy populations of these species because winter motorized uses there would be unsuitable and thus not allowed. The recommended wilderness areas would still allow administrative use of the area, including use by the Idaho Department of Fish and Game, to manage wildlife populations. The ability to actively manage vegetation for the benefit of big game would be less in recommended wilderness areas. This alternative strikes a balance between the protection of mountain goat populations and winter recreational use.

Furbearers that use terrestrial habitats would mainly be affected by the amount of recommended wilderness and whether motorized over-snow travel is allowed. This is because trapping itself is the biggest factor for effects for most of these species outside of prey abundance. The amount of recommended wilderness and motorized over-snow travel would directly influence accessibility during winter, which is when trapping is most effective and usually conducted. Therefore, the amount of recommended wilderness and whether winter over-snow travel is allowed is the primary indicator for effects to furbearers. In the Preferred Alternative, the amount of recommended wilderness increases, but motorized over-snow travel suitability increases from 39 to 60 percent so furbearers would be more accessible to trappers in some areas than they are under the No Action Alternative. Recommended wilderness would not be suitable for over-snow travel in the Preferred Alternative. The Idaho Department of Fish and Game regulates, monitors, and manages furbearers, and this management would continue to sustain these species.

The ability of the Nez Perce-Clearwater to pursue active management to achieve desired conditions would be higher in the Preferred Alternative than all alternatives but Alternative W. The ability of the Nez Perce-Clearwater to increase forage for elk and other ungulates in Management Area 2, as a result of restoring the natural range of variation, would be allowed under this alternative. Restoration would be achieved in recommended wilderness through wildland fire and target the best nutrition there., However, this may not be easy because these areas naturally have lower nutrition potential. The limiting factor for elk in the plan area, particularly within the roadless rule areas, is the lack forage because of lack of disturbance.

Current recommended wilderness, designated wilderness, and Idaho Roadless Rule areas would continue to provide for wolf, black bear, and cougar populations. Under the Preferred Alternative, these species would have more protection through recommended wilderness than in the No Action Alternative. These populations would forage upon the population of ungulates and big game populations.

Under this alternative, mechanized travel is prohibited in recommended wilderness. The prohibition of mechanized travel, such as bicycles, would have slight benefits to big game because mountain bikes have been documented to displace elk (Wisdom et al. 2018). Bikes and other mechanized travel have the potential to displace wildlife like elk. That this activity is not suitable in the Preferred Alternative in recommended wilderness prevents this type of disturbance in those areas. Under this alternative, this activity would be prohibited. However, mechanized travel is not intensive in the plan area at the present time. The prohibition on the use of game carts might make some areas more difficult for people to remove game animal carcasses from recommended wilderness areas. The utility of game carts depends upon the terrain and vegetation conditions. In the plan area, game carts are not very useful unless there is a road or trail nearby or unless the terrain is fairly level or sparsely vegetated. On the other hand, game carts allow some hunters to take animals farther away from roads or trails and transport game carcasses more effectively. Whether to allow or disallow game carts would have little or no effect on the wildlife as most hunters have additional options that can allow removal of game carcasses.

Effects to Multiple Use Wildlife from other Resource Areas and Common to All Alternatives

Air Quality

Air quality plan components will have little to no environmental consequences on wildlife resources. However, airshed management regulations under the Clean Air Act and the National Ambient Air Quality Standards often hinder the ability of the Nez Perce-Clearwater to manage vegetation for wildlife through prescribed fire from a smoke management perspective.

Carbon Storage

Plan components for carbon storage have little to no environmental consequences for multiple use wildlife.

Climate Change

The plan does not specifically address climate change. However, the plan has components that address a desire to have the Nez Perce-Clearwater resilience to future climates. These plan components would have little to no environmental consequences to multiple use wildlife. However, plan direction in the Forestlands section provide for habitats that are more resilient to the effects of climate change.

Cultural or Heritage

Plan components for cultural resources would have little to no environmental consequences to multiple use wildlife.

Suitable Wild and Scenic River Management

The amount of river miles suitable as wild and scenic rivers varies by alternative. The rivers considered are preliminarily classified as either wild, scenic, or recreational based upon their existing condition. Depending upon the selected alternative, their management will be consistent with these classifications. Some management activities are not suitable in these areas depending upon the classification and whether those uses are consistent with the Wild and Scenic Rivers Act. Suitability within these classifications can be found in Appendix F of the Land Management Plan.

In general, these uses are often beneficial to wildlife and many wildlife species would benefit from this management. MA2-GDL-SWSR-03 is a guideline that allows wildlife habitat enhancement within suitable wild and scenic rivers and corridors with the caveat that they should be designed to protect the outstandingly remarkable values for which they were found suitable. In some cases, this direction could alter or prevent active management of wildlife habitat for the enhancement of multiple use wildlife. Management of suitable wild and scenic rivers would benefit aquatic multiple use wildlife, such as waterfowl and aquatic furbearers.

Research Natural Areas

Research natural areas are areas identified for their unique natural ecosystems for the purposes of scientific study and education and for maintenance of biological diversity. Management of research natural areas is to maintain a representation of natural systems. Plan components for research natural areas would have either beneficial or little to no environmental consequences to multiple use wildlife.

Lolo Trail National Historic Landmark

Management of the Lolo Trail National Historic Landmark would have beneficial consequences or little to no environmental consequences to multiple use wildlife.

Physical and Biological Ecosystem Management

The plan components in the physical and biological ecosystem management section form the basis of wildlife habitat and provide the primary guidance for the management of wildlife habitats. These ecosystem plan components are based on the current understanding of the natural range of variability under a naturally functioning disturbance regime. Plan components for terrestrial, biophysical, forested lands, fire, and invasive species are the most influential. Many of these plan components and direction were evaluated in the environmental consequences section of the document.

Ecosystem Services

An Ecosystems Services section was added to the Land Management Plan. These components outline desired conditions for ecosystem services, including hunting and fishing. It also contains guideline FW-GDL-ES-01, which requires that routes open for summer and areas open for winter recreation should not be reduced in net. This plan component would maintain the existing amount of these features and would need to be considered when increasing space between the roads for elk. The plan has several sections that address economic and social sustainability. For example, plan components found in the livestock grazing, forest products, energy and mining, infrastructure, timber, recreation, tribal treaty rights, and multiple use wildlife are designed to provide ecosystem services. The plan integrates many of these resource uses with ecosystem plan components. This is because, in many cases, the use and sustainability of these resources for economic benefits are dependent upon the sustainability and conditions of the ecosystem. This is especially true for elk because the availability of elk hunting permits is based on the elk population. Nevertheless, this plan component would help ensure access for opportunities to harvest wildlife used for multiple uses.

Fire Management

Fire was one of the predominant disturbance factors on the Nez Perce-Clearwater in pre-Columbian times. The ecosystem is adapted to fire and functions properly when fires are at play at amounts and intensities as they were during those times. The system is currently departed from its natural range of variability as a result of primarily fire suppression and past extractive uses. This change has led to the departures found currently. Plan components for fire are designed to address these departures while protecting the communities and infrastructure in and around the plan area. Wildland fire is an essential ecological function in Nez Perce-Clearwater fire-adapted ecosystems. Balancing the safe and effective management of wildland fire to maintain and restore ecological integrity with the protection of communities, valued resources, and assets within and around the National Forest forms the core challenge of wildland fire management. This can be accomplished by implementing a coordinated risk management approach to build landscapes that are resilient to fire-related disturbances and preparing for and executing a safe, effective, and efficient response to fire. Fire plan components guide management to use fire within a risk-based framework to restore and enhance ecosystem integrity on the Nez Perce-Clearwater.

FW-STD-FIRE-01 states all wildfires shall have a management response that considers risk to life and safety, considering the costs and effects to resources and values at risk. FW-GDL-FIRE-01 guides wildfire management strategy and tactics to take an opportunistic approach integrating wildland fires to existing fuels treatments, past wildfires, forest health, and wildlife habitat improvement projects on the landscape. This would directly result in some benefits to multiple use wildlife species. FW-GDL-FIRE-02 addresses noxious weeds when considering planned ignitions. These plan components would contribute to the restoration of ecosystems, which would enhance habitat for many multiple use species, and improve habitat conditions for them.

Aquatic Ecosystems and Fisheries

Aquatics plan components manage aquatic, riparian, and wetland ecological conditions in the plan area. The plan contains a number of fish species listed under the Endangered Species Act and plan components were designed to contribute to the recovery of these fish. Plan components for aquatic ecosystems and are designed to prevent many threats to these habitats. All multiple use wildlife must drink water for their survival and all of them use aquatic or riparian habitats at times. Riparian habitats contribute disproportionately to biodiversity and are important to many wildlife species, including those commonly used by people. For commonly used wildlife, some species are more dependent upon the condition of these systems than others. Waterfowl are directly dependent upon aquatic ecosystems and the quality and quantity of these habitats directly affects their populations. On the other hand, ungulates may use these habitats for foraging and drinking but they depend only upon a source of water within a couple of miles for their needs. Their populations are not often limited by the available water.

About 32 species commonly used by the public are dependent upon aquatic habitats and were grouped into the aquatic, wetland, water, and riparian habitat group. These habitats were analyzed in the Aquatics Ecosystems and Fisheries section as a coarse filter analysis for these species. The analysis found in the aquatic wildlife section of the Abundance and Diversity of Wildlife section analyzes effects to these species from the coarse filter components in detail. The conclusions in that report found that the plan provides well for aquatic and riparian habitats, providing ecosystem integrity to these systems, and should provide well for aquatic wildlife species. The plan components provide either protection or mitigation for most major threats. Plan components in this section are generally beneficial to other commonly used wildlife.

The major exception is that some evidence from modeling the natural range of variation suggests that vegetation around aquatic and riparian habitats could be outside of the natural range of variability and may depend upon infrequent disturbance, such as fire, for maintenance. However, the effects these departures may have on wildlife commonly used by the public are unclear. The most likely effect is that some broad-leaved plants may be suppressed from lack of disturbance. Broad-leaved habitats are important to a wide variety of migratory birds, which contribute to bird watching. Broad-leaved shrubs and trees also contribute to foods for ungulates, beavers, and black bears. Beavers are perhaps the most impacted species when broad-leaved vegetation is lost through succession in riparian habitats. They can be absent from areas previously occupied when succession by coniferous vegetation causes a loss of broadleaved riparian vegetation. Beavers have sometimes been called ecosystem engineers because they manipulate aquatic systems to the benefit of dozens of other wildlife species. The aquatics plan components restrict the active management of these systems to provide this disturbance through planned ignitions or vegetation manipulation. This may prohibit some important needed restoration activities.

Forest Products (Other Than Timber)

Forest products are resources available to the public for their use and benefit. Forest products include firewood, mushrooms, Christmas trees, berries, and other resources. Plan components for these activities include FW-DC-SFP-01 and FW-DC-SFP-02 help provide these resources to the public in a sustainable manner. These activities can have some environmental consequences that can impact multiple use wildlife. Specifically, firewood harvest can adversely affect species that use snags and downed wood, and berry picking can affect forage resources for black bears and migratory birds. Firewood gathering is usually conducted near roadways, in upland areas, mostly on the uphill side of roadways, and is rarely collected on the downhill side of a road. Because most riparian areas are on the downhill side of roads, firewood is gathered less often in riparian areas. Desirable species are those with the highest British thermal units, which, in descending order, include western larch, Douglas-fir, lodgepole pine, Ponderosa pine, and Engelmann spruce. Other species, such as grand fir and subalpine fir, are not desirable. Firewood is not collected very far away from roads. Current management restricts users to harvest only dead and downed trees and restricts the harvest of red cedar from firewood gathering. Within Management Area 3, the harvest of firewood can influence the abundance of snags close to roads (Wisdom and Bate 2008).

Ten multiple use wildlife species use snags for reproducing or denning as crucial structures and eleven species use downed wood. Four species use both downed wood and snags. These include both terrestrial and aquatic multiple use species. Species that use downed wood include the mink, coyote, short-tailed weasel, long tailed weasel, northern river otter, western spotted skunk, harlequin duck, black bear, American marten, bobcat, and northern Raccoon. Species that use snags or dead portions of live trees include Barrow's goldeneye, bufflehead, common goldeneye, common merganser, hooded merganser, wood duck, American black bear, American marten, bobcat, and northern raccoon. Therefore, most of these species are either waterfowl or furbearers, with only one big game species included. Most firewood gathering probably occurs in upland habitat and not riparian areas. Therefore, those species most likely affected include the short and long-tailed weasel, American black bear, and bobcat. These other species are likely to use snags or downed wood within riparian areas, which have lower chances of use by firewood collectors.

Plan components in forested habitats have desired conditions to provide snags for several wildlife species and guidelines to retain snags during management to help provide for these species. The Forest Service

Northern Region used Forest Inventory Analysis data to evaluate snag abundance trends in northern Idaho (Bollenbacher et al. 2009b). They found that snag numbers in wilderness were similar in numbers to those in the managed front where firewood collection is currently occurring. These numbers suggest snags are still abundant and available for these species in the plan area.

Infrastructure

Infrastructure is primarily associated with road systems, buildings, and backcountry airstrips. Plan components for infrastructure include desired conditions to maintain infrastructure to meet their purpose and for maintenance. Facilities, such as ranger stations, fire towers, and guard stations, can affect wildlife habitats locally but their footprint and distribution in the plan area are so small comparative to the land base that they have only minor effects. There are seven airstrips in the plan area, and they have been established for a long period of time. Airstrips have comparatively little effect on multiple use wildlife habitats other than their footprint and the disturbances they pose. They do allow access into areas that would otherwise be accessible except on horseback or foot. A portion of their use is conducted by licensed and permitted outfitter and guides that take clients into the backcountry areas for hunting and fishing. Thus, they provide social and economic benefits and uses of wildlife resources for appropriate human uses. There are some multiple use wildlife species that are hunted more around these airstrips as a result of the access airstrips provide. The amount of hunting pressure from outfitters and guides is small compared to that of the general public. Outfitter and guide numbers for hunting are limited by the Idaho Department of Fish and Game, which only issues permit for these activities to a limited number of guides. The number of permits for outfitter and guides and hunting permits are regulated by the Idaho Department of Fish and Game to maintain a huntable population. So, while some individuals are taken, the population is managed to sustain and support the use of this resource. The number of permits issued for hunting is not within Forest Service control.

The road system has influenced some multiple use species. Species that have shown response to roads include black bears, mule deer, elk, and moose. Several of these species show avoidance behavior or response to disturbance from motorized vehicles.

The installation, maintenance, and use of recreation facilities, including trails, has the potential to affect big game through the removal or fragmentation of habitat and displacement through avoidance of human use. The revised plan alternatives include several forestwide components that address the addition of new roads, including those specific to elk.

Invasive Species

Invasive species poses a risk to habitat for many wildlife species. Invasive species can affect habitat conditions because they can dominate areas to the exclusion of native plants. The effects are most pronounced in non-forested habitats. Species affected by invasive plants include big game, upland game, and waterfowl. The plan and alternatives have plan components addressing invasive plants. See Section 2.1.7 for invasive species plan components. Plan components in the wildlife section of the document are meant to promote native species, as in FW-DC-WLMU-03 and FW-DC-MLMU-06.

Lands and Lands Special Uses

This section concerns the acquisition or disposition of forest lands, rights of way, and easements. These activities can have effects on the amount and location of lands that serve as wildlife habitats. The plan does not contain plan components for the prioritization of these activities related to multiple use wildlife. However, it does have desired conditions that consider habitats for Species of Conservation Concern and federally listed species. While not specified, nothing in the plan precludes acquisition of lands that could serve as habitats for game species. Nothing in the plan would prevent disposal of important habitats for multiple use species. The plan does have language that desires to maintain access to the public through easements. Maintaining access to public lands for hunting is an important issue for sportsmen in the northern Rockies.

FW-GDL-WL-02 gives direction on actions that might affect wildlife movements. It applies to some habitat features for multiple use animals, such as migration areas or winter range.

Livestock Grazing

Direct interaction between livestock and game species are likely to occur. The extent of the effects depends upon the overlap of wildlife habitat and livestock allotments. Allotments are limited in the plan area. Only about 14.8 percent of the Nez Perce-Clearwater is grazed. Allotments occur in the Palouse district and along the western portion of the plan area from near Musselshell Meadows southward. Nearly all the allotment areas are habitat for a variety of multiple use species. For example, elk and whitetail deer occur almost forestwide, except in cliff areas. In contrast, mountain goats rarely occur within allotments. Most of the allotments are grazed by cattle and the plan only has one sheep allotment, which is vacant. Big game species are among those affected the most by grazing. Grazing can also affect migratory birds that are popular for wildlife watching.

The effects of livestock grazing on big game species can include direct competition for resources and degradation of habitat conditions. Grazing can influence vegetation communities through reduced productivity, changing plant composition, and herbaceous structure. Coe et al. (2001) suggests competition for resources has the potential to occur between cattle and elk to a higher degree than between mule deer and cattle. Elk demonstrated a higher degree of displacement and avoidance from cattle compared to mule deer, which is likely due to resource partitioning and associated spatial displacement (Coe et al. 2001, Stewart et al. 2002). This highlights the importance of maintaining a balance and diversity of forage species on the landscape to benefit big game as they transition between seasonal ranges. Increased vegetative vigor and production could retain a greater proportion of digestible biomass for big game species to utilize. Indirect effects include those associated with grazing infrastructure, including mortalities associated with fence entanglements. These effects may occur within grazed allotments.

Predatory big game, such as wolves, cougars, and black bears, are affected by grazing because they sometimes prey upon livestock. In response, people often seek to kill the depredating predator. This can result in impacts to individuals at the local scale and can reduce the population of predatory big game species when grazing is widespread. At the same time, this reduction can benefit ungulate species. The plan does not have plan components to reduce these effects.

The revised plan alternatives contain a desired condition that grazing allotments supply livestock forage and contribute to local ranching operations while staying within or moving toward desired ecological conditions. When stocking rates are high, range resources are degraded. FW-DC-GRZ-01 is a plan component that expresses a desire to have the planning area provide for livestock use and provide economic and cultural benefits to local communities and produce forage for multiple uses in a sustainable manner. FW-GDL-GRZ-03 is a guideline that requires allotment plans to maintain plant vigor, root development, soil cover, and places a cap of 35 to 55 percent utilization on allotments. After evaluating many grazing studies, Holechek et al. (1999) defined moderate grazing between 40 to 45 percent. These guidelines should be sufficient to maintain plant vigor and rangelands for both livestock and wild ungulates. This guideline should also provide for range conditions that would support upland game. Effects to migratory birds would be lower due to this plan component.

Livestock grazing may impact riparian areas, which are important habitats for waterfowl and aquatic forebears. Livestock tend to forage within riparian areas and cause degradation of riparian vegetation, soil compaction, erosion, and sedimentation into streams in some cases. Grazing-specific guidelines found in the aquatics plan components contain measures to maintain or improve riparian habitat, including specific, quantifiable forage utilization measures within riparian areas.

Infrastructure, such as fences and water developments, should be designed and located to prevent barriers and reduce the probability for injury or mortality to wildlife. FW-GDL-WLMU-02 addresses this concern by requiring that new fencing be designed to reduce barriers to big game.

Management Area Allocations

The allocation of management areas was evaluated in detail under the alternatives. The framework of the proposed Forest Plan and alternatives is that the Nez Perce-Clearwater is managed within three management areas. Management Area 1 is designated areas, such as designated wilderness or designated wild and scenic rivers. Management Area 2 is largely composed of Idaho Roadless Rule areas and will also include research natural areas and suitable wild and scenic rivers. Management Area 3 is the front country and is meant to be managed as general forest. It emphasizes timber extraction, motorized uses, vegetation restoration, and developed recreation. This type of management has benefits and drawbacks for multiple use wildlife. Increased human presence and motorized uses can displace these species, while increased vegetation treatments provide more high-quality forage.

The Forest Plan and alternatives will not change the amount of designated wilderness and designated wild and scenic rivers. Under the plan alternatives, various amounts of recommended wilderness and suitable wild and scenic rivers are proposed. All recommended wilderness areas being considered originate from existing Idaho Roadless Rule areas. Suitable wild and scenic rivers proposed under the alternatives were identified for their outstandingly remarkable values through a process consistent with the directives for the 2012 Planning Rule. The amount of wild and scenic rivers suitable under the alternatives include some lands that were formerly considered front country or general forest management under the 1987 Plans. All other management areas are nested within these management areas. Some examples include research natural areas and the Lolo Trail National Historic Landmark.

Management is most restricted within Management Area 1 and the least restrictive under Management Area 3. Management Area 2 is intermediate between these two. Management areas regulate the reason why projects may be proposed and the types of activities that are allowed. Management area direction has important ramifications for the management of habitats for multiple use wildlife. The vegetation within the Nez Perce-Clearwater is largely composed of conifer forest of high canopy cover. As canopy closure increases, forage quality for ungulates declines. In much of the Nez Perce-Clearwater, the only practical forage resources are those created by disturbance, such as wildland fire, or timber harvest. Management Area 1 restricts disturbance to only natural wildfire. Management Area 2 allows active management to restore ecological conditions but does not allow timber production to achieve it. Idaho Roadless Rule areas also include stipulations as to the purpose and need for which restoration activities may be conducted. Management Area 3 may be managed for a variety of reasons to meet multiple use objectives including for wildlife. Timber management is emphasized in Management Area 3 and will help create forage for ungulates and early seral conditions for a variety of wildlife. The ability to actively manage wildlife habitats for the benefit of game species is directly impacted by management area direction. For further discussion on how management area allocation effects big game species refer to the alternative evaluation section above.

Energy and Minerals

Impacts to multiple use wildlife from minerals and energy activities could include the potential alteration or removal of habitat, increased fragmentation, and the potential for human-caused mortality from high-speed traffic or high traffic levels on roads. Plan components in the energy and minerals section of the document are desired conditions for these uses to be available and contribute to the social and economic contribution of the Nez Perce-Clearwater to the communities within the extent of the law. Energy development is negligible to non-existent on the Nez Perce-Clearwater. Mineral extraction on the Nez Perce-Clearwater occurs in many places but most typically occurs within waterways or through hard rock mining. These activities could impact habitats for aquatic furbearers and waterfowl locally. Aquatics plan components for mineral extraction addresses some of these impacts. Otherwise, consequences to wildlife habitats from plan components in the mineral extraction and energy section would have a minor footprint within the plan area. The overall threat impact is low for the Nez Perce-Clearwater for multiple use wildlife.

At-Risk Plants

Plan components for at-risk plants include FW-GDL-TE-01. This plan component has no environmental consequences or beneficial consequences for multiple use wildlife. In some cases, projects under the plan to enhance habitat for multiple use wildlife may need to be altered to protect at-risk plants. These are minor consequences that should not adversely affect this resource.

Recommended Wilderness

The discussion in the evaluation of alternatives explores the environmental consequences of recommended wilderness. This section evaluates the consequences of plan components within recommended wilderness areas. Plan components for recommended wilderness are generally beneficial for wildlife. MA2-DC-RWILD-01 is a desired condition to maintain wilderness character. Most wildlife species benefit from this type of management. As all recommended wilderness areas being considered fall within Idaho Roadless Rule areas, many of the activities allowed and disallowed or dictated by the Idaho Roadless Rule. Idaho Roadless Rule direction applies, even though the plan components do not specify this. Recommended wilderness would be managed as if they were within the backcountry recreation theme under the Idaho Roadless Rule. A variety of activities are not suitable in recommended wilderness. Examples include road construction, timber production, and construction of new buildings or facilities. Some activities are suitable in some alternatives but not in others. Effects of these activities are evaluated in alternatives section above. MA2-DC-RWILD-02 is a desired condition that indicates natural disturbance as the primary disturbance force affecting the composition, structure, and patterns of vegetation. Recommended wilderness management from this desired condition would restrict active management to enhance habitat for multiple use species. MA2-DC-RWILD-03 is a desired condition for these areas to contribute to connectivity and facilitate animal movements. Restrictions on road construction will benefit species such as elk, cougars, black bears, and gray wolves. Several furbearer species will also benefit from recommended wilderness areas because these areas are less accessible to some extent.

In some areas of the Nez Perce-Clearwater, noxious weeds have become established and may spread if not treated. Weeds have impacted important winter range for ungulates species. MA2-SUIT-RWILD-20 would allow herbicide use to control noxious weeds and recommended wilderness areas.

Hunting and fishing guides provide important social and economic functions that benefit society to facilitate use of wildlife commonly used by the public. MA2-SUIT-RWILD-19 finds outfitter and guides activities suitable in recommended wilderness areas.

There was concern from the state agency that management direction within recommended wilderness would hinder their ability to manage wildlife populations through activities, such as scientific studies, wildlife census, wildlife translocations, and other wildlife management activities, related to their responsibility to manage wildlife. MA2-SUIT-RWILD-21 is a plan component identifying these activities as suitable in recommended wilderness in coordination with the Nez Perce-Clearwater. Finding this activity suitable would allow state agencies, such as that of the Idaho Department of Fish and Game, to continue management activities they deem necessary to continue to manage multiple use wildlife in these areas.

Except for MA2-DC-RWILD-02, the plan components identified above changed conditions only slightly over Idaho Roadless Rule area management. MA2-DC-RWILD-02 would constitute the biggest change from roadless rule area management to recommended wilderness management terms with respect to its effect on wildlife habitat management, which would hinder active management to promote multiple use wildlife.

Idaho Roadless Rule Areas

Management of Idaho Roadless Rule areas are largely directed by the Idaho Roadless Rule. Many activities allowed and disallowed by the roadless rule are identified as suitability plan components in the plan. Timber production is not suitable, but timber harvest is allowed in some themes and for some reasons. Permanent road construction is not suitable in many themes but is suitable in community protection zones. The Idaho Roadless Rule imposes constraints and exceptions to the construction of roads in Idaho Roadless Rule Areas. Temporary road construction is not suitable in many themes, except community protection zones and backcountry restoration area themes. Prescribed fire is suitable, which would allow restoration of ecological conditions and would enhance habitat for ungulates. MA2-DC-IRA-02 is a desired condition that disturbance reflects natural disturbance. Mineral leasing is not suitable in some themes, which have beneficial consequences for wildlife. Motorized and mechanized travel in both summer and winter are suitable uses. Allowing these activities may have environmental consequences to the ecological conditions for species like elk, black bears, wolves, and other multiple use species that display avoidance behavior of motorized activities.

The plan contains specific desired conditions for wildlife and Idaho Roadless Rule areas. MA2-DC-IRA-05 is an ecological condition that expresses a desire for these areas to provide for elk herds. MA2-DC-IRA-03 is a desire that these areas provide a variety of wildlife habitat conditions including connectivity, foraging, and denning. The multiple use section of the plan also contains desired condition MA2-DC-WLMU-01that seeks to increase high quality elk nutrition in Idaho Roadless Rule areas. Furthermore, to address concerns that motorized use within Idaho Roadless Rule areas would decrease the size of areas without motorized access in some areas, MA2-DC-WLMU-02 is a desired condition that areas of 5,000 acres or larger remain without motorized access. This desired condition has an associated guideline, MA2-GDL-WL-05, that restricts the addition of new motorized trails unless areas 5,000 acres or larger without motorized access are available adjacent to that area and should avoid areas of high nutrition potential when possible. These plan components will help ensure that uses allowed within Idaho Roadless Rule areas continue to provide for multiple use species, such as elk.

Scenery

Plan direction for viewshed management or scenery would have negligible to beneficial environmental consequences for multiple use wildlife.

Soils

Plan direction for soils have beneficial environmental consequences for wildlife species commonly used by the public. It would be expected that no adverse environmental consequences would result from soil plan components.

Suitable Wild and Scenic Rivers

Management of suitable wild and scenic rivers is generally beneficial to most wildlife species. It would be beneficial to most commonly used wildlife as well. Those most benefiting from suitable wild and scenic river management are waterfowl and aquatic furbearers. Management of suitable wild and scenic rivers can also affect ungulate habitat. Winter range for ungulate species in the plan area occurs on south and west facing aspects along many rivers in the plan area. The various ungulates stratify themselves by elevation and terrain features. For example, moose winter at higher elevation and deeper snow than elk, while elk winter higher than deer generally. Bighorn sheep use the rugged terrain of the Salmon River year-round and require rugged escape cover as an important feature of habitat. Some mountain goat populations winter on steep cliffs above the North Fork Clearwater, Salmon River, Selway River, and Lochsa River. Other mountain goat herds winter in rugged cliff habitat far from rivers. River corridors can also contribute to high quality forage ungulates. All these species require forage resources as a required habitat feature.

Management of habitat to benefit ungulates is best performed when disturbance occurs creating new or improved forage resources for both winter and summer habitat. This disturbance can come from both natural and man created sources. However, these activities are not prohibited within suitable wild and scenic rivers. In fact, guideline MA2-GDL-SWSR-03 allows projects to protect and enhance wildlife and fish habitat so long as the projects protect the outstandingly remarkable values.

Management of suitable wild and scenic rivers for outstandingly remarkable values can reduce the ability to actively manage these habitats for the benefit of ungulates in some cases if the activity would conflict with the management of the outstandingly remarkable value. Suitability of some uses can take away some tools used to implement these types of projects. So, projects would have to use tactics that are suitable within river corridors, which varies by whether the river is wild scenic or recreational.

MA2-DC-SWSR-01 is a desired condition directing management to protect the outstandingly remarkable values and free flowing characteristics. These have beneficial consequences to waterfowl and aquatic furbearers. In general, these are beneficial to neutral for other commonly used species.

MA2-STD-SWSR-02 prohibits construction of roads within suitable wild and scenic rivers in the wild category. This has beneficial consequences on a broad variety of wildlife. Elk are known to exhibit avoidance behavior of roads and this restriction would allow the continued use of elk along these rivers.MA2-GDL-SWSR-01 requires a high scenic integrity objective within corridors of scenic class on suitable wild and scenic rivers. This guideline would help reduce impacts of projects conducted under the plan for some species but hinder active management for ungulates in some cases. In most cases, this guideline would alter projects to maintain scenic objectives.

MA2-GDL-SWSR-02 requires that trails, airfields, and roads protect the outstandingly remarkable values. MA2-GDL-SWSR-04 is a requirement to make stabilization or protection of heritage resources. While the allowance of these features can have some impacts, this plan direction would have little or no consequences for commonly used wildlife. Projects to construct these features would be analyzed individually for their effects.

The identification of wild and scenic suitability has the potential to attract greater use of these rivers by the public. People could be attracted to features that may qualify a river as having outstandingly remarkable values. The potential for increased human uses could affect some wildlife species by disturbing habitats and displacing species. The harlequin duck is suspected to respond to recreational disturbances. While this is a hunted species, populations are also an outstandingly remarkable value for some of these rivers because of their rarity and because some of these rivers host regionally important populations of this species.

Sustainable Recreation (Including Developed and Dispersed Recreation)

Sustainable recreation plan components guide and establish the Nez Perce-Clearwater's recreation program. Recreation is an important use of the National Forest and is highly valued by the public. The recreation program seeks to provide a range of recreational user experiences. Included in those uses are opportunities for camping in developed campgrounds and camping outside of developed sites, hiking and backpacking on and off trails, riding on mechanized transportation such as bicycling, recreational driving of motorized vehicle recreation, floating rivers, swimming, rock climbing, wildlife watching, fishing, trapping, hunting, and other uses. These activities can affect commonly used wildlife and their habitats by displacement because of avoidance behavior. Many species benefit from motorized access controls including furbearers, and herbivorous big game. However, motorized routes can facilitate predator control by the Idaho Department of Fish and Game and hunters. The effects vary by the species, habitat, and the activities.

Recreation and Access Management

The recreation opportunity spectrum is developed with guidance from the final directives and varies by alternative. The recreation opportunity spectrum establishes the settings under which various recreational activities are permitted or disallowed, especially those that allow or disallow motorized recreation. The classes of recreation opportunity spectrum determine the combination of activities allowed. Primitive and semi-primitive non-motorized are the settings that disallow motorized use. The intention in some of our plan is to connect trails and provide more loop opportunities for motorize trail use in both Management Area 3 and Management Area 2. Some of the alternatives for recreation opportunity spectrum settings reflect this. Hunting and trapping are a form of recreation that is supported by the recreation opportunity spectrum setting. Various levels of motorized access and recreation opportunity spectrum settings provide different opportunities for user experience hunting in various settings. The plan components for elk habitat and access have struck a balance to allow for these opportunities while conserving the wildlife resources.

Winter recreation opportunity spectrum settings differ from those in summer. The rational being that the effects of motorized use over the snow differ from those in the summer because winter recreation does not physically alter the land in the form of a road or trail. While this is the case, many wildlife species are displaced by both types of recreation and the effects differ because winter is a more stressful time for many wildlife species. The winter recreation opportunity spectrum allows much more liberal use of snowmobiling than summer motorized travel. While the recreation opportunity spectrum technically allows snowmobile use, users tend to gravitate towards areas with fewer trees, smoother ground, less steep slopes, and are influenced by the placement of access points and roads. Motorized over-snow travel within winter range for big game could be detrimental to winter survival. While in the summer, elk might move in response to motorized use, in winter they often do not have other places to go because of deep snows. In the Preferred Alternative, some areas used by big game were identified as not suitable for winter recreation to help protect wintering big game. Fortunately, most snowmobiling is not desirable in the same areas as those providing for big game winter range. Winter range occurs along the Lochsa, Selway, Middle Fork Clearwater, North Fork Clearwater, Southfork Clearwater, and Salmon Rivers and some in the Island area of the Nez Perce-Clearwater. These are not near the groomed snowmobile trail systems. The four groomed snowmobile trail systems include the Fish Creek Recreation Area, Lolo Pass/Powell, Elk City/Dixie Area, and Elk River Snowmobile Trail System. Grooming is accomplished in partnership with Idaho Parks and Recreation, Montana Fish Wildlife and Parks, Timberliners, Missoula Snowgoers, Snodrifters, and Valley Cats Snowmobile Club. Outfitted operations provide snowmobile trips for visitors.

An area may be suitable for motorized use but that does not mean motorized use is allowable everywhere in that setting. Motorized use by wheeled or over-snow vehicles is restricted to designated trails, roads, and areas, as shown on the motor vehicle use maps for the Nez Perce-Clearwater. Travel management decisions are separate, project-level decisions that determine the specific areas and routes for motorized recreation consistent with the desired recreation opportunity spectrum, as mapped.

Hiking, mechanized, and motorized recreation has been shown to displace elk from important habitats, sometimes to great distances (Wisdom et al. 2018). Some of these disturbances are more impactful than other. For example, motorized use by ATVs evoked the largest distances while cycling was intermediate, and hiking and horseback riding had the smallest distances of displacement. It is well established that elk are displaced from habitats by motorized traffic as dozens of studies have shown avoidance behavior and displacement. Other studies have pointed out that elk vulnerability to hunting increases with increased road miles. The installation, maintenance, and use of recreation facilities, including trails has the potential to affect big game through the removal or fragmentation of habitat and displacement through avoidance of human use. The development of motorize trails and roads can facilitate increased access for trapping on some species. Vehicle strikes can increase on roads of higher speed. Plan components that facilitate these types of developments would likely have some detrimental consequences to elk and other commonly used wildlife.

The road system can be a source of habitat degradation in aquatic systems. The release of sediment from road systems into aquatic systems can affect habitat conditions for many aquatic species. Aquatics plan components address sedimentation from the road system into aquatic systems by a combination of desired conditions, objectives for restoration, and standards and guidelines that prevent the road system from degrading aquatic habitats. These plan components should be adequate for sustaining the habitats for waterfowl and aquatic furbearers and continue to provide benefits to ungulates and black bears.

For waterfowl and aquatic furbearers, aquatic recreation such as floating and swimming can cause disturbance and displacement from these habitats. These effects are usually sub lethal but may affect breeding success and use of an area. Harlequin ducks have been suspected of being affected by recreation on rivers, but this has not been tested empirically in the science.

FW-DC-REC-07 is a desired condition that recreation would be designed to minimize environmental impacts. Plan components in the elk section of the plan have measures to address motorized routes and are specific to in the management areas. They to apply appropriately to projects that seek to create new motorized trails in Management Area 2 and new motorized roads or trails in Management Area 3.

All revised plan alternatives include the desired condition that the transportation system provides for safe and efficient travel and access to the National Forest with minimal impacts on natural resources, including wildlife.

Timber

Plan components for timber harvest include a suite of desired conditions, objectives, and restrictions to provide a sustainable level of use and apply the appropriate measures to ensuring that the timber production on the Nez Perce-Clearwater addresses many of the concerns of this use on other resources. Many species of commonly used wildlife benefit from early seral habitat conditions and would do well in areas of timber production. For example, many species in the ecotone, forest edge, or habitat combinations and the non-forested or early seral habitats groupings both benefit from timber harvest because it can create these conditions. In total, ten species of commonly used wildlife use ecotones between forested and non-forested habitats and seven species use early seral or non-forested habitats. These two groups make up about 27 percent of the species commonly used by the public and most of these species are among the most economically or socially important commonly used species. These include whitetail deer, elk, moose, and forest grouse.

Plan components within the revised plan alternatives address composition, structure, and function of vegetation communities, which provide a coarse filter strategy designed to support disturbance regimes that will maintain and reinforce ecological integrity and biodiversity. Revised plan alternatives include plan components to maintain vegetation within the natural range of variation when possible. All revised plan alternatives contain desired conditions for grassland and shrubland habitats with native plant communities that are self-sustaining and support biodiversity with few non-native species present. These plan components would provide for a wide diversity of foraging options for big game species. Forested habitats provide cover and shelter for big game from both environmental conditions and human use, such as hunting. Forage can also be found within forested areas characterized by more open canopies. Coniferous forests provide hiding cover for big game animals to escape from predators, contribute to thermoregulatory needs, and provide access to winter forage. Desired conditions to maintain forest structure within the natural range of variation for tree density as measured by canopy cover would provide a range of forest cover conditions to meet these needs of big game. All revised plan alternatives identify areas that are suitable for timber production, which includes areas where growing, tending, harvesting, and regenerating crops of trees for commercial purposes may be emphasized. Regeneration harvest would create openings that would provide greater volume of forage.

Size and shape of openings created through regeneration harvest in the revised plan alternatives would be designed to mimic openings created by natural processes. All revised plan alternatives specify that clearcutting and other methods of regeneration harvest are to be used only were deemed appropriate for multiple resource needs, including wildlife habitat.

While some species benefit from timber harvest, others can be adversely affected by timber harvest. Commonly used wildlife species that may have habitat reduced by timber harvest includes the American marten, which depends upon mature forest conditions. Species like black bears benefit in some ways from early seral conditions created by timber harvest and are adversely affected in other ways, such as loosing cover. Similarly, several aquatic species use forested habitats near wetlands. Under the aquatics plan components, timber production is not suitable in riparian areas and appropriate measures are included to reduce impacts to these important habitats. Therefore, timber harvest should not have adverse effects on waterfowl and aquatic furbearers.

Since the ecosystem is adapted to disturbance, this temporary loss of habitat recovers over time. A level of timber harvest can be sustained as long as the amount and distribution does not exceed the rates or change the patterns at which natural disturbance changed these habitats. When it does, it can cause departures from the natural range of variability. Because timber harvest is based upon the desired conditions in the vegetation section, it should not result in conditions outside of the natural range of variation and continued departures. This type of management should provide the ecological conditions and ecosystem integrity for many commonly used species.

FW-DC-TBR-01 includes a desire to use timber production and harvest to restore vegetation conditions and reflects the scale of natural disturbances and is designed to reach forest vegetation desired conditions. This addresses an important departure characteristic present on the Nez Perce-Clearwater created by artificial 40-acre limits on harvest that do not replicate landscape patterns found under natural disturbance (Hessburg et al. 2015). These landscape changes have had some detrimental effects on habitat configuration for many wildlife species, including those commonly used by the public. Elk are known to use edges more than interiors of openings and these measures would provide for that use. See Section 5.1 for specific timber plan components that can benefit elk habitat.

Timber production is often associated with increases in roads to access the timber and transport it. Timber operations often improve existing roads to be suitable for logging trucks. Timber operations can create new permanent roads or use temporary roads that are then closed or restored after harvest. These roads can affect a variety of wildlife species, but perhaps the most affected would be elk. Elk are displaced from otherwise useable habitats because of motorized uses on roads. Elk plan components provide a strategic and flexible system for evaluating and making decisions on roads developed during timber harvest activities. Roads associated with timber harvest and recreational uses in some areas of the Nez Perce-Clearwater, especially Management Area 3, might not be used by elk in areas with little space between roads for them to use.

Watershed Management

Watershed management is largely beneficial to species commonly used by the public. This is especially true for waterfowl and aquatic furbearers. These systems probably are outside of their natural range of variability because of fire suppression and past harvest practices. However, the current condition is not adversely impacting many species. In some cases, lack of disturbance has probably caused some forest types to transition from broadleaved vegetation into conifers. This change may have reduced the ability of some areas to support beavers. Aquatics plan components are comprehensive to provide for these aquatic ecosystems but may lack disturbance to provide for broadleaved vegetation. Some aquatics measures may complicate restoration of upland wildlife habitats, such as early seral conditions for ungulates.

Tribal Treaty Rights

Tribal treaty rights are generally favorable for wildlife. Plan direction in the tribal trust treat rights section would generally benefit wildlife. Many commonly used wildlife species are also commonly used by tribes for clothing, spiritual purposes, subsistence, hunting, fishing, gathering, trapping, and other uses. As mentioned previously, wildlife are sacred to tribes and are not divulged as to their use and location, nor can all the ways that tribes value wildlife be described. Plan components within tribal treaty rights section consists of desired conditions that provide a sustainable diversity of habitats necessary to provide plant and animal species that are of tribal importance. They desire to support wildlife populations at huntable and harvestable levels for the exercise of treaty reserved rights. Standards and guidelines restrict activities that are detrimental to the exercise of treaty reserved rights. These plan components would help support wildlife at huntable and harvestable populations and for treaty reserved rights.

Vegetation

The premise of the 2012 Planning Rule is that ecosystems maintain ecosystem integrity. Ecosystem integrity is achieved when ecological conditions operate within their natural range of variability in terms of their structure, function, composition, and connectivity. The ecological conditions described in the

Forestlands section seek to ensure that the lands within the Nez Perce-Clearwater achieve and maintain ecological integrity. The structure, function, composition, and connectivity of terrestrial ecosystems were considered in developing the plan components for vegetation, including those for forested habitats, non-forested habitats, and aquatic habitats. These ecological conditions are designed to provide for all wildlife, including those commonly used by the public. Achieving desired conditions for vegetation may result in short-term effects to some species while other species will benefit from these activities. In general, it can be expected that species that use non-forested and early seral habitats will increase on the landscape while those species that use late seral forests may decrease in some areas. However, the percentages and proportions of a variety of size classes were designed into the vegetation section to replicate the natural range of variation. Hessberg et al. (2015) described seven principles to restoring forests in the Pacific Northwest. They suggested that mature forests were much less abundant historically than it is today. Similarly, forests were less dense than they are today. Many young stands commonly contained large and very large trees that survived the last disturbance event. While stands were younger, these relics provided some of the same habitat components used by species in mature and old stands. Plan components describing and requiring a desire to retain these elements are an important feature of maintaining the natural range of variability. Periodic disturbances, such as fire, shifted species dominance types of trees to those that are more fire resistant. Fire suppression and past vegetation management have shifted dominance types from fire tolerant species to fire intolerant species. The effect of these changes on wildlife are not well understood but they likely shifted species distribution and abundance and the proportion of species that use a variety of habitat types.

These changes may also have affected species commonly used by the public. It is suspected, for example, that mountain goat habitat may shrink due to encroachment and may not be as connected as it once was. Similarly, bighorn sheep habitats have probably been reduced through increased forest succession. While historically common, black bear populations may be higher than they were in the past due to the amount of mature forest. Several of the species that are early seral or ecotone dependent have been affected by fire suppression and lack of disturbance, which has caused advancing forest succession. Restoring the structure, function, composition, and connectivity of habitats in the plan area to ensure that they have ecosystem integrity will generally be to the benefit of most species commonly used by the public. Vegetation management will be neutral to beneficial in most cases for predatory big game, such as bears, cougars, and wolves.

Wildlife

This section evaluates the effects on wildlife plan components on wildlife used for multiple uses. Plan components for wildlife are generally beneficial to species commonly used by the public. Some management direction for species like fisher might seem on the surface to be diametrically opposed to habitat management for elk. It must be kept in mind that small increases in the amount of forage for elk can result in large benefits in fat accumulation, reproductive rates, calf survival, and winter survival. Modeling results from SIMPPLLE suggest fisher habitats are very departed in extent of disturbance, and composition compared to historical conditions because of fire exclusion and past timber practices. Without intervention, and under a warmer climate, modeling results suggest that fisher habitat will dramatically decline regardless of management. Modeling results suggest that these changes will come largely through natural disturbance, such as fire, insects, disease, and other disturbance agents. These changes will naturally benefit several ungulates and other species that use early seral habitats commonly used by the public. Additional early seral conditions should benefit ungulate populations and benefit predatory big game as well.

Plan components under the Northern Rockies Lynx Direction could slow or prevent some restoration activities in in cold and cool moist broad potential vegetation type groups, which could benefit species commonly used by the public. Over the short-term, this will benefit species like American martens and snowshoe hares. Over longer time frames, stand conditions could extend above their natural range of variation, leaving them susceptible to uncharacteristic wildfire as a result of this direction. The Nez Perce-Clearwater should take advantage of opportunities in lynx habitat allowable under the Northern Rockies Lynx Direction to increase stand diversity and function to a larger extent than it has in the past to benefit both lynx and species commonly used by the public.

Plan components that direct the Nez Perce-Clearwater to increase patch diversity and connectivity should benefit many wildlife species, including those commonly used by the public. Some management for species, such as elk, could temporarily affect species that depend on mature forest. For example, treatments for elk might affect American marten habitat. Modeling results using SIMPPLLE suggest that American marten habitat will decline slightly under the plan alternatives; however, this habitat is above its natural range of variability, so some decline is expected as a result of management towards this end. Management directed towards improving elk populations should have beneficial effects on predatory big game.

Summary of Consequences

By and large the plan will provide for the majority of species that are used for hunting, fishing, gathering, trapping, viewing, traditional or ceremonial uses or other uses. The plan favors some and perhaps decrease habitat for others depending on life history. Elk and other big game were a focus of the development of the plan and plan components were designed to benefit these species. The extent to which management is directed to benefit multiple use wildlife was balanced with competing resources including recreation, timber management, motorized access and more.

Generally, the plan will managed towards vegetation conditions that were at the warm-dry range of variability, and because of increased disturbances during those times, habitats were more likely to be in an early seral condition. For large herbivores, additional early seral conditions are generally favorable for nutritional resources and herds of most big game are expected to benefit. These include elk, moose, white-tailed deer, mule deer, bighorn sheep, and mountain goats. Most upland game species as well as many furbearers would benefit from early seral conditions. Species like some furbearers, like American and Pacific martens that depend on mature or older forests will likely decline to some extent.

The plan and Preferred Alternative favor more access for recreational and economic purposes. The wildlife species that are sensitive to motorized uses or are accessed more easily by motorized access will not do as well relatively speaking than if the motorized system favored fewer roads and less human access. Several species are at least somewhat sensitive to roads and motorized uses, which include elk, black bears, large predators like wolves and cougars. Several species are not influenced greatly by motorized access, and this would have a neutral effect on them. The land allocations in the Preferred Alternative for recommended wilderness encompass some important mountain goat areas and the Preferred Alternative would be better for them than other alternatives. Bighorn sheep populations are relatively unaffected by much in the plan, but measures to reduce exposure to pathogens would prevent losses, but there is small risk with potentially large consequences from pack goats uses.

Land allocations that favor more recommended wilderness would benefit most wildlife species, but some depend on these types of areas more than others. For example, most furbearers are less accessible for trapping in recommended wilderness areas, while black bears are less likely to be baited in recommended wilderness areas. Wolves, cougars, mountain goats, black bears, bighorn sheep thrive in areas with less human disturbances. The allocation of recommended wilderness in the Preferred Alternative, which represents an increase over the No Action Alternative, would benefit these species.

A summary of potential consequences from the Land Management Plan to wildlife is presented in Table 296. These are the relative benefits of the items that vary by alternative based on the species biology, responses to different disturbance factors, whether they benefit from early seral conditions or late seral conditions, or other factors that vary by alternative. Larger numbers represent whether the species is perceived to be more affected by some aspect of the alternatives for vegetation conditions, motorized route management, land allocations, or plan direction. Lower numbers reflect a lower intensity or slight response to the factors in the alternatives. These are meant to give a broad index or general sense of the relative benefits to the species of the suite of alternatives and factors. The factors above, along with the relative importance of those factors to the species, were considered in assigning the relative score to each species for each alternative. However, again, all multiple uses species should be provided for as a result of the plan.

Table 296. Summary of consequences to wildlife by alternative (Alt), using relative benefit to people scale, from high (5) to low (1)

Game type	Animal name	No Action Alt	Alt W	Alt X	Alt Y	Alt X	Preferred Alt
Big Game	Elk	2	4	5	3	2	4
Big Game	Mule Deer	2	4	5	3	2	4
Big Game	White-Tailed Deer	2	4	5	3	2	4
Big Game	Moose	2	4	5	3	2	4
Big Game	Bighorn Sheep	5	5	5	5	5	5
Big Game	Mountain Goat	3	5	1	1	2	5
Big Game	Black Bear	4	3	3	5	4	3
Big Game	Cougar	2	4	5	3	2	4
Big Game	Wolves	2	4	5	3	2	4
Upland Game	Spruce Grouse	2	4	5	3	2	4
Upland Game	Ruffed Grouse	2	4	5	3	2	4
Upland Game	Dusky Grouse	2	4	5	3	2	4
Upland Game	Snowshoe hare	5	5	5	5	5	5
Upland Game	Turkey	2	4	5	3	2	4
Upland Game	Chukar	5	5	5	5	5	5
Furbearer	American Marten	4	4	2	3	4	3
Furbearer	American Beaver	4	4	4	4	4	4
Furbearer	River otter	5	5	5	5	5	5
Furbearer	Bobcat	3	4	5	3	3	4
Furbearer	Long tailed weasel	2	4	5	3	2	4
Furbearer	Short-tailed weasel or Ermine	2	4	5	3	2	4
Furbearer	Red fox	5	5	5	5	5	5
Furbearer	Badger	2	4	5	3	2	4
Furbearer	Mink	5	5	5	5	5	5
Furbearer	Skunk	5	5	5	5	5	5
Furbearer	Raccoon	5	5	5	5	5	5

3.2.10 Air Quality

Air quality is one of the many resources the Forest Service is required to monitor and protect on public lands. Air quality is dependent on the type and amount of pollutants emitted into the atmosphere, the location and topography of an airshed and the prevailing meteorological and weather conditions. Both external and internal sources of air pollution affect the Nez Perce-Clearwater. Sources of air pollution within the Nez Perce-Clearwater include particulates and chemicals single space generated from timber and mining operations, prescribed fire, wildfire, road dust, and transportation and other combustion engines sources. Air pollution sources outside of the Nez Perce-Clearwater that affect the forest include agricultural sources, such as crop burning, municipal emissions, and other sources, including long distance source emissions transmitted via continental air flow patterns.

There is a need to alter management activities in compliance with the 2012 Planning Rule, which will have effects on air as a resource. The focus of this discussion will be on how the various Nez Perce-Clearwater Forest Plan alternatives could affect air quality through management activities, specifically focusing on the use of prescribed fire. Leasing of land for mining operations also occurs on the Nez Perce-Clearwater and air quality impacts from mining are addressed in the Energy and Minerals section. All management activities described can exacerbate public health issues, as well as obscure visibility. Of all potential sources of air pollution from management activities that occur on the Nez Perce-Clearwater, smoke is the most substantial contributor to air quality and visibility. However, there is a need to use fire to maintain and restore the fire-adapted ecosystems on the Nez Perce-Clearwater and to reduce hazardous fuels in the wildland-urban interface. In addition, there is a desire to continue to use timber and mineral extraction as part of cultural, economic, and recreation activities.

Relevant Laws, Regulations, and Policy

Federal Laws

Clean Air Act of 1955, as amended in 1967, 1970, 1977, and 1990 (42 U.S.C. 85 § 7401 et seq.): This federal act is a legal mandate designed to protect the public and the environment from air pollution. Although this policy created the foundation for air quality regulation, states and counties are often responsible for implementation of the air quality standards. The Clean Air Act assigns the task of setting the national ambient air quality standards (NAAQS) to the Environmental Protection Agency (EPA). The EPA evaluates and updates these standards every five years. The 1977 Clean Air Act amendments, strengthened by the 1990 amendments, gave federal land managers an “affirmative responsibility” to protect the air quality related values of Class I areas from adverse air pollution impacts. Mandatory Class I areas were designed under the Clean Air Act and are usually pristine areas of the country which receive the highest degree of regulatory protection from air pollution impacts. Air quality related values are the features or properties of a Class I area which can be changed by air pollution.

Clean Air Act Conformity: This provision of the Clean Air Act requires federal agencies to ensure that the actions they undertake in nonattainment and maintenance areas are consistent with federally enforceable air quality management plans for those areas.

Prevention of Significant Deterioration: This provision of the Clean Air Act requires federal land managers “to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, ... and other areas of special national or regional natural, recreational, scenic, or historic value.” This section addresses resource protection through the establishment of ceilings on additional amounts of air pollution over baseline levels in “clean air” areas, protection of the air quality-related values of certain special areas, and additional protection for the visibility values of certain special areas.

Wilderness Act: This federal act requires the Forest Service to minimize the effects of human use or influence on natural ecological processes and preserve natural conditions within wilderness.

Consequently, this includes minimizing the effects of human caused air pollution to the wilderness and its air quality related values.

Regional Haze Rule (40 CFR Part 51): This rule, issued by the Environmental Protection Agency, mandates that states address control of human-caused air pollution that impacts visibility in designated Class I airsheds. Class I airsheds are congressionally appointed wilderness areas greater than 5,000 acres in existence before 1977. The goal of the Regional Haze Rule is to return visibility conditions in Class I areas to natural background conditions by the year 2064.

National Ambient Air Quality Standards (40 CFR part 50): This standard establishes health-based levels of certain air pollutants considered healthy for all persons in all areas. Levels have been established nationally, and states can choose to adopt and enforce the national standards or create and abide by their own stricter standards. Secondary standards are established for public welfare protection, including protecting against decreased visibility and damage to animals, crops and vegetation, and buildings.

The Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. EPA 1998): On May 15, 1998, the Environmental Protection Agency (EPA) issued the Interim Air Quality Policy of Wildland and Prescribed Fires to address impacts to public health and welfare (U.S. Environmental Protection Agency 1998). The goal of the policy is to allow fire to function in an ecological role to help maintain healthy ecosystems. In doing so, it must also balance the need to protect public health and welfare from the impacts of fire-related air pollution emissions. The policy is interim because it does not yet address agricultural burning or regional haze (U.S. Environmental Protection Agency 1998). The Interim Air Quality Policy of Wildland and Prescribed Fires suggests air quality and visibility impact evaluations of fire activities on federal lands should consider several different items during planning (U.S. Environmental Protection Agency 1998). In a project-level environmental analysis document, it is appropriate to consider and address, to an extent practical, a description of applicable regulations, plans, or policies; identification of sensitive areas (receptors); and the potential for smoke intrusions in those sensitive areas. Other important disclosure items include applicable smoke management techniques, participation in a basic smoke management program, and the potential for emission reductions. Ambient air quality and visibility monitoring for Class I areas are typically done collaboratively with the states. Impacts to regional and sub-regional air are addressed operationally through coordinated smoke management programs. The EPA urges the states to develop, implement, and certify smoke management programs that meet the recommended requirements of the Interim Air Quality Policy of Wildland and Prescribed Fires. The Forest Service is a member burner of the Montana and Idaho Airshed Group.[21] Member burners submit burn requests to the Smoke Monitoring Unit, which coordinates and approves prescribed burning activities in a manner designed to meet ambient air quality standards.

National Environmental Policy Act Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions (revised draft of 2014): This guidance explains that agencies should consider both the potential effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the implications of climate change for the environmental effects of a proposed action. The revised draft guidance supersedes the draft greenhouse gas and climate change guidance released by the Council on Environmental Quality in February 2010 and, unlike the 2010 draft guidance, the revised draft guidance applies to all proposed federal agency actions, including land and resource management actions (Climate Change and Forest Carbon).

[21] Montana Idaho Airshed Group: https://mi.airshedgroup.org/

State and Local Laws

Idaho State Implementation Plan: Each state is required, under the Clean Air Act, to have an Environmental Protection Agency (EPA) approved state implementation plan (section 110(a)(2)) to identify a strategy to maintain or attain national ambient air quality standards (section 110(h)(1)). The Idaho State Implementation Plan is the collection of EPA-approved programs, policies, and rules that the State of Idaho uses to attain and maintain the primary and secondary national ambient air quality standards.

Idaho Smoke Management Plan: Idaho does not have an EPA-approved smoke management plan, so the state follows federal and interagency basic smoke management guidelines. Idaho is in the process of developing a state smoke management plan through its negotiated rulemaking process. It is unknown when this process will be completed.

Methodology

Spatial Scale

The analysis area or region of influence for air quality depends on the specific pollutant(s) and emissions source(s) involved, as well as weather patterns, terrain, and prevailing winds. Primary pollutants are emitted directly; secondary pollutants are formed through chemical reactions in the atmosphere from precursor pollutants. The region of influence for a primary pollutant depends on the rate of emissions from a source, the elevation of the source, the type of pollutant, and the meteorological conditions that limit its dispersion and dilution during transport away from the emissions source. The region of influence for primary pollutants is an area potentially subject to measurable air quality impacts under unfavorable dispersion conditions and is generally a relatively small area, ranging from one mile to less than a few miles from the source. The region of influence for a secondary pollutant, such as ozone, is much larger because secondary pollutants can impact air quality for hundreds of miles.

The analysis area for the evaluation of effects to air quality from forest plan alternatives is the airshed in which the Nez Perce-Clearwater lies. An airshed is a geographical area in which atmospheric characteristics, such as wind patterns, are similar. Airshed boundary descriptions are detailed in the Montana and Idaho Airshed Group Operations Guide (Montana Department of Environmental Quality 2010). The Nez Perce-Clearwater lies within Airsheds 12B and 13, which are shown in Figure 125. There are no impact zones directly within Airsheds 12B and 13. Impact zones are areas identified in the Montana and Idaho Airshed Group Operations Guide as smoke sensitive or that have an existing air quality problem. Impact zones near the Nez Perce-Clearwater include Pinehurst in Airshed 11, McCall in Airshed 15, Salmon in Airshed 17, and Missoula in Airshed 3a (not pictured, in western Montana).

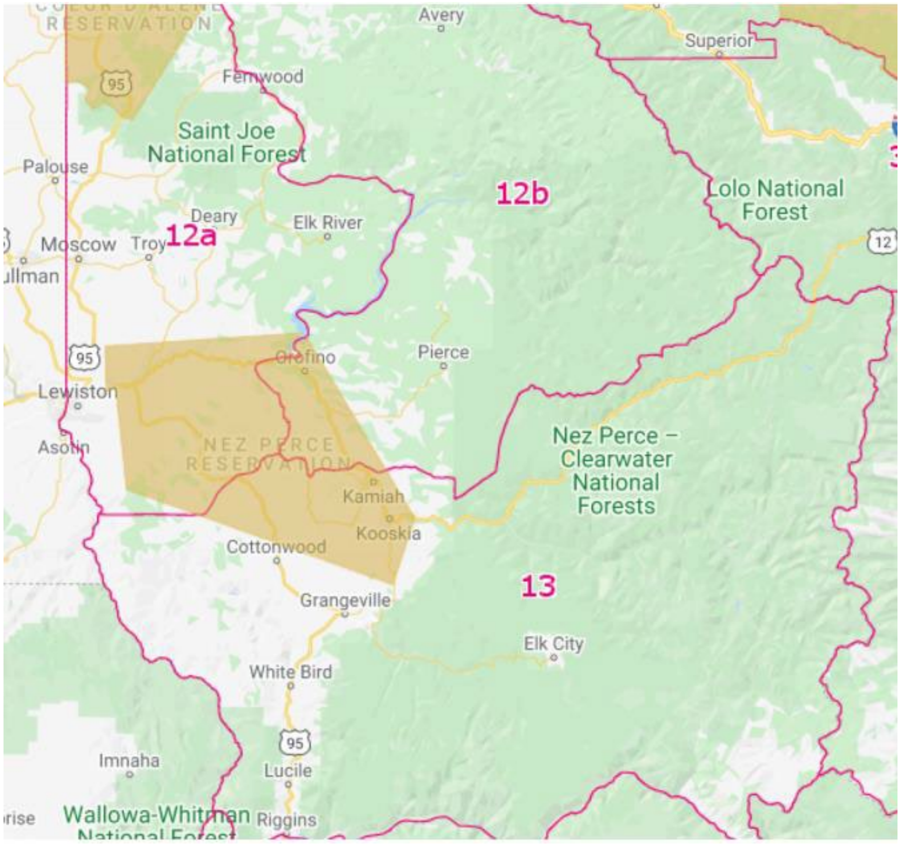


Figure 125. Airsheds (outlined), impact zones (shaded areas) and Nez Perce Reservation boundary.

Data Source: (Montana Department of Environmental Quality 2010)

Temporal Scale

The planning timeframe for this Land Management Plan is 15 years, but the impacts of fire will be analyzed in this report for the short-term (present to 10 years) and the long-term (10 to 30 years). Because of the interplay of effects between prescribed burning and wildfire, it is important to analyze smoke impacts to ambient air and visibility in both the short- and long-term. Prescribed fire activities generally occur under favorable atmospheric conditions for smoke dispersion to limit human health impacts. Wildfires managed to meet Land Management Plan objectives offer long-term benefits by reducing future wildfire emissions. Research indicates that prescribed burning results in an 18 to 25 percent reduction in carbon dioxide from smoke emissions, with examples as high as 60 percent (Wiedinmyer and Hurteau 2010).

Past, Present, and Future Activities used in the Analysis

No additional actions beyond those proposed under each alternative will be included in the effects analysis. Of all potential sources of air pollution from management activities that occur on the Nez Perce-Clearwater, smoke is the most substantial contributor to air quality and visibility.

Methods and Assumptions

This analysis examines the potential air quality impacts from implementation of the proposed forest plan and alternatives. The proposed action is programmatic covering the broad pattern of potential projects and wildfires that can influence air quality. Project-level emissions analysis will take place prior to conducting any smoke-producing management activities.

The assessment of air quality impacts is qualitative in nature. Quantitative values for smoke and other emissions are difficult to predict because they rely on site-specific information, including vegetation and meteorology. The primary approach compares the tradeoffs between potential smoke emissions from the restoration treatments that reduce the potential wildfire emissions and the wildfire emissions that would occur without the restoration. This section focuses on regulated air pollutants.

Assumptions

There are many uncertainties about when or where wildfires occur and what potential other sources of smoke may be and how great the emissions. Several assumptions were made for this analysis to address these uncertainties.

- Wildfire—It is unknown exactly when, where, or how much wildfire will occur, but the trend of increasing large wildfires and associated high smoke emissions is expected to continue (Hurteau et al. 2014). In addition, research indicates that wildfire emissions are widely underestimated (Liu et al. 2017).
- Smoke emissions—The amount of emissions released from combustion of vegetation depends on the type of vegetation, density of vegetation, and the completeness of combustion.
- Smoke management—Smoke management would be practiced actively with all prescribed fires and wildfires managed to meet land management plan objectives. This would include smoke prediction modeling, smoke monitoring, and close coordination with the local air districts.

Measurement Indicators

The key indicators are ambient air quality and visibility, as follows:

- An alternative would be considered to have potentially significant impacts if its implementation would result in a national ambient air quality standard's non-compliance violation, as determined by the Idaho Department of Environmental Quality.
- An alternative would be considered to have potentially significant impacts to visibility if its implementation would result in changes to or degradation of visual quality, views, and the aesthetic landscape.

The units of measure for both indicators are acres of wildfire and acres of prescribed fire per alternative. These indicator measurements were chosen because fire is the greatest producer of smoke that can have effects on ambient air quality and visibility.

Affected Environment

Existing Condition

Air quality on the Nez Perce-Clearwater is generally good, with limited upwind industrial sources and periodic robust wind dispersion. The Nez Perce-Clearwater is subject to long-distance transport emissions from sources to the west in Oregon and Washington. Existing sources of emissions include dust from trails during dry conditions and smoke emissions from wildfires and prescribed burns. Local emission levels are low due to the sparse population and vast areas for dispersion.

Air quality is highly influenced by climate. All of the affected environment lies west of the Continental Divide where the climate can be described as a modified North Pacific Coast type in which winters are milder, precipitation is more evenly distributed throughout the year, summers are generally cooler, and winds are lighter. Prevailing wind patterns are shown for the Nez Perce-Clearwater in Figure 126; hourly observed wind data from the Lowell, Idaho, Three Rivers station (pictured lower left) indicate predominant light northern winds, while hourly observed wind data from the Missoula International Airport station (pictured upper right) in Montana indicate predominant moderate westerly winds.

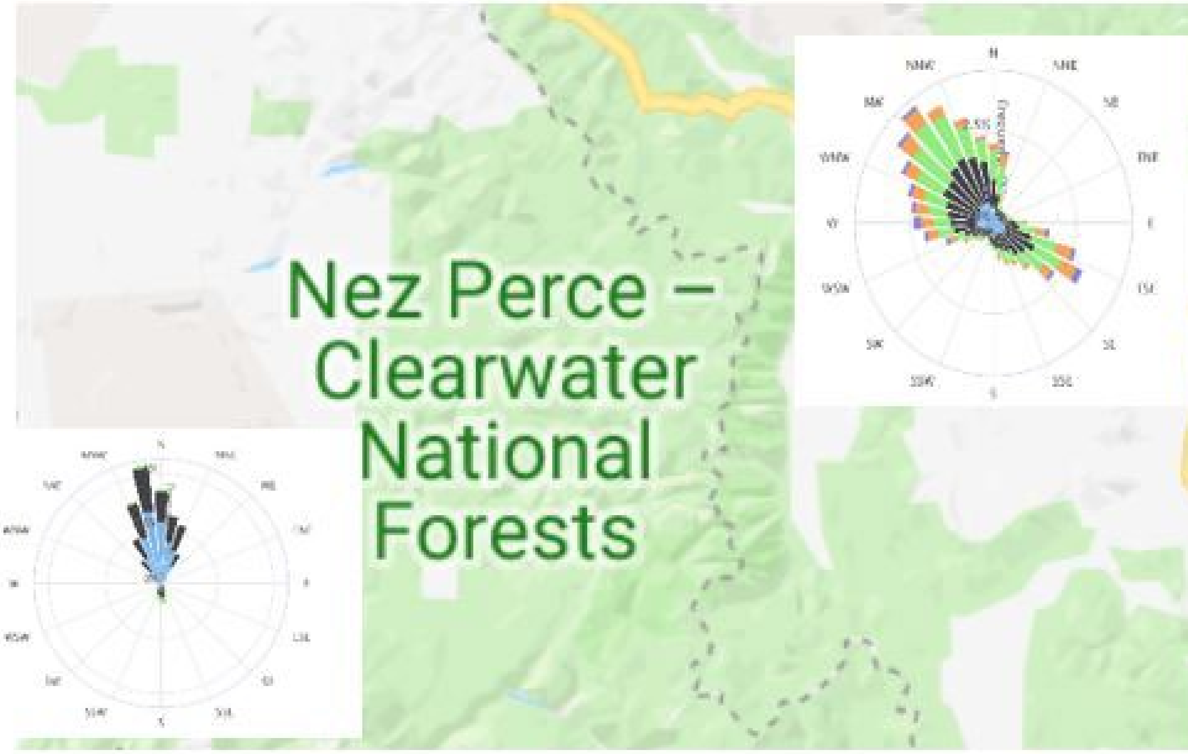


Figure 126. Illustration of predominant wind directions in the Nez Perce-Clearwater National Forests.

Data Source: Midwestern Regional Climate Center Cli-MATE tool

Wind rose information indicates magnitude (miles per hour) and direction (degrees) of wind sources over a 20-year period from January 2000 to January 2019 of hourly monitoring. Wind rose information was obtained for the Lowell, Idaho, Three Rivers station and Missoula International Airport station in Montana from the Midwestern Regional Climate Center Cli-MATE tool.[22]

Ambient Air Quality

The Environmental Protection Agency (EPA) defines six known air pollutants as criteria pollutants for which national ambient air quality standards (NAAQS) are set. Table 297 displays the national ambient air quality standards for the six criteria pollutants defined by the EPA. States are allowed to define their own ambient air quality standards as long as they are at least as strict as the national standards. Idaho's ambient air quality standards are as stringent as the national ambient air quality standards. Because Idaho standards equal national standards, only national standards are shown in Table 297. The most common violation of a national ambient air quality standard from smoke is that of the PM2.5 standard, which refers to atmospheric particulate matter with a diameter less than 2.5 micrometers. Wildfires are considered naturally occurring events; wildfire smoke impacts may not be prevented. State departments of environmental quality are required to have natural emergency action plans that identify procedures to follow when natural events violate air quality standards, such as notifying the public of the health impacts

[22] cli-MATE: MRCC Application Tools Environment (purdue.edu)

of smoke and how to decrease and minimize exposure. Prescribed fires that are ignited by land managers are human-caused and are, therefore, subject to regulation.

Table 297. The Environmental Protection Agency's national ambient air quality standards

Pollutant	Averaging Period	Federal (EPA) standards (2016)[1]	EPA Standard Type
Carbon Monoxide	1 hour	35 ppm	primary
Carbon Monoxide	8 hours	9 ppm	primary
Lead	3 months	1.5 $\mu g/m^3$	NA
Lead	rolling 3 months	0.15 $\mu g/m^3$	primary & secondary
Nitrogen Dioxide	1 hour	100 ppb	primary
Nitrogen Dioxide	1 year	53 ppb	primary & secondary
Ozone	1 hour	NA	primary & secondary
Ozone	8 hours	0.070 ppm (2015 standard)	primary & secondary
Particulate Matter ≤ 10 µm (PM10)	24 hours	150 µg/m	primary & secondary
Particulate Matter ≤ 10 µm (PM10)	1 year	NA	primary & secondary
Particulate Matter ≤ 2.5 µm (PM2.5)	24 hours	35 µg/m	primary & secondary
Particulate Matter ≤ 2.5 µm (PM2.5)	1 year	12.0 µg/m	primary
Particulate Matter ≤ 2.5 µm (PM2.5)	1 year	15.0 µg/m	secondary
Sulfur Dioxide	1 hour	75 ppb	primary
Sulfur Dioxide	3 hours	0.5 ppm	secondary
Sulfur Dioxide	24 hours	0.14 ppm	primary
Sulfur Dioxide	1 year	0.030 ppm	primary
Visibility	1 year	NA	NA

Note. µg/m3 = micrograms per cubic meter, µm = micrometer, NA = not applicable, PM10 = atmospheric particulate matter with a diameter less than 10 micrometers, PM2.5 = atmospheric particulate matter with a diameter less than 2.5 micrometers, ppb = parts per billion, ppm = parts per million, m = meter.

1.For additional information about the federal (EPA) standards, go to https://www.epa.gov/criteria-air-pollutants/naaqs-table.

Data Source: Environmental Protection Agency, National ambient air quality standards, epa.gov/criteria-air-pollutants/naaqs-table, accessed September 2019.

The Clean Air Act requires each state to identify areas that have ambient air quality in violation of the national ambient air quality standards. The status of areas with respect to national ambient air quality standards is categorized as follows:

- Nonattainment – any area that does not meet an ambient air quality standard or that is contributing to ambient air quality in a nearby area that does not meet the standard
- Attainment – meets or is cleaner than the national standard
- Unclassifiable – cannot be classified based on available information

The unclassified designation includes attainment areas that comply with federal standards, as well as areas that lack monitoring data. Unclassified areas are treated as attainment areas for most regulatory purposes. Areas that have been reclassified from nonattainment to attainment are considered maintenance areas. States are required to develop, adopt, and implement a state implementation plan to achieve, maintain, and enforce the national ambient air quality standards in nonattainment areas. The plans are submitted to, and must be approved by, the Environmental Protection Agency (EPA). Deadlines for achieving the national ambient air quality standards vary according to the air pollutant at issue and the severity of existing air quality problems. The State of Idaho is required to notify the public whenever the national ambient air quality standards are exceeded.

The Nez Perce-Clearwater boundary resides within three counties—Clearwater, Idaho, and Shoshone. To understand the current air quality in the Nez Perce-Clearwater, one approach is to examine current emissions estimates. The EPA's National Emissions Inventory (NEI) is a comprehensive and detailed annual estimate of air emissions of air pollutants from many sources, including point, nonpoint, and "event" sources. Table 298 shows estimates of air pollution per county from all potential sources. For more information, see the Environmental Protection Agency's National Emissions Inventory at https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei.

Table 298. Tons per year of criteria air pollutants by county

County	Idaho	Clearwater	Shoshone
Population (2010 census)	16,267	8,695	12,765
Carbon Monoxide	343,314	42,128	32,669
Lead	0	0	0
Nitrogen Oxides	5,818	942	1,270
PM10	40,857	5,529	6,033
PM2.5	28,293	2,905	2,228
Sulfur Dioxide	2,220	213	144
Volatile Organic Compounds[1]	180,861	49,150	41,481
Ammonia[1]	6,805	827	360
Total	**623,550**	**103,288**	**85,287**

[1]Volatile Organic Compounds and Ammonia are not listed Criteria Air Pollutants (CAPs) subject to national ambient air quality standards but are regarded as precursors to Ozone and PM2.5, respectively, and may be regulated similarly to the listed Criteria Air Pollutants.

Data Source: Environmental Protection Agency, National emissions inventory 2014, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei, accessed September, 2019.

All areas in the Nez Perce-Clearwater boundary have been designated as in attainment or maintenance with the national ambient air quality standards. However, West Silver Valley, an area north of the Nez Perce-Clearwater in adjacent Shoshone County, has been in moderate nonattainment of the 2012 PM2.5 standard since January 2015 (Figure 127). This area is monitored by the Idaho Department of Environmental Quality, which is working closely with local partners to reach attainment status and comply with federal air quality standards. The emission sources that are being addressed in the Idaho Statement Implementation Plan are open backyard burning, prescribed or slash fires, and woodstoves.[23]

[23] https://mrcc.purdue.edu/CLIMATE/welcome.js

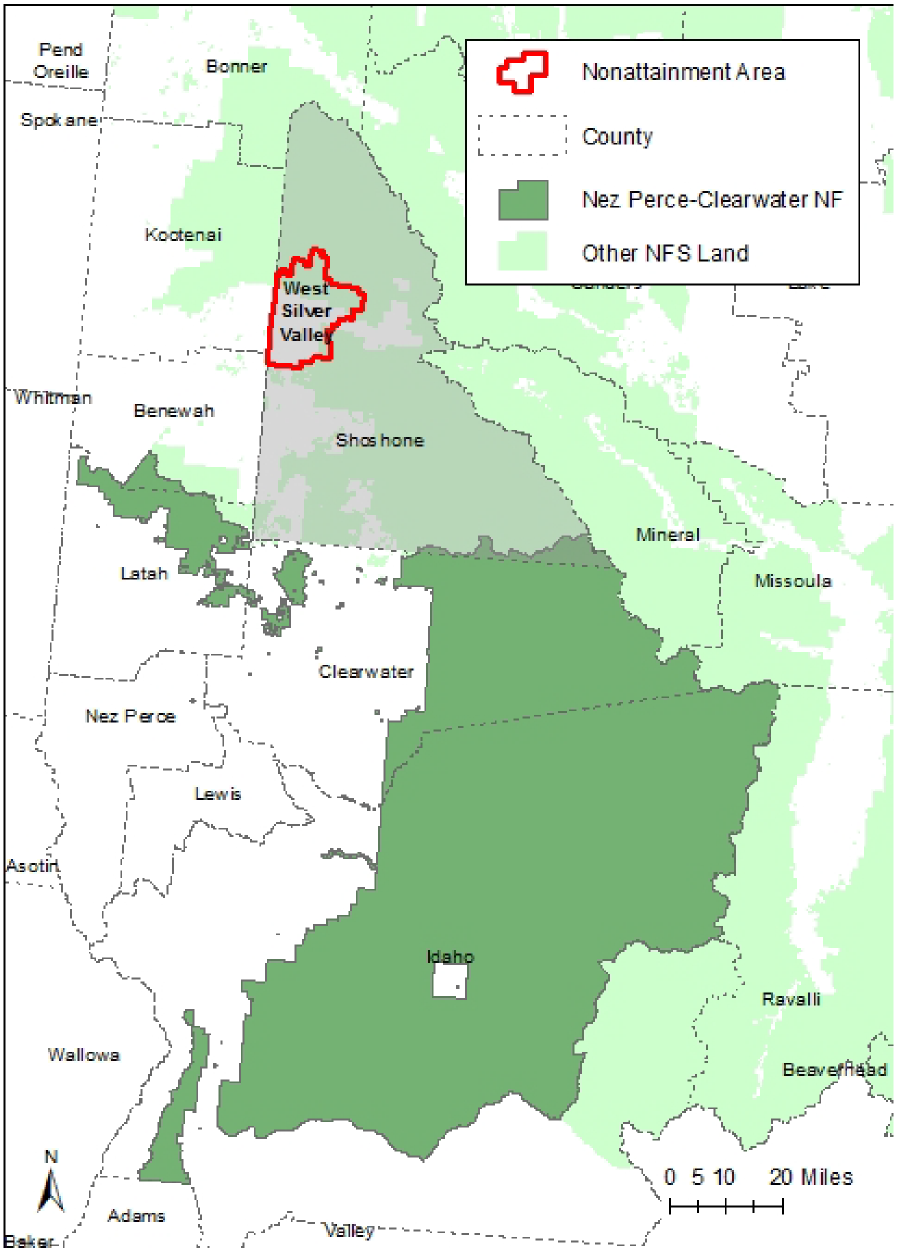


Figure 127. Shoshone County West Silver Valley Nonattainment Area (in red).

Data Source: The Nonattainment Area layer came from Environmental Protection Agency, Nonattainment areas for criteria pollutants (Green Book), https://www.epa.gov/green-book, accessed September, 2019.

The Nez Perce-Clearwater's forest plan is not expected to generate conditions that would significantly affect the West Silver Valley attainment status in the future. Given the proximity, prescribed burning done directly in the forest boundary may have effects on air quality in Shoshone County, but generally northerly winds would be transporting air from Shoshone County to the Nez Perce-Clearwater, not the other way around. Implementing smoke management and coordination, which is present in all forest plan alternatives, will negate smoke effects to the greatest extent possible.

Smoke

In the United States, wildfire smoke is recognized as a significant contributor to exceedances of the national ambient air quality standards established by the Environmental Protection Agency to protect public health and welfare (U.S. Environmental Protection Agency 2016). This is a recent criteria, in part, because the national ambient air quality standards have become more stringent over time based on periodic review, as required by the Clean Air Act, and now allow only small increases in pollutants from background air pollution levels. The duration, areal extant, and concentration of wildfire smoke in the United States has been increasing.

The Environmental Protection Agency's (EPA's) National Emissions Inventory (NEI) details emissions of air pollutants by source category, including point, nonpoint, and "event" sources, as well as finer categories known as "sectors." National Emissions Inventory sector data was aggregated into functional categories to determine the largest sources of criteria air pollutants emissions. Specific methodology for aggregating sector data into functional categories is detailed in Appendix L. Table 299 displays all criteria air pollutants emissions in tons per functional category. A total of 95 percent of emissions in the three Nez Perce-Clearwater counties can be captured by the fire and natural functional groups, with fire releasing over two times the emissions. Table 299 shows how fire is the largest source of criteria air pollutants emissions in the area; thus, smoke is the primary air quality concern. Fire includes emissions from wildfires, prescribed fires, agricultural burning, and pile burning. Natural emissions include biogenic emissions from vegetation and soils.

Table 299. CAP emissions by functional category in Idaho, Clearwater, and Shoshone counties.

Source	Criteria Air Pollutants Emissions (tons)
Fire	550,930
Natural	220,295
All other sources	40,891

Data Source: Environmental Protection Agency, National emissions inventory 2014, https://www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei, accessed September, 2019.

The Forest Service is a member of an organization known as the Montana and Idaho Airshed Group, which coordinates prescribed burns within the State of Idaho. Group members submit prescribed burns to the smoke management unit for daily, site-specific approval. The smoke management unit, located at the Aerial Fire Depot and Regional Office in Missoula, Montana, coordinates efforts to manage smoke during both the wildfire season and prescribed burning season. They are responsible for making sound and timely decisions that consider both the importance of implementing prescribed burns and the minimization of potentially adverse air quality impacts on individual airsheds throughout Montana and Idaho. Adherence to the Montana and Idaho Airshed Group Operating Guide is the current accepted smoke management plan for the State of Idaho. The Montana and Idaho Airshed Group defines impact zones as areas identified as smoke sensitive or as having existing air quality problems (Montana Department of Environmental Quality 2010). The Idaho Department of Environmental Quality expects the Nez Perce-Clearwater to implement basic smoke management practices described in National Wildfire Coordinating Group Smoke Management Guide for Prescribed Fire (PMS 420-2 2018) (National Wildfire Coordinating Group 2001).

The Idaho Department of Environmental Quality does not currently require burners to obtain permits for air quality purposes; however, members of the Montana and Idaho Airshed Group are required by the operations guide to comply with notification and reporting procedures pre- and post-ignition and must seek daily ignition approval from the smoke management unit as described above. The Idaho Department of Environmental Quality is in the process of writing a state Smoke Management Plan through "Negotiated Rulemaking," which will likely include regulatory changes and further oversite of how prescribed fire is managed by the state agency. These changes will likely affect how Nez Perce-Clearwater receives authorization to ignite prescribed fire activities and formalize reporting requirements. A final draft of these regulatory changes has not been issued by the Idaho Department of Environmental Quality as of the publication of this proposed revision; however, a draft of the regulations is available and implementation is expected by 2022.

Air quality is addressed in the individual prescribed fire plan for each prescribed burn. Forest Service Manual 5140 requires a documented burn plan that contains all of the elements outlined in the 2014 Interagency Prescribed Fire Planning and Implementation Procedures Guide (National Wildfire Coordinating Group 2017b). This guide prompts the burn plan author to address all laws and regulations concerning smoke management, as well as the potential for localized nuisance smoke impacts.

In 1998, the Environmental Protection Agency (EPA) released the Interim Air Quality Policy on Wildland and Prescribed Fires (U.S. Environmental Protection Agency 1998). The document was published with the intent of integrating two public policy goals: "(1) to allow fire to function, as nearly as possible, in its natural role in maintaining healthy wildland ecosystems, and (2) to protect public health and welfare by mitigating the impacts of air pollutant emissions on air quality and visibility" (U.S. Environmental Protection Agency 1998). These goals underlie the management approach for fire and vegetation on the Nez Perce-Clearwater as well.

Wildfire smoke can produce three of the six criteria pollutants the EPA has set as maximum standards for protection of human and environmental health. These are carbon monoxide, particulate matter, and volatile organic compounds that can produce ground-level ozone (U.S. Environmental Protection Agency 2016). Smoke is a complex mixture of carbon dioxide, water vapor, carbon monoxide, particulate matter, hydrocarbons, and other organic chemicals. The number of compounds present in smoke number into the thousands (U.S. Environmental Protection Agency 2016). Seventy percent of smoke emissions are made up of small particulate matter, also referred to as PM2.5 or particulate matter smaller than 2.5 micrometers, which has been proven to cause adverse health effects in humans (U.S. Environmental Protection Agency 2016). Because of this, wildfire smoke from naturally ignited fire and prescribed fire poses a potential health threat to the public.

Another smoke emission that poses health risks to humans is carbon monoxide, which can cause short-term health-related problems for firefighters. Carbon monoxide rapidly mixes with surrounding air at short distances from a burn area and it poses little to no risk to the general public. Ground-level ozone, although not a direct product of smoke emissions, is also a concern due to its effects on lung function and plant growth.

The forest plan components are expected to reduce future impacts by distributing some of the locally generated smoke to years that have average to below average fire conditions but still have better dispersion during the wildfire season compared to the prescribed burn season. This will also potentially reduce fuel loading during extreme wildfire seasons, which will also reduce smoke production during those events.

Visibility

As part of the Clean Air Act Amendments of 1977, Congress designated all wilderness areas greater than 5,000 acres and all national parks greater than 6,000 acres as subject to visibility protection requirements. These areas are referred to as "Mandatory Federal Class I Areas." Mandatory Class I Areas within the Nez

Perce-Clearwater are the Selway-Bitterroot Wilderness and Hells Canyon Wilderness. However, the Hells Canyon Wilderness falls within another Forest Service jurisdiction and is not administered by the Nez Perce-Clearwater. The Regional Haze Rule requires states to improve visibility in these Class I areas.

The small size of the PM2.5 makes it highly efficient at scattering light, causing visibility issues and contributing to regional haze. Visibility impairment in the form of regional haze obscures the clarity, color, texture, and form of what can be seen. Emissions from manmade and natural sources can spread across long distances and result in haze, even in remote pristine wilderness areas.

The Regional Haze Rule addresses improving visibility in Class I areas and the Wilderness Act of 1964 mandates that the Forest Service preserve and protect the natural condition of designated wilderness areas, including the intrinsic wilderness values of air quality and visibility, regardless of Class I designation. Regardless of whether smoke violates air quality standards, localized impacts of burning can cause visibility issues. Smoke management practices from the forest industry and state and federal partners, as well as participation in the coordinated efforts of the Montana and Idaho Airshed group, have helped prevent national ambient air quality standards violations and reduced nuisance smoke in the Nez Perce-Clearwater area.

A program known as the Interagency Monitoring of Protected Visual Environments (IMPROVE) was established to monitor visibility in Class I areas and provide information on achieving progress with the Regional Haze Rule. The IMPROVE monitor, located at Sula Peak, monitors pollutant contributions and visibility impairment on the Selway-Bitterroot Wilderness (Figure 128 and Figure 129) indicates no significant trend in visibility on the worst or the best haze values monitored in the Selway-Bitterroot Wilderness. The largest contributor to visibility impairment at the Selway-Bitterroot is organic carbon and is attributed primarily to smoke.

Wildfires will continue to impact visibility in the Class I area. The impacts would be similar under all alternatives. Smoke management opportunities are limited during large wildfires, especially those that are to the upwind of the Nez Perce-Clearwater and affect the Nez Perce-Clearwater's airshed.

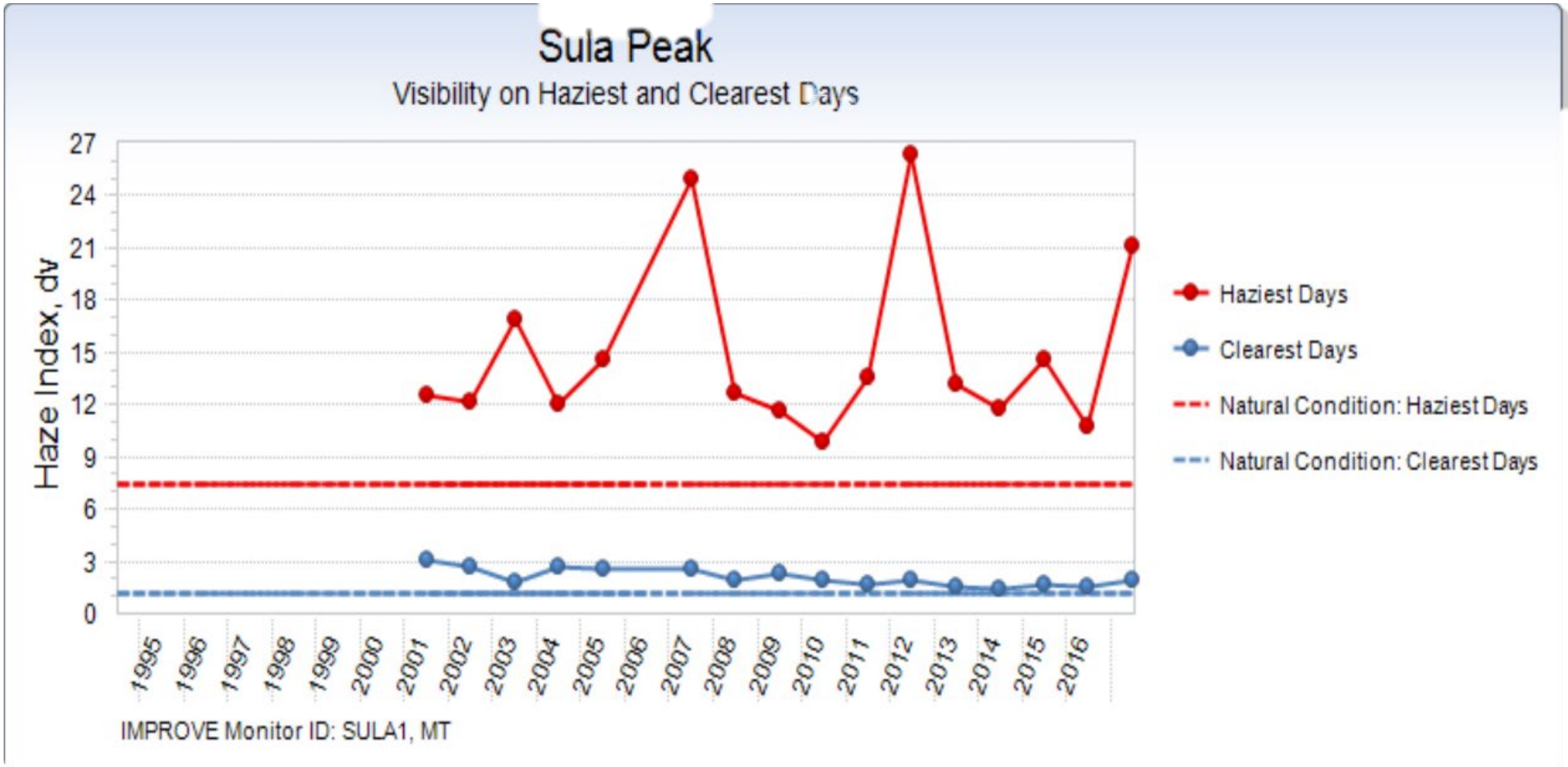


Figure 128. Trends in visibility on haziest and clearest days on Sula Peak (2001-2017)

Data Source: Federal Land Manager Environmental Database, http://views.cira.colostate.edu/fed/SiteBrowser/Default.aspx?appkey=SBCF_VisSum, accessed September, 2019.

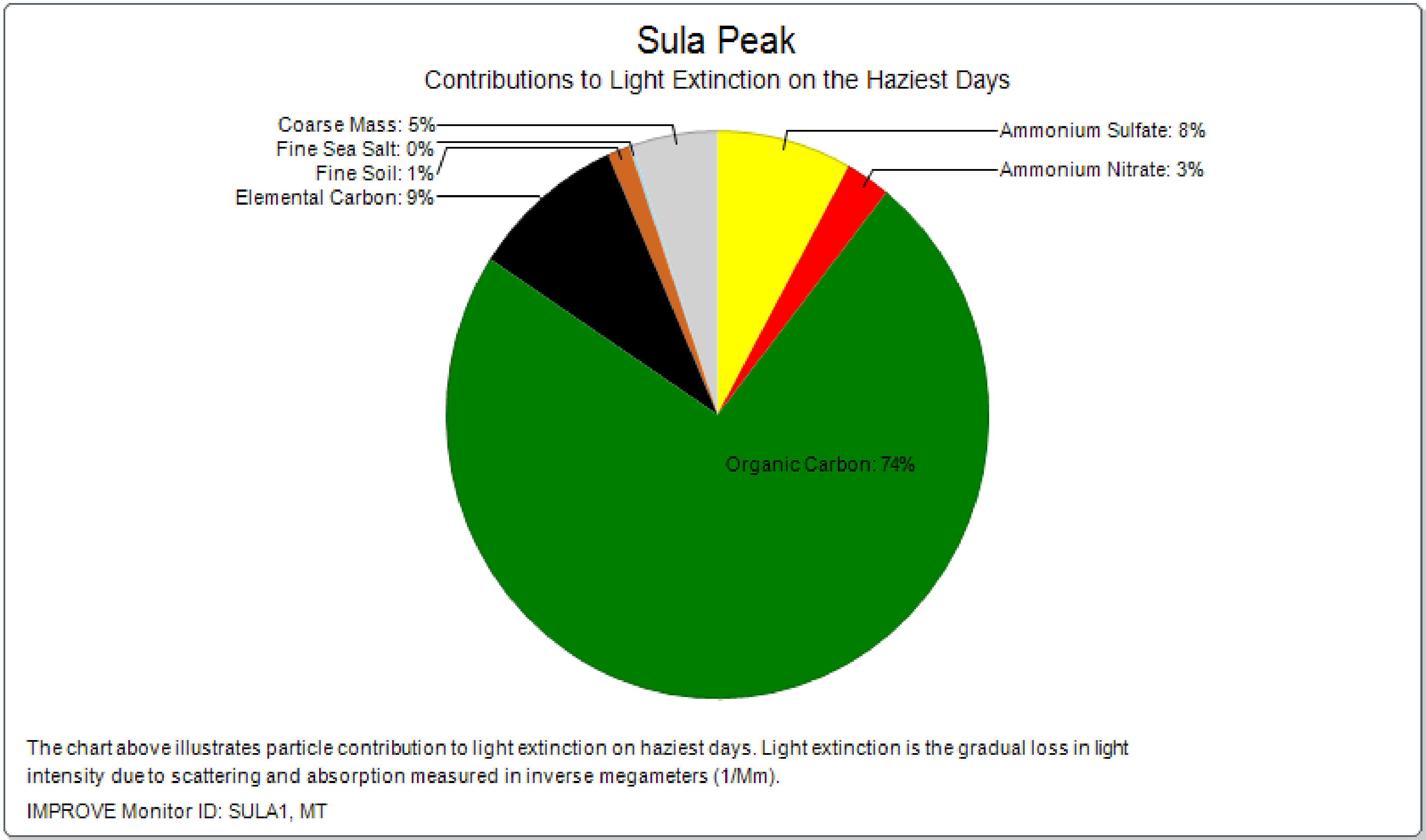


Figure 129. Sula Peak IMPROVE Data for Contributions to Light Extinction on the Haziest Days.

Data Source: Federal Land Manager Environmental Database, http://views.cira.colostate.edu/fed/SiteBrowser/Default.aspx?appkey=SBCF_VisSum, accessed September, 2019.

Environmental Consequences

Table 300 provides the projected average acres per decade of wildfire, and future treatment by alternative.

Table 300. Projected average acres per decade of wildfire and future fuels treatment by alternative

Component and Indicator	No Action Alternative	Alternative W	Alternative X	Alternative Y	Alternative Z	Preferred Alternative
All Wildfire Acres Burned	357,000	358,284	348,245	437,535	438,443	360,258
Future Fuels Treatment Acres	99,050[1]	229,225	239,255	230,075	149,057	227,242
Fire Management Flexibility Acres[2]	349,832	921,519	0	408,452	715,739	320,059

[1]Based on the average annual acres of fuels treatment over the past 10 years under the current plans.

[2]Denotes acres of special management considerations, such as recommended wilderness and suitable wild and scenic river designation.

Effects Common to All Alternatives

Smoke from wildfire is anticipated to be the primary contributor to air quality impacts in the Nez Perce-Clearwater, as it has been historically. The Nez Perce-Clearwater has a limited ability to alter or control the location or extent of this effect due to the unpredictable nature of wildfire and changes in climate. Wildfires have the greatest potential to influence short- and long-term air quality and visibility in the Nez-Perce Clearwater.

The Nez Perce-Clearwater will continue to participate in the Montana and Idaho Airshed Group and will conduct prescribed burning and fuels operations in accordance with operating guidance set forth by the Group. These controls provide the best possible protection of public health and welfare by mitigating the impacts of air pollution while still allowing fire to assume its natural role in maintaining healthy wildland ecosystems.

Effects to No Action Alternative

Current plan direction is to coordinate all Forest Service management activities to meet the requirements of the State Implementation Plan, State Smoke Management Plan (Montana/Idaho Airshed Group Operating Guide), and federal air quality standards.

Under the fire management program, prescribed fire and fuels treatments are conducted within the constraints established by the Montana and Idaho Airshed Group to meet local, state, and federal levels. Continued use of fuels treatments, such as prescribed burning, will affect local air quality and visibility in the short-term. The Nez Perce-Clearwater must meet established air quality standards when conducting fuels treatment activities. In addition, use of prescribed fire and fuels treatments under all of these alternatives will be limited by how much vegetation, when and where burns can occur, and budget constraints. These constraints, as well as adherence to air quality standards, will in turn limit impacts to human health and visibility.

Effects Common to Action Alternatives

Each action alternative reflects a mix of increased fuels treatments by prescribed burning and mechanical treatments. Continued fuels treatment activities will have the potential to affect local air quality in the short-term under each action alternative. Wildfire is expected to have the greatest effect on air quality in the Nez Perce-Clearwater for each alternative.

Effects that Vary by Action Alternative

Each alternative increases the use of fuels treatments and the potential for local, short-term air quality impacts. However, each alternative varies greater in fire management flexibility. Recommended wilderness and suitable wild and scenic river designations will limit the flexibility for fuels treatments. It is likely that natural ignitions will be managed for resource objectives to reduce fuels and move these landscapes toward desired conditions. Alternatives identifying the most acres for recommended wilderness and suitable wild and scenic river designation will have a higher potential for wildfire smoke emissions.

Alternatives W and Z include increased fuels treatments and increased acreage identified as recommended wilderness and suitable wild and scenic river designation. These alternatives will likely have the highest potential for long- and short-term air quality impacts. Alternative X includes increased fuels treatment but does not identify additional recommended wilderness and suitable Wild and Scenic River designation. Alternative X would offer managers the most flexibility in managing fuels treatments. Alternative Y increases the fuels treatments acres and slightly increases wilderness and suitable wild and scenic river designation. The Preferred Alternative increases fuels treatments and slightly decreases wilderness and suitable wild and scenic river designation, marginally increasing fire management flexibility from the current status.

Cumulative Effects

Most impacts to air quality and visibility in the Nez Perce-Clearwater are expected to remain contributable to smoke, primarily from wildfires. Wildfires in upwind areas, including other Western states and Canada, can also contribute to decreased air quality on the Nez Perce-Clearwater. In addition to emissions from wildfire and prescribed burning on the Nez Perce-Clearwater, other sources of emissions could include timber and mining operations, road dust, and transportation and other combustion engine sources. Upwind air pollution sources could also include crop burning, municipal emissions, and emissions attributed to long range transport.

Effects to Resource from Other Resources

As discussed in the affected environment sections, smoke from wildfire and prescribed fire is the largest contributor to air quality and visibility on the Nez Perce-Clearwater.

Summary of Consequences

A summary of consequences of the plan on air quality is included in **Error! Reference source not found.**by alternative.

Table 301. Air quality summary of consequences by alternative

Measurement Indicator	No Action	Alt. W	Alt. X	Alt. Y	Alt. Z	Preferred Alternative
Nez Perce-Clearwater meets all applicable air quality standards	No effect	No effect	No effect	No effect	No effect	No effect

Note: Summary based on fuels treatments, including prescribed burning, not on unplanned ignitions such as wildfire.

Conclusion

The air quality in and around Nez Perce-Clearwater is generally good, with limited influence from industrial, residential, and transportation sources. The primary influence to air quality and visibility in the Nez Perce-Clearwater is smoke from wildfire and prescribed fire activity. Wildfire is expected to remain the primary source of smoke and negative impact to air quality and visibility in and around the Nez Perce-Clearwater.

Prescribed fire and fuels treatments will become an increasingly important tool for managing the Nez Perce-Clearwater and achieving desired ecosystem conditions. The action alternatives vary slightly in the number of acres used for fuels treatments and prescribed burning but do reflect an increase in these activities from the current plan. Continued adherence to the Montana and Idaho Airshed Group management practices and all federal, state, and local regulations is expected to minimize degradation to air quality and visibility from these activities for all alternatives. Increased recommended wilderness and wild and scenic river designated acres could limit fire management flexibility and potentially increase smoke attributed to wildfire. The Preferred Alternative increases acres for fuels treatments and prescribed burning and decreases acres for recommended wilderness and wild and scenic river designation, thus slightly increasing fire management flexibility.

3.2.11 Ecological Sustainability

The mission of the U.S. Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. The 2012 Planning Rule specifies that land management plans must include forestwide plan components to provide for integrated social, economic, and ecological sustainability, while providing for ecosystem services and multiple uses. Ecological sustainability refers to the capability of ecosystems to maintain ecological integrity and meet the needs of the present generation without compromising the ability of future generations to meet their needs. Specifically, the land management plan must include plan components to guide the Nez Perce-Clearwater's contribution to ecological sustainability and be designed to 1) maintain, restore, or promote the ecological integrity of terrestrial, riparian, and aquatic ecosystems; 2) maintain the diversity of plant and animal communities; and 3) support the persistence of native species within the plan area, subject to the extent of Forest Service authority and the inherent capability of the plan area (FSH 1909.12, 23.1).

As described in Section 23.11 of Forest Service Handbook 1909.12, ecosystems in the plan area should have ecological integrity and adaptive capacity and support a diversity of species and habitat types. Ecosystems have integrity when their composition, structure, function, and connectivity are operating normally over multiple spatial and temporal scales. Adaptive capacity is the ability of ecosystems to respond, cope, or adapt to disturbances and stressors, including environmental change, to maintain options for future generations. The diversity of terrestrial, riparian, and aquatic ecosystems and habitats is fundamental to providing ecological conditions that support the abundance, distribution, and long-term persistence of native species and diversity of plant and animal communities.

Various aspects of a resilient ecosystem require both new and updated individual and integrated direction regarding habitat conservation and restoration, species conservation, management of vegetative fuels, management of wildfire and ecological responses to it, management of invasive species, and dealing with the effects of climate change. The land management planning revision process identified a need for specific integrated direction regarding ecosystem restoration and resiliency. In 1987, forest plan components were established to manage ecosystems toward achieving desired conditions that maintain and improve species composition, habitat, and function. Direction reflected the best scientific data and information available at that time. Since then, certain aspects of this direction have been updated by forest plan amendments. However, much of the direction in the 1987 Nez Perce and Clearwater Forest Plans was developed to manage specific elements of specific ecosystems that have evolved markedly over the past 26 years. Today, because of changes in ecosystem conditions and the newly arisen issues that affect them, 1987 Forest Plan direction does not ensure future ecosystem restoration and sustainability. For example, it has no components that address how to manage resources to ensure ecosystem resilience and adaptation to climate change.

This section describes some key ecological elements on the Nez Perce-Clearwater and provides a summary detailing how the Land Management Plan will provide for ecological sustainability (36 CFR 219.8) and support the diversity of plant and animal communities and persistence of native species (36 CFR 219.9). Land Management Plan desired condition, standards, guidelines, and suitability determines are common across all Action Alternatives. Land Management Plan objectives vary between on alternatives, depending on the pace of implementing objectives.

Relevant Laws, Regulations, and Policy

The Nez Perce-Clearwater will follow all laws, regulations, and policies that relate to managing National Forest System land. The Land Management Plan is designed to supplement, not replace, direction from these sources. Other Forest Service direction, including laws, regulations, policies, executive orders, and Forest Service directives via manuals and handbooks are not repeated in the Land Management Plan.

Federal Laws

Multiple-Use Sustained-Yield Act of 1960: Congress has affirmed the application of sustainability to the broad range of resources over which the Forest Service has responsibility. The Multiple-Use Sustained-Yield Act confirms the Forest Service's authority to manage the national forests and grasslands "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes" (16 U.S.C. § 528) and does so without limiting the Forest Service's broad discretion in determining the appropriate resource emphasis or levels of use of the lands of each national forest and grassland.

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by National Forest Management Act (NFMA) of 1976 (16 U.S.C. 1600-1614, 472a): This Act states that the development and administration of the renewable resources of the National Forest System are to be in full accord with the concepts for multiple use and sustained yield of products and services as set forth in the Multiple-Use Sustained-Yield Act of 1960. It sets forth the requirements for land and resource management plans for units of the National Forest System, including requiring guidelines to provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area and within multiple use objectives.

Agency Regulations

36 CFR 219.8: Requires land management plans to provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area.

36 CFR 219.9: Requires land management plans to provide for the diversity of plant and animal communities and the persistence of native species in the plan area, within Forest Service authority and consistent with the inherent capability of the plan area.

Policy

Forest Service Manual 2020 provides policy for reestablishing and retaining ecological resilience of National Forest System lands and resources to achieve sustainable multiple use management and provide a broad range of ecosystem services. Resilient ecosystems have a greater capacity to survive disturbances and large-scale threats, especially under changing and uncertain future environmental conditions, such as those driven by climate change and human uses.

The Forest Service Manual objective is that ecosystems ecologically or functionally are restored so that, over the long term, they are resilient and can be managed for multiple use and provide ecosystem services, including but not limited to carbon storage and sequestration.

Forest Service Manual 2020 policy directs the Forest Service to emphasize ecosystem restoration across the National Forest System and within its multiple use mandate (FSM 2020.3(1)). Additionally, the Forest Service may reestablish, maintain, or modify the composition, structure, function, and connectivity of aquatic and terrestrial ecosystems to sustain their resilience and adaptive capacity (FSM 2020.3(3)).

Ecoregions

An ecological type is a category of land with a distinctive combination of landscape elements, differing from other types in the kind and amount of vegetation it can produce and in its ability to respond to management actions and natural disturbances (Winthers et al. 2005). Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. Ecoregions are identified through the analysis of the spatial patterns and the composition of biotic and abiotic elements, including geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. By recognizing the spatial differences in the capacities and potentials of ecosystems, ecoregions stratify the environment by its probable response to disturbance (Bryce et al. 2017). The use of ecoregions is beneficial when planning and implementing management actions using an all-lands approach, as ecoregions cross ownership boundaries.

There are four levels within the ecoregion hierarchy as delineated by the United States Environmental Protection Agency. The Nez Perce-Clearwater is located within the Northwestern Forested Mountains Level I ecoregion and the Cold Deserts and Western Cordillera Level II ecoregions. There are 10 Level III ecoregions and 71 Level IV ecoregions in Idaho (McGrath et al. 2002). The Nez Perce-Clearwater is comprised of 4 Level III ecoregions and 19 Level IV subregions, as shown in Figure 130.

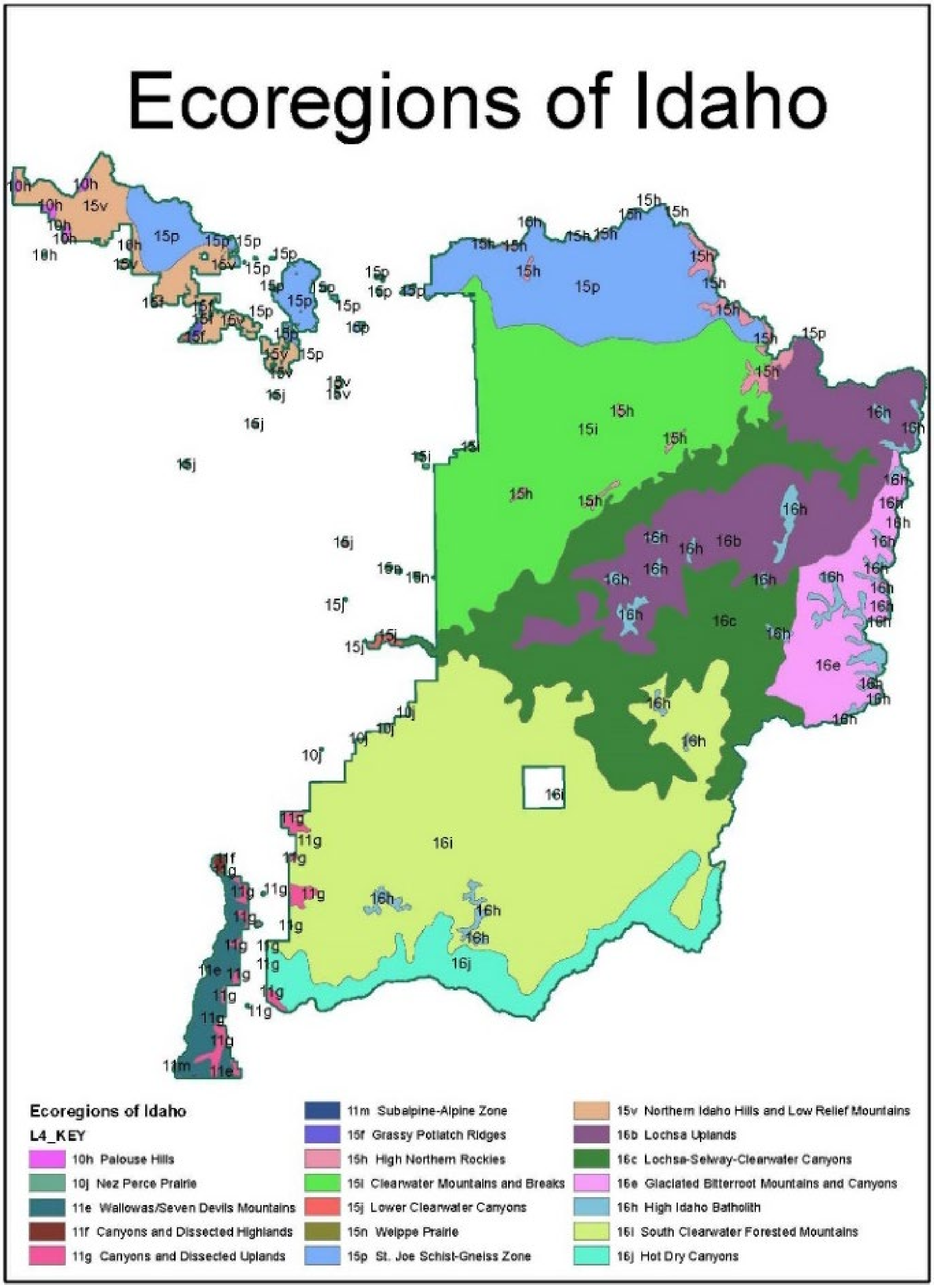


Figure 130. Level III ecoregions and Level IV subregions within the plan area

Source: http://www.ecologicalregions.info/data/id/id_eco_lg.pdf and https://www.nrc.gov/docs/ML1018/ML101800248.pdf.

The Columbia Plateau ecoregion occurs on less than one percent of the Nez Perce-Clearwater, totaling about 91,000 acres. It is an arid grassland and sagebrush steppe that is surrounded by moister, predominantly forested mountainous ecoregions. The Columbia Plateau ecoregion is underlain by thick basalt. It includes Level IV ecoregions 10h Palouse Hills and 10j Nez Perce Prairie.

The Blue Mountains ecoregion occurs on two percent of the Nez Perce-Clearwater. It is mountainous and mostly volcanic in origin. Douglas-fir, subalpine fir, grand fir, Engelmann spruce, western larch, lodgepole pine, and Ponderosa pine occur within this ecoregion. The Blue Mountains ecoregion includes Level IV ecoregions 11e Wallowa/Seven Devils Mountains, 11f Canyons and Dissected Highlands, 11g Canyons and Dissected Uplands, and 11m Subalpine-Alpine Zone.

The Northern Rockies ecoregion occurs on 31 percent of the Nez Perce-Clearwater. It is mountainous and rugged. Climate, trees, and understory species are characteristically maritime influenced. Douglas-fir, subalpine fir, Engelmann spruce, western larch, lodgepole pine, and Ponderosa pine, as well as Pacific indicators such as western redcedar, western hemlock, mountain hemlock, and grand fir, occur within this ecoregion. Western white pine was once common but has been decimated by blister rust, early to mid-twentieth century logging, and fire suppression. Whitebark pine is also undergoing a considerable population decline because of white pine blister rust, mountain pine beetle, and uncharacteristic wildfire resulting from altered fire regimes. Thick volcanic ash deposits occur over much of the ecoregion. The Northern Rockies ecoregion includes Level IV ecoregions 15f Grassy Potlatch Ridges, 15h High Northern Rockies, 15i Clearwater Mountains and Breaks, 15j Lower Clearwater Canyons, 15n Weippe Prairie, 15p St. Joe Schist-Gneiss Zone, and 15v Northern Idaho Hills and Low Relief Mountains.

The Idaho Batholith ecoregion occurs on 66 percent of the Nez Perce-Clearwater. It is mountainous, deeply dissected, partially glaciated, and characteristically underlain by granitic rocks. Soils derived from granitics are droughty and have limited fertility and, therefore, provide only limited amounts of nutrients to aquatic ecosystems. They are highly erodible when vegetation is removed. Maritime influence is slight and lessens toward the south. Grand fir, Douglas-fir, western larch, and, at higher elevations, Engelmann spruce and subalpine fir occur within this ecoregion; Ponderosa pine, shrubs, and grasses grow in deep canyons. The Idaho Batholith ecoregion includes Level IV ecoregions 16b Lochsa Uplands, 16c Lochsa-Selway-Clearwater Canyons, 16e Glaciated Bitterroot Mountains and Canyons, 16h High Idaho Batholith, 16i South Clearwater Forested Mountains, and 16j Hot Dry Canyons.

The Level III and IV ecoregion delineations and descriptions incorporate information from Bailey's ecoregions (Bailey 1995). The Forest Service uses Bailey's ecoregions to evaluate and compare biophysical conditions across large landscapes. The Nez Perce-Clearwater is located almost entirely within the M333 Northern Rocky Mountain Forest Steppe and M332 Middle Rocky Mountain Steppe ecological provinces as delineated by Baily (1995). Nested within the ecological provinces are ecological sections. The Nez Perce-Clearwater is primarily located in the M332A Idaho Batholith and M333D Bitterroot Mountain sections, with small amounts occurring in the M332G Blue Mountains and 331A Palouse Prairie sections (McNab et al. 2007). These sections are further broken down into Land Type Associations (LTA), which are landscape scale biophysical stratifications using landform and geologic material information. The Nez Perce-Clearwater contains 92 land type associations.

System Drivers

Ecological Processes

Ecological processes are the interactions among the physical, chemical, and biological elements of an ecosystem and occur at multiple spatial and temporal scales. These processes are crucial for maintaining healthy ecosystems and supporting the long-term persistence of biodiversity.

Examples of ecological processes include:

- Types, frequencies, severities, patch sizes, extent, and spatial pattern of disturbances, such as fires, grazing, timber harvest, landslides, floods, and insect or disease outbreaks
- Ability of native species to move throughout the plan area and cross into adjacent areas to use habitat that fulfills their life cycle needs
- Successional pathways and stand development of major vegetation types, longevity, and turnover of habitats
- Pollination
- Predation and herbivory at multiple trophic levels
- Hydrologic flow regimes, including time, duration, and magnitude
- Sediment transport, including timing and duration
- Soil development and retention
- Energy flow
- Nutrient cycling and retention

Natural Disturbance Regimes

Natural disturbance regimes are the primary influences on forested and non-forested ecosystems across much of the Nez Perce-Clearwater due primarily to the extent of areas where little active management occurs, such as wilderness and Idaho roadless areas. Fire is a primary natural disturbance process that changes vegetation conditions and is a necessary and critical ecological function across the Nez Perce-Clearwater, playing a central role in providing quality habitat for terrestrial and aquatic species.

Other natural disturbance, including insects, disease, landslides, flooding, drought, and weather events such as windstorms, are continually cycling through the landscape. These natural processes create a patchwork of vegetative openings across the Nez Perce-Clearwater and a variety of ecological conditions. See sections for Forestlands, At-Risk Plant Species, Fire Management, Soils, Water Resources, Aquatic Ecosystems and Fisheries, Wildlife, Abundance and Diversity of Wildlife, and Threatened, Endangered, Candidate, and Proposed Wildlife Species for more information related to natural disturbance processes.

Stressors

Ecosystems that are healthy and have ecological integrity are better able to adapt to changes imposed by stressors. Stressors are natural or human-influenced factors that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological process in a manner that may impair its ecological integrity. Examples of stressors include invasive species impacts, loss of spatial connectivity, disruption of natural disturbance regimes, influence of climate change, and uncharacteristic wildland fire. Climate change has the potential to bring about uncharacteristic natural disturbances and could likely exacerbate natural and human-influenced stressors. Direct human influences, such as roads, infrastructure, pollutants, mineral extraction, and fire exclusion, can disrupt ecological processes and cause further stress to the system. Stressors could intensify as increasing demands and pressures from the public for a variety of multiple uses and ecosystem services that national forest lands provide.

Natural Range of Variation

Natural range of variation is the variation of ecological characteristics and processes over scales of time and space that are appropriate for a given management application. The natural range of variation is a tool for assessing the ecological integrity of an ecosystem and does not necessarily constitute a management target or desired condition. Utilizing the natural range of variation can help identify key structural, functional, compositional, and connectivity characteristics for which plan components may be important for either maintenance or restoration of such ecological conditions. Although the intent is to promote ecosystem integrity in the plan area, it may not be possible or appropriate to strive for returning key characteristics to past conditions throughout the plan area.

Discerning the natural range of variation is fundamental in strategic thinking and planning, even if restoration to historical conditions is not the management goal or possible on parts of the plan area. The natural range of variation is useful for understanding each specific ecosystem, for understanding its existing ecological conditions, and for understanding its likely future character based on projections of climate regimes. The natural range of variation also provides a frame of reference for understanding the dynamic nature of ecosystems and how they change over time and acts as a guide to understanding how to restore a resilient ecosystem with structural and functional properties that will enable it to persist into the future. Understanding the natural range of variation provided context and insights and helped with the development of specific plan components that promote the maintenance or restoration of ecological integrity and diversity of terrestrial, riparian, and aquatic ecosystems and habitat types throughout the plan area. These plan components provide an ecosystem (coarse filter) approach to maintaining the persistence of native species.

Although understanding the natural range of variation is important, the future will not be the same as the past. Therefore, in addition to the natural range of variation, additional factors were considered in the development of desired conditions. These included maintaining conditions that contribute to long-term resilience given uncertainties in future climate and disturbances; sustaining stand structures or species compositions that provide habitat for at-risk wildlife or plant species; conserving rare structures or components; mitigating existing or anticipated human use patterns; considering the effects changing climate may have; and acknowledging the ecosystem services expected from forest lands.

Ecological Conditions on the Nez Perce-Clearwater

Ecological conditions on the Nez Perce-Clearwater vary across the landscape. A variety of information can be used to assess terrestrial and aquatic conditions at differing temporal and spatial scales. Two primary tools the Forest Service uses include the Watershed Condition Framework and the Terrestrial Condition Assessment. These assessments cover all national forests across the United States.

Terrestrial Condition Assessment

The U.S. Forest Service has conducted restoration related activities for decades; however, the need for reestablishing and retaining resilience of National Forest System lands to achieve sustainable management has never been greater (Cleland et al. 2017). Deleterious effects of elevated temperature and reduced precipitation, particularly in the west; uncharacteristically severe or frequent wildfire; fragmentation of habitat due to roads; and the effects of air pollution or invasive species are adversely impacting National Forest System lands (Cleland et al. 2017).

The terrestrial condition assessment framework (Cleland et al. 2017) was used to complete a national level assessment of ecological integrity based on uncharacteristic stressors, conditions, and disturbance agents for National Forest System lands in the United States. The terrestrial condition assessment is a mid-scale evaluation utilizing the land type association tier of the national hierarchical framework of ecological units as analysis units (Cleland et al. 1997). Land type associations represent the landscape-level units in the hierarchy, averaging about 20,000 acres in size.

The terrestrial condition assessment was designed to complement the watershed condition framework, a national effort to evaluate the status of watersheds across all National Forest System lands (U.S. Department of Agriculture 2011d, Potyondy and Geier 2011). The Watershed Condition Framework is discussed in further detail in the Water Resources section.

The terrestrial condition assessment evaluates effects of uncharacteristic stressors and disturbance agents on land-type associations to identify restoration opportunities on National Forest System lands in the United States at both the national and regional scales. The terrestrial condition assessment used the ecosystem management decision support system, a spatial decision support system for landscape analysis and planning. Primary national data sources included observed insect and pathogen-induced mortality; key critical loads for soil and the atmosphere; long-term seasonal departures in temperature and precipitation; road densities; uncharacteristic wildfires; historical fire regime departure; wildfire potential; insect and pathogen risk; and vegetation departure from the natural range of variability.

Results from the analysis displayed that about 74 percent of National Forest System lands across the United States had moderate or better overall ecological integrity; whereas 26 percent are in poor or very poor condition (Cleland et al. 2017). As shown in Figure 131, the Nez Perce-Clearwater falls into the poor or very poor condition for overall terrestrial condition.

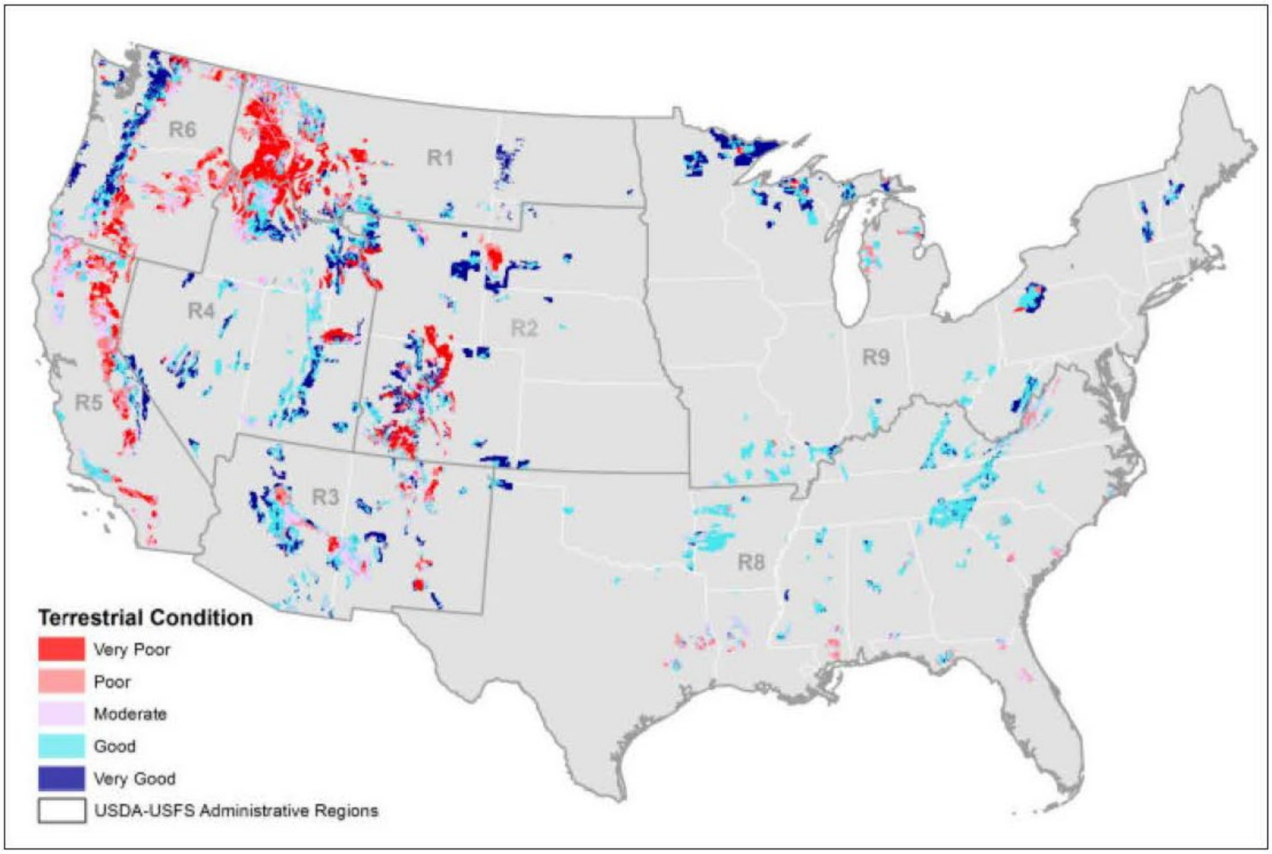


Figure 131. Overall ratings of land type associations from the Terrestrial Condition Assessment on Forest Service administrative lands

Data Source: (Cleland et al. 2017).

The U.S. Forest Service Northern Region has extensive areas with high insect and disease risk, 37 percent of the Region; high and very high wildfire potential, 34 percent of the Region; and high mortality occurring within the past five years, 16 percent of the Region. All western regions are experiencing stress due to elevated temperatures and, to a lesser degree, reduced precipitation. Of greatest concern are increases in winter temperature and decreases in winter precipitation (Cleland et al. 2017). As stated in Cleland and others (2017):

The western United States has been subject to uncharacteristically severe wildfire in past decades largely due to a century of fire suppression, past logging, and climate exposure (Collins et al. 2011). Fire suppression has resulted in increased tree densities and associated moisture demand, and increased fuel loads relative to historical or pre-European settlement forest conditions (Naficy et al. 2010). Increased winter temperatures reduce snowpack and water storage (Margulis et al. 2016) and also reduce cold-induced mortality of damaging insects and diseases (Bentz et al. 2010). Increased temperatures during the growing season reduces fuel moisture, aggravating conditions promoting uncharacteristic wildfire (Abatzoglou and Williams 2016, Westerling 2016) and increases the extent to which trees are stressed and less able to resist adverse effects of insect and disease.

Figure 132 displays the overall terrestrial condition rating of the land type associations from the terrestrial condition assessment for the Nez Perce-Clearwater. Most of the Nez Perce-Clearwater is rated as having poor or very poor terrestrial condition ecological integrity.

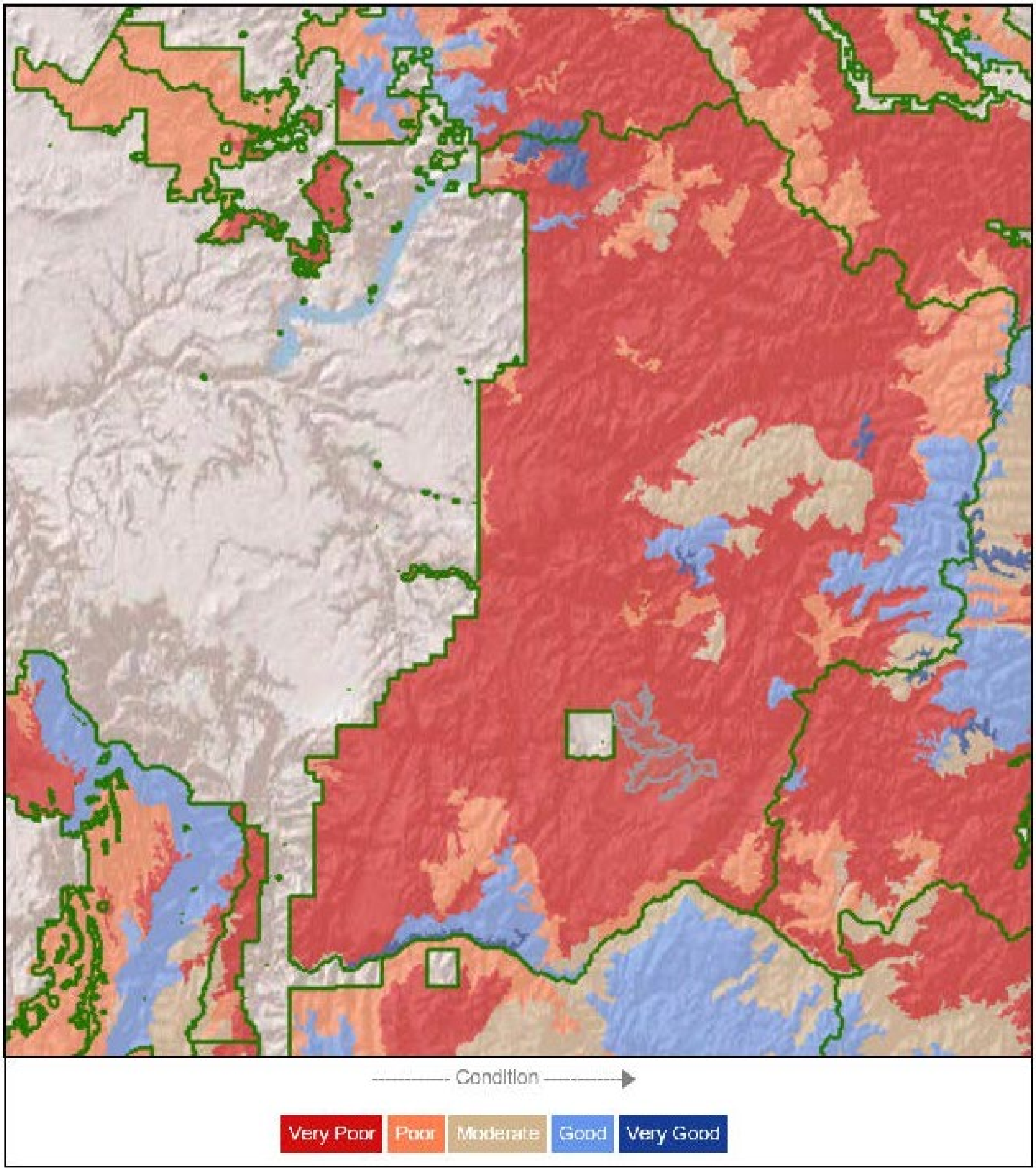


Figure 132. Overall terrestrial condition rating of the land type associations for the Terrestrial Condition Assessment

Data Source: Terrestrial Condition Assessment webmap, accessed 5/20/2019.

The terrestrial condition rating is based on disturbance agents and vegetation condition. Disturbance agents include Biotic and Abiotic agents. Biotic agents include insects and pathogen incidences.

Abiotic agents include road density, climate exposure, air pollution, and uncharacteristic disturbances such as wildfire. Figure 133 displays the disturbance agents' ratings, which show a mix of good, moderate, and poor ratings.

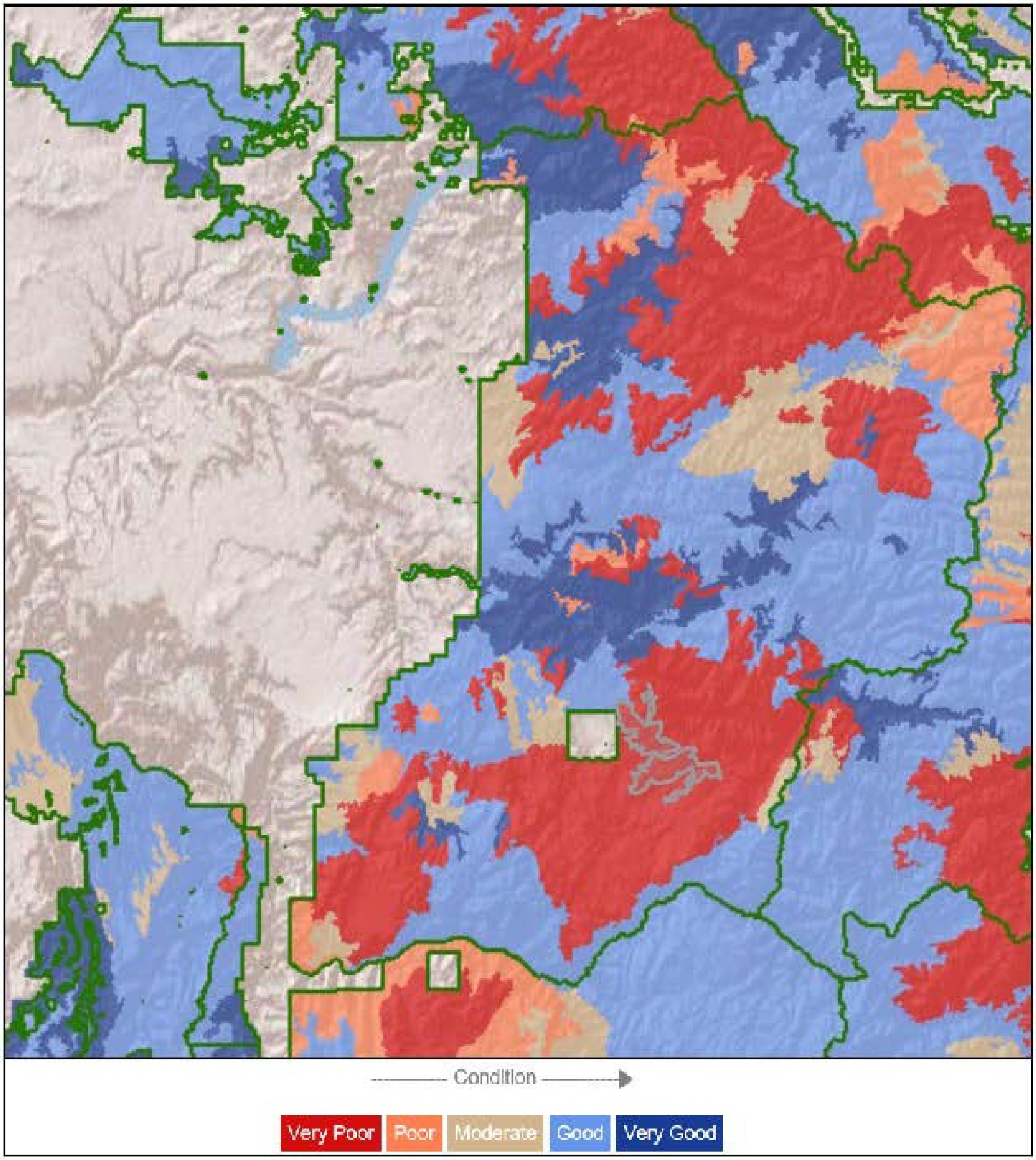


Figure 133. Disturbance agents rating of the land type associations from the Terrestrial Condition Assessment

Data Source: Terrestrial Condition Assessment webmap, accessed 5/20/2019.

The vegetation condition rating consists of wildfire potential, insects and pathogens risk, vegetation departure, and fire regime departure. Figure 134 displays the vegetation condition rating. Most of the

Nez Perce-Clearwater is rated as having poor or very poor vegetation condition. A high wildfire potential occurs across 84 percent of the Nez Perce-Clearwater and insects and pathogens risk occurs across 80 percent of the area.

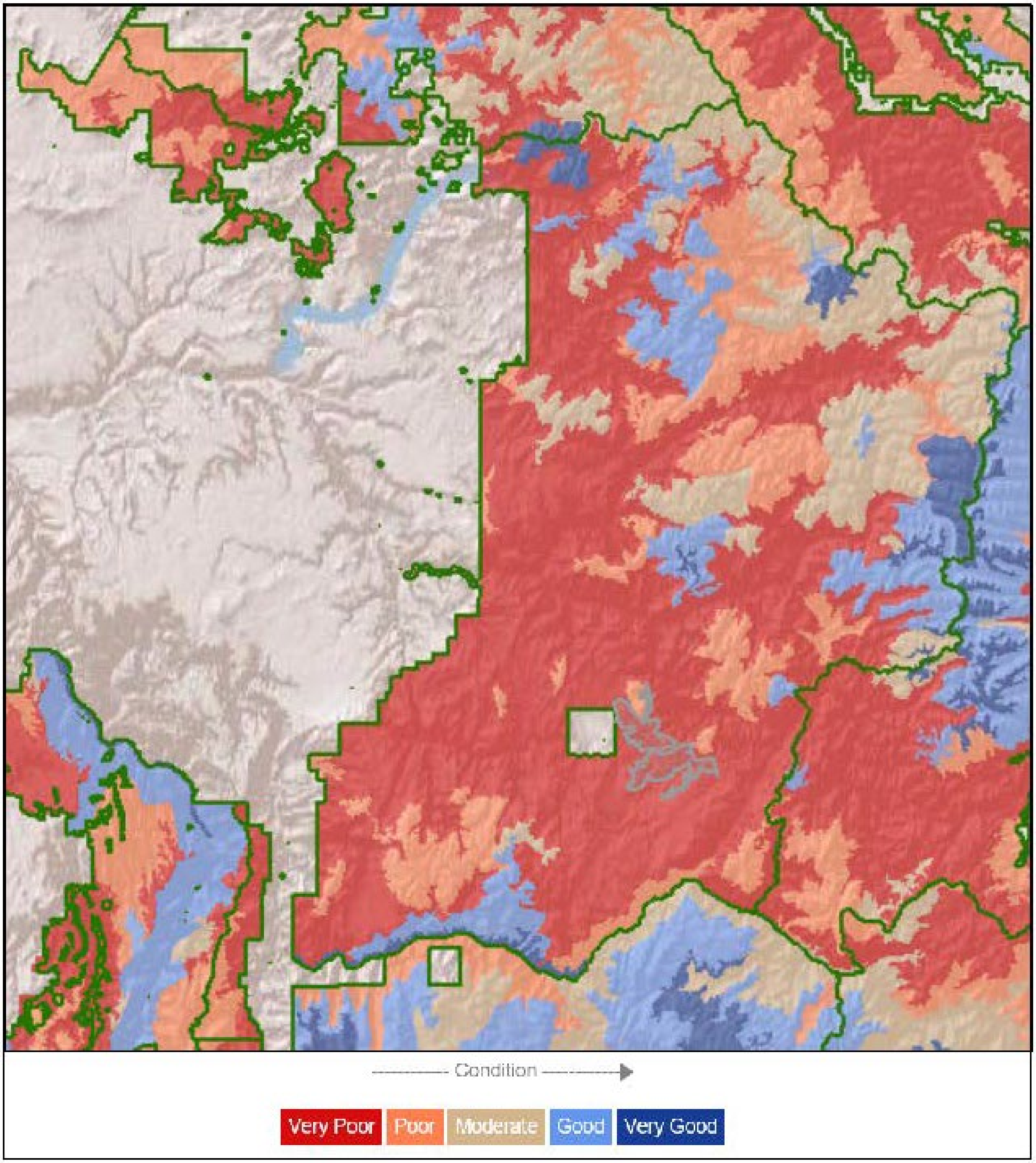


Figure 134. Vegetation condition rating of land type associations from the Terrestrial Condition Assessment

Data Source: Terrestrial Condition Assessment Webmap, accessed 5/20/2019.

Overall, based on the terrestrial condition assessment (Cleland et al. 2017), the Nez Perce-Clearwater has a poor to very poor terrestrial condition rating or low ecological integrity.

The Nez Perce-Clearwater can apply the terrestrial condition assessment as a management tool to assist with identifying and prioritizing project areas for treatment. Utilizing the terrestrial condition assessment in conjunction with the watershed condition framework would facilitate the development of well-integrated projects conducted at the appropriate scale to move towards Land Management Plan desired conditions.

Watershed Condition Framework

The corresponding Watershed Condition Framework (U.S. Department of Agriculture 2011d) is a consistent, nationwide approach to classify watershed condition and to prioritize watershed restoration at the subwatershed (HUC12) scale. Watershed condition classification ultimately categorizes watersheds in one of three discrete classes that reflect the level of watershed health or integrity. The watershed condition analysis completed on the Nez Perce-Clearwater in 2011 resulted in 64 percent of subwatersheds rated as functioning properly, 33 percent rated as functioning at risk, and 3 percent rated as impaired. The Watershed Condition Framework is discussed in further detail in the Water Resources section and Appendix K.

Other Assessments and Data Sources

The Nez Perce-Clearwater National Forest' Wildland Fire Risk Assessment (U.S. Department of Agriculture 2017c) characterizes wildland fire likelihood and intensity, as well as potential effects across the national forests. The assessment provides information to support strategic forest planning and prioritization, support strategic fire management decisions, and categorize potential impacts of wildland fire on highly valued resources. The assessment estimated burn probability, which is the likelihood that a specific geographic location will experience a wildland fire during a specified time (annually). Over 60 percent of the Nez Perce-Clearwater was estimated to have a moderate to high burn probability. The Nature Conservancy (2014) completed a local assessment called Forest Composition and Structure Restoration Needs within the Clearwater Basin, Idaho, to describe the extent of vegetation departure occurring on the Nez Perce-Clearwater. The assessment concluded 35 percent of all forested acres on the Nez Perce-Clearwater and adjacent ownerships, equaling over 1.8 million acres, are currently in need of disturbance to place forest landscapes on a trajectory to their natural range of variability.

The Idaho State Forest Action Plan Resource Assessment (Idaho Department of Lands 2020) was developed by the Idaho Department of Lands in partnership with many other agencies and organizations. Its purpose is to ensure that federal and state resources are focused on landscape areas with the greatest opportunity to address shared priorities and achieve measurable outcomes. The Forest Resource Assessment provides a geospatial analysis of conditions and trends for all forested lands in Idaho. Threats to and benefits from forest resources were identified and form the foundation of the analysis.

The Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b) includes information on the ecological conditions of Nez Perce-Clearwater lands; describes key conservation targets for fish and wildlife species and their habitats; identifies threats to those targets, such as invasive weeds and wildfire; and provides recommended actions to address the threats. The ecological conditions assessment based on a landscape integrity model ranked Nez Perce-Clearwater lands as primarily very good and good. Very good conditions are described as having an absence of, or minimal, human disturbance; zero to some stressors and threats present; on-the-ground condition can be negatively impacted by localized stressors, such as invasive species or site-specific land uses like livestock grazing; and ecosystem processes and functions are typically within natural ranges of variation. Good ecological conditions are defined as having a landscape that deviates from the minimally disturbed class due to existing impacts, common in the wildland-urban interface; some stressors and threats present; often the best attainable condition where human impacts are present; and ecosystem processes and functions are usually within natural range of variation.

As noted in the Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b), portions of the Nez Perce-Clearwater, primarily along the national forest boundary or in areas of mixed ownership, were ranked as having fair ecological conditions. Fair ecological conditions are described as having several to many stressors present; land use roughly split between human-altered and minimally disturbed; ecosystem processes and functions are impaired and somewhat outside the range of variation found in the reference condition but are usually still intact; ecosystem processes are restorable; and sometimes the best remaining condition in watersheds with many human impacts.

There is also a variety of subbasin and watershed assessments completed by the Northwest Power and Conservation Council, Idaho Department of Water Resources, Idaho Department of Environmental Quality, Nez Perce Tribe, county soil and water conservation districts, and the Nez Perce-Clearwater that describe watershed and stream conditions.

There are numerous other sources that provide data on ecological conditions, such as Forest Inventory and Analysis (FIA), PACFISH and INFISH Biological Opinion Effectiveness Monitoring (PIBO), NatureServe, Soil Survey Geographic Database (SSURGO), and Landfire.

Management Strategies to Support Ecological Integrity

The 2012 Planning Rule adopts the definition of ecological integrity advanced by Parrish et al (2003) as the quality or condition of an ecological system when its dominant ecological characteristics, such as elements of species composition and diversity, structure, function, and ecological processes, occur within the natural range of variation and can withstand and recover from most perturbations imposed by natural environmental dynamics or human influence (36 CFR 219.19). The outcomes of improved ecological integrity include enhanced resistance, resilience, and adaptive capacity.

Three management strategies commonly published in the literature that support ecological integrity include promoting resilience to change, creating resistance to change, and enabling forests to respond or adapt to change (Holling 1973, Janowiak et al. 2014, Millar et al. 2007, Keane et al. 2018).

Resilience is defined as the degree to which forests and ecosystems can recover from one or more disturbances, either natural or human influenced, without a major shift in composition or function and is the most commonly suggested adaptation option discussed in the context of climate change (Millar et al. 2007). Resilient forests and grasslands accommodate gradual changes related to climate and can cope with disturbances. Resiliency depends on the extent and severity of the disturbance and the rate at which systems recover from disturbances. However, recovery rates are very difficult to define (MacDonald 2000). In most cases, the effect of a given disturbance will diminish over time.

Resistance is the ability of the forest, grassland, or ecosystem to withstand disturbances without significant loss of structure or function. From a management perspective, resistance includes both the degree to which communities are able to resist change, such as from a warming climate, and the manipulation of the physical environment to counteract and resist physical or biological change, such as through burning or harvest treatments (Keane et al. 2018).

The response or adaptive approach intentionally accommodates change rather than resists it, with the goal of enabling or facilitating forested and non-forested ecosystems to respond adaptively as environmental changes accrue. Treatments would mimic, assist, or enable ongoing natural adaptive processes, anticipating events outside the historical conditions, such as extended fire seasons or summer water deficits. Response tactics may include such practices as shifting desired species to new, potentially more favorable sites through planting; managing early-successional forests to "re-set" normal successional trajectories to create desired future patterns and structures; and promoting connected landscapes (Millar et al. 2007).

Although it is important to understand the concepts and purpose behind these three management strategies, it is more important to understand that they all have the same goal of helping the forest and ecosystem adapt to inevitable future changes related to climate while maintaining ecological integrity and continuing to provide desired ecosystem services. No single approach will fit all situations and the integration of various adaptive approaches and management practices is the best strategy (Millar et al. 2007, Spittlehouse and Stewart 2003).

Most of the natural resource desired conditions included in the Land Management Plan incorporate these management strategies with the aim of maintaining or restoring healthy ecosystems that provide ecosystem services and support ecological sustainability in the short and long term.

Ecological Sustainability, 36 CFR 219.8

The 2012 Planning Rule specifies that land management plans must include forestwide plan components to provide for integrated social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.8). Inherent capability of the plan area is defined as the ecological capacity or ecological potential of an area characterized by the interrelationship of its physical elements, its climatic regime, and natural disturbances (36 CFR 219.19). The following information outlines how the Nez Perce-Clearwater Land Management Plan provides for ecological sustainability.

Sustainability is defined as the capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs (36 CFR 219.19). Ecological sustainability refers to the capability of ecosystems to maintain ecological integrity. The 2012 Planning Rule provides direction for ecological sustainability (36 CFR 219.8) by addressing: 1) ecosystem integrity; 2) air, soil, and water; 3) riparian areas; and 4) best management practices.

Ecosystem Integrity, 36 CFR 219.8(a)(1)

Ecosystems have integrity when their composition, structure, function, and connectivity are operating normally over multiple spatial and temporal scales. However, not every desired condition or acre has to meet the definition of ecosystem or ecological integrity because some specific areas may not have the capability or because another concern, such as public safety, is more important in a specific area.

Ecological integrity is defined as the quality or condition of an ecosystem when its dominant ecological characteristics; for example, composition, structure, function, connectivity, and species composition and diversity occur within the natural range of variation and can withstand and recover from most perturbations caused by natural environmental dynamics or human influence (36 CFR 219.19).

36 CFR 219.8 specifies that a land management plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including plan components to maintain or restore structure, function, composition, and connectivity, while considering the following:

- Interdependence of terrestrial and aquatic ecosystems in the plan area.
- Contributions of the plan area to ecological conditions within the broader landscape influenced by the plan area.
- Conditions in the broader landscape that may influence the sustainability of resources and ecosystems within the plan area.
- System drivers, including dominant ecological processes, disturbance regimes, and stressors such as natural succession, wildland fire, invasive species, and climate change and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change.
- Wildland fire and opportunities to restore fire adapted ecosystems.
- Opportunities for landscape scale restoration.

Each of these items is discussed in further detail to better demonstrate how the Nez Perce-Clearwater Land Management Plan meets the direction for ecosystem integrity outlined in 36 CFR 219.8.

Interdependence of terrestrial and aquatic ecosystems in the plan area, 36 CFR 219.8(a)(1)(i)

Integrated resource management is defined as multiple-use management that recognizes the interdependence of ecological resources and is based on the need for integrated consideration of ecological, social, and economic factors (36 CFR 219.19). In the context of forest planning, the term "integration" means that the plan components work together but does not mean that all uses must be provided for on all lands (FSH 1909.12, Section 22). The Multiple-Use Sustained-Yield Act makes that principle clear by explaining that "multiple use" means management to make "judicious use of the land for some or all" of the renewable resources thereon, with some land "used for less than all of the resources" (16 USC 531).

The plan components in the Land Management Plan were developed in an integrated manner and reflect the interaction and interdependence of terrestrial, aquatic, and riparian ecosystems in the plan area. The integrated plan components work together toward maintaining or achieving ecological integrity, while also considering social and economic factors. The following are examples of integrated plan components included in the Land Management Plan:

FW-DC-FIRE-01. Restore and maintain landscapes: Landscapes across the Nez Perce-Clearwater are resilient to fire-related disturbances in accordance with management objectives. Natural fuel conditions emulate the structure, species mix, spatial pattern, extent, and resiliency of the historic fire regime of the area. Wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner and meet desired conditions for other resources.

FW-DC-WTR-02. Spatial connectivity exists within or between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact habitat refugia. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-associated, and many upland species of plants and animals.

FW-DC-RMZ-01. Riparian Management Zones reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions as compared to reference conditions. The species composition and structural diversity of native plant communities in riparian management zones provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration. Nutrients, large woody debris, and fine particulate organic matter are supplied in amounts and distributions sufficient to sustain physical complexity and stability.

FW-DC-WL-03. The arrangement and distribution of vegetation patches is consistent with the natural range of variation and varies widely in size, shape, and structure to provide connectivity for native wildlife.

MA3-DC-FOR-11. Snags are present across Nez Perce-Clearwater lands, contributing to diversity of structure and habitat. Snags are unevenly distributed and dynamic over time with highest densities occurring in burned areas and those infested by insects. The lowest densities of snags occur along roads and in developed sites or other areas where the concern for human safety is elevated. A range of decay classes is represented.

Contributions of the plan area to ecological conditions within the broader landscape influenced by the plan area, 36 CFR 219.8(a)(1)(ii)

Ecological conditions within the broader landscape and ecological connectivity

The Nez Perce-Clearwater encompasses approximately four million acres. Although the Land Management Plan would directly guide management of the extensive acreage of the Nez Perce-Clearwater, it also has the potential to influence the broader landscape outside the plan area.

The Nez Perce-Clearwater contains some of the largest tracts of roadless and designated wilderness in the lower 48 states. Approximately 28 percent of the Nez Perce-Clearwater is Idaho roadless and 26 percent is designated wilderness. The Nez Perce-Clearwater contains portions of the Selway-Bitterroot Wilderness, Gospel-Hump Wilderness, and Frank Church-River of No Return Wilderness areas.

Five national forests are adjacent to the Nez Perce-Clearwater. The Idaho Panhandle and Lolo National Forests edge the northern section, the Bitterroot National Forest follows the eastern portion, and the Payette and Wallowa-Whitman National Forests border the southern end of the Nez Perce-Clearwater. The west and northwest portions of the national forest are bordered by mixed ownership lands, including private, state, industrial forestry, and other federal land. There are also scattered parcels of mixed ownership contained within the administrative boundary of the Nez Perce-Clearwater, totaling approximately 136,000 acres.

Nez Perce-Clearwater contains many free-flowing rivers that flow from, through, and into adjacent national forests and lands of mixed ownership. Water is a key ecosystem service that is provided by the Nez Perce-Clearwater and is important in the broader landscape and outside the plan area. Water that originates from Nez Perce-Clearwater eventually flows into the larger Snake and Columbia River systems, which support many communities in Idaho, Washington, and Oregon. Additionally, these aquatic ecosystems provide habitat for unique and diverse populations of fish and wildlife, enabling native species to move throughout the plan area, and cross into adjacent areas to use habitat that fulfills their life cycle needs.

The Nez Perce-Clearwater supports a number of at-risk plant, fish, invertebrate, and wildlife species. In some cases, national forest system lands may provide all, or a high percentage, of the habitat for a given species; however, in most instances, wildlife generally move from area to area without regard for boundaries. The extensive acreage of undeveloped lands on the Nez Perce-Clearwater interconnected with neighboring public lands provide important habitat security and connectivity for wide-ranging species, such as anadromous fish, lynx, wolverine, and other carnivores. Connectivity is described as ecological conditions that exist at several spatial and temporal scales that provide landscape linkages that permit the exchange of flow, sediments, and nutrients; the daily and seasonal movements of animals within home ranges; the dispersal and genetic interchange between populations; and the long-distance range shifts of species, such as in response to climate change (36 CFR 219.19).

The Nez Perce-Clearwater is located within several broader recovery areas for at-risk species. The Nez Perce-Clearwater contains major rivers and tributaries that are important for federally listed fish species and species of conservation concern. These rivers are considered key habitats in the Snake River recovery plans for Chinook salmon, steelhead, bull trout, lamprey, and sockeye salmon. The Nez Perce-Clearwater also contains lands within the Bitterroot Grizzly Bear Recovery Zone. Although the Nez Perce-Clearwater does not currently support a grizzly bear population, it does provide suitable bear habitat. Additionally, the Nez Perce-Clearwater occurs within the area guided by the Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f), which covers national forests in Idaho, Montana, Utah, and Wyoming.

The Nez Perce-Clearwater is situated within the Yellowstone to Yukon Conservation Initiative region, which stretches 2,000 miles from the Greater Yellowstone Ecosystem to Canada’s Yukon Territory. This region provides much of the best remaining habitat for North America’s threatened or sensitive species, including grizzly bears, wolves, wolverines, lynx, and native fish populations. The Yellowstone to Yukon Conservation Initiative is a non-profit organization that works with partners across varying land ownerships to protect core habitats and keep those habitats connected. The Nez Perce-Clearwater sits within two priority areas of the region. The Salmon-Selway-Bitterroot Ecosystem priority area includes one of the largest continuous roadless areas in the lower 48 States. The Cabinet-Purcell Mountain Corridor priority area is one of the most important linkages in the entire Yellowstone to Yukon region that allows wildlife to move from one key area to another and includes the headwaters of many important salmon and trout rivers.

The Land Management Plan contains plan components that provide for ecological connectivity at multiple temporal and spatial scales that would provide landscape linkages facilitating the exchange of resources and the movements of species across the broader landscape. The following are examples of plan components related to ecological connectivity:

FW-GL-TE-01. The Nez Perce-Clearwater works with federal, state, tribal, and private land managers towards an all-lands approach to management and cooperation, including efforts to mitigate threats or stressors, provide for wildlife and fish habitat connectivity, and to provide social, economic, and ecological conditions that contribute to mutual objectives.

FW-DC-TE-04. Vegetation reflects natural disturbance regimes. The composition, structure, function, and connectivity of native plant communities are appropriate for a given landscape and climatic setting.

FW-DC-WTR-02. Spatial connectivity exists within or between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact habitat refugia. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-associated, and many upland species of plants and animals.

FW-GL-WL-02. The Nez Perce-Clearwater cooperates with highway managers, state agencies, tribes, and landowners to implement wildlife and aquatic organism crossings that reduce encounters and contribute to public safety.

FW-DC-WL-03. The arrangement and distribution of vegetation patches is consistent with the natural range of variation and varies widely in size, shape, and structure to provide connectivity for native wildlife.

FW-DC-WL-06. The grizzly bear Bitterroot Recovery Zone provides the ecological conditions to support recolonization of grizzly bears. Land Management Plan land use allocations provide connectivity to allow secure passage from occupied habitat to the Bitterroot Recovery Zone.

FW-DC-WL-09. Wide-ranging species are free to move across and between habitats, allowing for dispersal, migration, genetic interaction, and species recruitment.

MA2-GDL-WL-05. To maintain large areas of unfragmented habitat for wide-ranging species, such as elk and grizzly bear, new motorized trails open to the public should not be authorized in Idaho Roadless Areas unless there are adjacent areas of 5,000 acres without open motorized system routes. This guideline does not apply to Community Protection Zones (CPZs) as defined by the Idaho Roadless Rule, areas with existing motorized access that are currently less than 5,000 acres, and existing trails that are relocated or reconstructed to mitigate negative impacts to ecological resources.

MA2-DC-IRA-03. Roadless areas contribute habitats for wide ranging species and connectivity for movement of wildlife. These areas also provide foraging, security, denning, and nesting habitat for wildlife.

MA2-DC-RWILD-03. Recommended wilderness areas facilitate the connectivity and movement of wildlife species across the Nez Perce-Clearwater by remaining large areas with little human activity.

Ecological conditions, habitats, or key ecosystem characteristics in the plan area that are unique, under-represented, or rare across the broader landscape

The Nez Perce-Clearwater possesses a tremendous range and unusual diversity of habitats, from boreal and coastal elements in the north to extensive grasslands and pine forests in the south. The maritime influence of the Pacific Ocean also contributes to a unique coastal disjunct ecosystem with associated species uncommon to the northern Rockies, such as the Coeur d'Alene and Idaho giant salamanders, deer fern, and Pacific dogwood.

The Nez Perce-Clearwater lies at the heart of the Rocky Mountain Refugium, containing high endemism and biodiversity of land snails, salamanders, and plants. This area is essentially comprised of areas spared from glaciation nor paved by volcanic flows, which allowed some species to survive the last glacial maxima until today (Stagliano et al. 2007). Examples of species or groups that persist today include the extensive land snail biodiversity, the Idaho Giant Salamander, the Coeur d'Alene salamander, and coastal disjunct plant communities. This assemblage of endemics represents a distinctive role and contribution to biodiversity.

The Nez Perce-Clearwater contains various significant biophysical features, such as caves, karst, and rock cavities. Biophysical features provide specialized seasonal and year-round habitats for a variety of wildlife species, including bats, cliff-nesting birds, terrestrial snails, invertebrates, reptiles, and amphibians. Karst features create unique microhabitats and are important areas for rapid subsurface drainage and aquifer recharge.

The Nez Perce-Clearwater is located directly in the path of ash dispersal from three major Pacific Rim volcanic eruptions—Glacier Peak, Mount Mazama, and Mount Saint Helens—depositing an ash cap as deep as 36 inches in some depressions. The resulting soil fertility and water-holding capacity supports the Nez Perce-Clearwater's highly productive ecosystems.

In Idaho, low and mid-elevation peatlands have been recognized as important habitats characterized by a unique suite of environmental conditions and hosting more than forty rare plant and animal species (Bursik and Moseley 1995). Peatlands are generally defined as wetlands with waterlogged substrates and at least 30 centimeters of peat accumulation. They develop in sites that are saturated throughout the growing season and where the rate of biomass accumulation exceeds decomposition. The Nez Perce-Clearwater contains a few small peatland ecosystems that contain habitat for plant and wildlife species that are uniquely adapted to the distinctive suite of conditions associated with these habitats. The health and stability of unique habitats, such as peatlands, can often reflect the overall health of the greater ecosystem of which they are a part.

The Land Management Plan includes plan components that support the conservation of ecological conditions, habitats, or key ecosystem characteristics in the plan area that are unique, under-represented, or rare across the broader landscape, specifically:

FW-DC-TE-01. Uncommon habitat elements (mineral licks, talus slopes, fractured wet bedrock, rocky outcrops, scree slopes, waterfalls, and geologic inclusions) support long-term persistence of endemic species with narrow or vary narrow habitat specificity and limited distribution associated with these habitats.

FW-GDL-TE-01. To conserve at-risk plants, terrestrial invertebrate animals, and Coeur d'Alene salamanders that are found only near the uncommon habitat elements described in FW-DC-TE-01, activities should not remove or alter the habitat when terrestrial plant or invertebrate animal communities that have been assigned a NatureServe ranking of G1 globally critically imperiled or G2 globally imperiled are present unless designed specifically to improve conditions for these species.

FW-DC-TE-02. Peatlands, including fens and bogs, have the necessary soil, hydrologic, water chemistry, and vegetative conditions to provide for continued development and resilience to changes in climate and other stressors. Peatlands support unique plant and animal species.

FW-DC-CAVE-02. Cave formations, relief features, and karst landscapes continue to develop or erode under natural conditions.

FW-DC-SOIL-03. Volcanic ash-influenced soils are intact and retain unique properties, including high soil porosity and high water and nutrient holding capacity.

GA-DC-SR-03. Habitat for endemic terrestrial snails is available.

FW-DC-GS-07. Dasynotus and Pacific dogwood persist in transitional shrubland and forested habitats throughout their ranges on the Middle Fork Clearwater River and its major tributaries.

FW-DC-GS-08. Douglas clover and sticky goldenweed persist in seasonally moist meadows over basalt on the Palouse Ranger District, particularly in the headwaters of the Potlatch River.

Pollinators, 36 CFR 219.8(a)(1)(ii)

Pollinators are crucial components of functioning ecosystems. The Nez Perce-Clearwater contains the habitat conditions to support pollinators providing benefits to the broader landscape. Pollinators, such as most bees and some birds, bats, and other insects, play a crucial role in flowering plant reproduction and in the production of most fruits and vegetables. Without the assistance of pollinators, most plants cannot produce fruits and seeds. There is evidence that many species may be in decline due to a variety of factors. The Land Management Plan includes plan components that promote the maintenance or restoration of ecological conditions for pollinators and improve pollinator health.

Broadly, the desired conditions in the Land Management Plan increase habitat quality for invertebrate pollinator species. Plan components provide habitat for pollinator species in the plan area by promoting the maintenance and restoration of native plant species, encouraging a variety of habitats, and conserving large areas without the habitat fragmentation that has become characteristic of agricultural and developed land. Plan components included in the forestwide terrestrial ecosystem, forestlands, and meadows, grasslands, and shrublands sections are particularly important for restoring and maintaining habitats and successional stages that will support general floral diversity and benefit pollinators.

Specifically, the Land Management Plan emphasizes the importance of pollinators by including a desired condition that promotes plant communities that are comprised of a diverse mix of native grass, forb, shrub and tree species which provide forage for pollinator species (FW-DC-TE-03).

Conditions in the broader landscape that may influence the sustainability of resources and ecosystems within the plan area, 36 CFR 219.8(a)(1)(iii)

Existing conditions of the broader landscape outside National Forest System boundaries may influence the Nez Perce-Clearwater's ability to maintain or restore the ecological integrity of ecosystems. Such conditions may include habitat fragmentation, land use patterns, resource management, or urbanization.

External factors also affect the ability of the Nez Perce-Clearwater to facilitate or mimic dominant ecological processes and system drivers of the broader landscape, especially those related to fire-adapted ecosystems. More human development is occurring near the boundary of lands administered by the Nez Perce-Clearwater. This trend is expected to continue in the future and the need for vegetation treatments being implemented within wildland urban interface areas will increase. The ability to use fire to maintain and restore the fire-adapted ecosystems on the Nez Perce-Clearwater or to reduce hazardous fuels in the wildland urban interface is dependent upon air quality regulations. As air quality regulations become stricter, the ability to use fire as a management tool becomes limited. If past trends of increasing regulations and decreasing burn opportunities continue, the effects would likely result in not being able to use fire at the level needed to make meaningful improvements to forest and fuel conditions.

For the Forest Service, external factors can hinder the success in achieving progress outlined in the strategic plan (U.S. Department of the Interior 2015c). These factors include extreme weather, climate fluctuations, and environmental change beyond the natural range of forest and grassland variability, which may alter ecological productivity and resilience, and legal and regulatory constraints and changes that affect management activities, reduce management options, and diminish program resources. As outlined in the strategic plan, potential challenges to Forest Service success include:

- Actions by external groups and individuals that affect forest and grassland management and make it more difficult to achieve our objectives.
- Demographic shifts or changes in stakeholders' perceptions or values that result in unanticipated shifts in expectations from our forests and grasslands.
- Economic fluctuations which change market conditions and human behavior.
- International crises or homeland security issues that transform public needs affecting our program accomplishments.

The relative stability of the Nation's forests and grasslands can obscure the environmental and land use changes that have occurred over time. Impacts from severe wildfires, insects and diseases, invasive species, human influences, climate change, extreme weather, and other visible disturbances have raised public awareness about the environment. These impacts, along with changing human demands, perpetually challenge the Forest Service's ability to ensure that ecosystems are healthy, resilient, and, thus, more adaptable to changing conditions or that they can be restored to a healthy state (U.S. Department of Agriculture 2015d).

Many management issues related to resources, such as fire, vegetation, invasive plants, water, fisheries, and wildlife, require an understanding of conditions both on and off National Forest System lands. The emphasis of an all-lands approach that focuses on working across boundaries with adjacent landowners can increase efficiency, lower costs, and improve cooperation. The following programs are examples of initiatives the Nez Perce-Clearwater currently uses and would continue to use under the Land Management Plan.

State Forest Action Plan

The Idaho State Forest Action Plan (FAP) is a long-term, comprehensive, coordinated strategy for investing state, federal, and leveraged partner resources. It addresses the issues and priority landscape areas identified in the Resource Assessment. The Forest Action Plan contains large-scale strategies to identify opportunities for willing partners to align their plans, leverage resources, and work together within the public land's areas and per the strategies as a way to gain the greatest value from limited resources in areas that contain multiple high-priority issues of statewide importance. The Forest Action Plan is statewide in scope but is not a site-specific plan. It helps provide focus to landowners, agencies, and collaborative groups during partnership efforts to identify projects and activities to reduce threats to and increase the benefits from Idaho's forestlands. Focusing work in the highest priority areas allows leveraging of funds and coordination across ownerships as a highly effective way to address the most critical forest resource issues in Idaho at a scale where significant, positive changes can be realized.

The State Forest Action Plan identified the Craig-Camas Priority Landscape Area, which overlaps with the Nez Perce-Clearwater. Threats identified are risks from insects and disease to forest health and the potential for uncharacteristic wildfire.

Shared Stewardship

Through shared stewardship, the Forest Service, State of Idaho, and other partners have unprecedented opportunities to co-manage fire risk for desired outcomes at the most appropriate scales. Our concept for an outcome-based investment strategy has three core elements:

- Determining management needs on a state level—Prioritize stewardship decisions directly with the states, setting priorities together and combining mutual skills and assets to achieve cross-boundary outcomes desired by all.
- Doing the right work in the right places at the right scale—Utilize new mapping and decision tools to locate treatments where they can do the most good, thereby protecting communities, watersheds, and economies where the risks are greatest.
- Using all available tools for active management—Utilize every authority and tool to do more work on the ground, including timber sales, mechanical treatments, and carefully managed wildland fire, working with partners and stakeholders to choose the right tools.

National Cohesive Wildland Fire Management Strategy

The National Cohesive Wildland Fire Management Strategy (U.S. Department of Agriculture and U.S. Department of the Interior 2014b) is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress towards three goals: resilient landscapes, fire adapted communities, and safe and effective wildfire response.

National Wildfire Crisis Strategy

In January 2022, the Forest Service launched a robust, 10-year strategy to address the wildfire crisis in places where wildfire poses the most immediate threats to communities. The strategy, called "Confronting the Wildfire Crisis: A Strategy for Protecting Communities and Improving Resilience in America's Forests," (U.S. Department of Agriculture 2022c) combines a historic investment of congressional funding with years of scientific research and planning into a national effort that will dramatically increase the scale and pace of forest health treatments over the next decade. Through the strategy, the agency will work with states, Tribes and other partners to address wildfire risks to critical infrastructure, protect communities, and make forests more resilient. The initial Wildfire Crisis Landscape Investments assessment (U.S. Department of Agriculture 2022d) identified high-risk firesheds on the Nez Perce-Clearwater, but the firesheds were not selected as a priority landscape. In early 2023, the USDA Forest Service added 11 additional landscapes. As outlined in Wildfire Crisis Landscape Investments (U.S. Department of Agriculture 2023b), high-risk firesheds on the Nez Perce-Clearwater were selected as a priority landscape. The Nez Perce-Clearwater-Lower Salmon priority landscape is 1.5 million acres in size. Work on this landscape will reduce fuels in and near high-risk firesheds, treat acres identified in the "Idaho Forest Action Plan," and restore watersheds critical to communities and habitat for threatened and endangered fish.

Good Neighbor Authority

The Good Neighbor Authority allows the U.S. Forest Service to enter into agreements with the Nez Perce Tribe, Idaho Department of Lands, and Idaho Department of Fish and Game to do the critical management work to keep forests healthy and productive. The Nez Perce-Clearwater has been very successful working with Idaho Department of Lands to improve the planning process and implementation of forest integrated projects.

Collaboration Across the Broader Landscape

The Nez Perce-Clearwater Land Management Plan proposes to collaborate with other land managers across the broader landscape, emphasizing an all-lands approach, working across boundaries and fostering partnerships as demonstrated by the inclusion of the following proposed goals:

FW-GL-TE-01. The Nez Perce-Clearwater works with federal, state, tribal, and private land managers towards an all-lands approach through management and cooperation, including efforts to mitigate threats or stressors, provide for wildlife and fish habitat connectivity, and to provide social, economic, and ecological conditions that contribute to mutual objectives.

FW-GL-TE-02. The Nez Perce-Clearwater cooperates with state agencies, federal agencies, and tribes to develop actions that lead to progress towards meeting other agencies' objectives for native and desired non-native fish and wildlife species.

FW-GL-FIRE-01. Fire adapted communities: The Nez Perce-Clearwater works with adjacent communities to manage vegetation within and adjacent to the national forests to withstand a wildfire without loss of life and property.

FW-GL-FIRE-02. Wildfire response: The Nez Perce-Clearwater and local, state, tribal, and other federal agencies support one another with wildfire response, including engagement in collaborative planning and the decision-making processes that consider all lands and recognize the interdependence and statutory responsibilities among jurisdictions. All jurisdictions that are impacted by wildfire participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

FW-GL-FIRE-03. The Nez Perce-Clearwater works with adjacent communities, landowners, permittees, and state, local, and other federal agencies to promote a collective understanding about wildfire risk and that wildland fire is an ecological process.

FW-GL-FIRE-04. Fire hazards in wildland urban interface areas are continually monitored. Project development, planning, and treatments are coordinated with local and tribal governments, agencies, and landowners to reduce the risk from wildland fire.

FW-GL-INV-01. The Nez Perce-Clearwater actively participates in Cooperative Weed Management Areas, which are used to determine weed treatment priorities, projects, budgets, and annual programs. Public awareness is promoted using various forms of outreach through the Cooperative Weed Management Areas.

FW-GL-INV-02. The Nez Perce-Clearwater works with federal, state, and county agencies, tribes, non-government organizations, permittees, and adjacent landowners to support integrated pest management, including invasive species prevention, early detection, and rapid response, control and containment, restoration and rehabilitation, and inventory and monitoring activities.

FW-GL-WTR-01. The Nez Perce-Clearwater works with appropriate agencies to control the expansion of aquatic invasive species.

FW-GL-WTR-02. The Nez Perce-Clearwater builds and maintains partnerships to fund and implement projects that result in improved water quality and watershed and stream conditions.

FW-GL-WTR-03. The Nez Perce-Clearwater works with partners to improve aquatic habitat, increase resiliency, and enhance by improving habitat for beaver where appropriate.

FW-GL-CWN-01. The Nez Perce-Clearwater works with the Nez Perce Tribe, State of Idaho, National Marine Fisheries Service, U. S. Fish and Wildlife Service, and other governmental organizations to plan and implement projects that contribute to recovery goals for aquatic species listed under the Endangered Species Act and their designated critical habitat, such that protective measures under the Act are no longer necessary.

FW-GL-CWN-02. The Nez Perce-Clearwater partners with federal agencies, including Section 7 consultation, as required; state agencies; tribes; counties; interested groups; and interested private landowners to recover threatened and endangered species.

FW-GL-WL-01. The Nez Perce-Clearwater cooperates and collaborates with the U. S. Fish and Wildlife Service, other federal agencies, state agencies, and tribes on conservation strategies, recovery plans, habitat management, and ecological conditions on National Forest System lands.

FW-GL-WLMU-01. The national forest cooperates with the Idaho Department of Fish and Game to provide habitat conditions that contribute to wildlife populations at levels meeting Idaho Department of Fish and Game species management plan objectives.

FW-GL-AIR-02. The Nez Perce-Clearwater works with federal, state, and tribal partners to meet applicable air quality requirements.

FW-GL-TT-02. Proposed practices and management activities recognize the role the Nez Perce have had on the ecology of the area and integrate traditional ecological knowledge into future projects.

FW-GL-TT-07. Consultation with the Nez Perce Tribe, traditional cultural practitioners, consulting parties, adjacent landowners, and project designers aid the FS in protecting and enhancing traditional cultural properties, cultural landscapes, sacred sites, and other culturally significant areas that provide tangible links to historically rooted beliefs, customs, and practices.

System drivers, including dominant ecological processes, disturbance regimes, and stressors, and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change, 36 CFR 219.8(a)(1)(iv)

Resilient ecosystems have a greater capacity to survive disturbances and large-scale threats, especially under changing and uncertain future environmental conditions, such as those driven by climate change and human uses. Ecosystems that are healthy and have ecological integrity are better able to adapt to changes imposed by stressors while retaining their composition, structure, and function. Many of the desired conditions in the terrestrial ecosystems, aquatic ecosystems, and wildlife sections of the Land Management Plan incorporated these concepts, emphasizing the role that dominant ecological processes, including disturbance, have on the landscape. These and other plan components facilitate ecosystem adaptation to the effects of stressors, as well as limiting the ability of natural and human-influenced stressors to impact ecosystem integrity. Numerous standards and guidelines in the Land Management Plan were developed to mitigate stressors associated with forest and grassland management. These plan components provide guidance on how to avoid, minimize, rectify, reduce, or compensate the adverse environmental impacts associated with an action.

The Land Management Plan takes into account the effects of a changing climate (36 CFR 219.8(a)(1)(iv)). During the development process of the Land Management Plan, the Nez Perce-Clearwater participated in a collaborative process through the Northern Rockies Adaptation Partnership. Resulting information was used to develop plan components that would facilitate adaptation to the effects of climate change. The Northern Rockies Adaptation Partnership is a science-management partnership consisting of 15 national forests in the Northern Region of the U.S. Department of Agriculture Forest Service; 3 national parks; the U.S. Forest Service Pacific Northwest and Rocky Mountain Research Stations; the University of Washington; and numerous other organizations and stakeholders. These organizations worked together over a period of two years to identify climate change issues relevant to resource management in the Northern Rocky

Mountains to find solutions that can minimize negative effects of climate change and facilitate transition of diverse ecosystems to a warmer climate. The Northern Rockies Adaptation Partnership provided education, conducted a climate change vulnerability assessment, and developed adaptation options for national forests and national parks that manage more than 28 million acres in northern Idaho, Montana, northwestern Wyoming, North Dakota, and northern South Dakota.

The Northern Rockies Adaptation Partnership publication—*Climate Change Vulnerability and Adaptation in the Northern Rocky Mountains, Part 1 and 2*—is the main source of information for identifying resource vulnerabilities and providing possible strategies and approaches to address vulnerabilities specific to the northern Rockies (Halofsky, Peterson, et al. 2018a, b). Appendix G provides further information on climate change adaptation strategies and identifies plan components that support them.

The Land Management Plan also incorporated other best available scientific information related to climate change and the management strategies of promoting resilience to change, creating resistance to change, and enabling forests to respond to change during plan component development.

Adaptive capacity is the ability of ecosystems to respond, cope, or adapt to disturbances and stressors, including environmental change, to maintain options for future generations (FSH 1909.12). The Land Management Plan provides direction to restore, establish, and maintain functioning ecosystems that would have greater ability to withstand stressors and recover from disturbances, especially with changing and uncertain environmental conditions and extreme weather events. By including plan components that focus on maintaining and restoring healthy ecosystems, promoting resilience, and incorporating climate change adaptation strategies, the Land Management Plan provides the mechanisms to improve the Nez Perce-Clearwater's adaptive capacity.

Although not specifically mentioned, most of the physical and biological ecosystem desired conditions in the Land Management Plan were developed to facilitate natural ecological processes and create healthy ecosystems. The following are examples of plan components that speak to climate change and promote resilience and adaption to environmental change:

FW-DC-CARB-01. Carbon storage and sequestration potential are sustained through maintenance or enhancement of ecosystem biodiversity and function, and forests are resilient to natural disturbance processes and changing climates.

FW-DC-TE-02. Peatlands, including fens and bogs, have the necessary soil, hydrologic, water chemistry, and vegetative conditions to provide for continued development and resilience to changes in climate and other stressors. Peatlands support unique plant and animal species.

Forestlands Desired Conditions. The forestlands desired conditions were developed to promote and increase the resiliency of forest landscapes, approximate natural succession and disturbance processes, and incorporate adaptation to changing climates.

FW-DC-FIRE-01. Restore and maintain landscapes: Landscapes across the Nez Perce-Clearwater are resilient to fire-related disturbances in accordance with management objectives. Natural fuel conditions emulate the structure, species mix, spatial pattern, extent, and resiliency of the historic fire regime of the area. Wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner and meet desired conditions for other resources.

FW-DC-SOIL-01. Soil productivity and function contributes to the long-term resilience of ecosystems.

FW-DC-INV-01. Invasive species either are not present or occur at low levels to allow watersheds, vegetation communities, and aquatic ecosystems to retain their inherent resilience and resistance to respond and adjust to disturbances. Plant communities retain their historic diversity and provision of values to fauna.

FW-DC-WTR-01. National Forest System lands provide the distribution, diversity, and complexity of watershed and landscape-scale features including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.

FW-DC-WL-02. Ecological conditions on the Nez Perce-Clearwater contribute sustainable habitat to maintain species of conservation concern. Habitat is resilient and adaptable to stressors and likely future environments.

GA-DC-SR-02. Habitat for Ponderosa pine associated species, including legacy trees and snags, are within desired conditions within Ponderosa pine systems (See FW-DC-FOR-02, FW-DC-FOR-03, FW-DC-FOR-04, and FW-DC-FOR-05). Understory characteristics do not facilitate stand replacing fires and are composed of native plants that provide insect populations as forage for Ponderosa pine associated species. These habitats are resilient to changes due to climate change.

Wildland fire and opportunities to restore fire adapted ecosystems, 36 CFR 219.8(a)(1)(v)

One of the U.S. Forest Service's 2015-2020 Strategic Plan goals is to foster resilient, adaptive ecosystems to mitigate climate change to sustain the Nation's forests and grasslands (U.S. Department of Agriculture 2015d). Mitigating wildfire risk is one of the strategic objectives identified to meet this goal, as well as restoring ecosystems that are naturally adapted to wildland fire. The intent is that the Nation's forests, grasslands, and adjacent communities and property are resilient to the impacts from wildfire.

Wildland fire refers to both wildfire (unplanned ignitions) and prescribed fire (planned ignitions). Wildland fire plays a natural and beneficial role in many forest types. Fire can also be a tool to help meet desirable outcomes for healthy forest and grassland ecosystems and to help restore, maintain, and protect healthy forests and grasslands. Wildfires, however, can also threaten public safety, property, and natural resources, especially in areas where developed lands intermix with rural forests, known as the wildland-urban interface. See the Fire Management section of the Final Environmental Impact Statement and Appendix 4 of the Land Management Plan for more information regarding fire and fuels management.

Fire is a necessary and critical ecological function across the Nez Perce-Clearwater. The Land Management Plan includes plan components related to wildland fire, fuels management, and restoration of fire-adapted ecosystems (36 CFR 219.8(a)(1)(v)). The integrated fire management plan components were developed using information such as the National Cohesive Wildland Fire Management Strategy, community assessment and mitigation plans, fire's historic role in the plan area, local community wildfire protection plans, local risk assessments, trends in fire behavior, and location of wildland-urban interface (WUI) areas.

In addition to the four fire management goals that emphasize working across boundaries and fostering partnerships (FW-GL-FIRE-01 to FW-GL-FIRE-04, listed above), four desired conditions were developed to emphasize fire's role in the ecosystem and the importance of utilizing fire to achieve ecosystem sustainability, while also providing for public and firefighter safety.

FW-DC-FIRE-01. Restore and maintain landscapes: Landscapes across the Nez Perce-Clearwater are resilient to fire-related disturbances in accordance with management objectives. Natural fuel conditions emulate the structure, species mix, spatial pattern, extent, and resiliency of the historic fire regime of the area. Wildland fires burn with a range of intensity, severity, and frequency that allows ecosystems to function in a healthy and sustainable manner and meet desired conditions for other resources.

FW-DC-FIRE-02. The full range of fire management activities, including both prescribed fire and natural wildfire, are recognized and used by Nez Perce-Clearwater administrators as an integral part of achieving ecosystem sustainability, including interrelated ecological, economic, and social components, such as improved ecosystem resilience and wildlife habitat, protection of property, other values at risk, and public safety.

FW-DC-FIRE-03. Fuels conditions adjacent to private property, administrative sites, and infrastructure promote lessened fire behavior that facilitates safe, effective fire management opportunities. Wildfire occurs at smaller scales and lesser severities in areas where resource objectives and infrastructure limit the desirability of a wildland fire event.

FW-DC-FIRE-04. The role of wildland fire is recognized as an important component of fire adapted ecosystems of the Nez Perce-Clearwater and is increasingly accepted and understood by the public, partners, and within the agency.

To maintain or move toward desired conditions, the Land Management Plan includes three objectives to use wildland fire and other vegetation treatments to improve or maintain desired forest vegetation conditions, based on the natural range of variation and historical disturbance regimes (FW-OBJ-FIRE-01); mitigate hazardous fuels (FW-OBJ-FIRE-02); and allow fire to play its natural role, where appropriate and desirable, to reduce the risk of uncharacteristic and undesirable wildland fires by managing natural, unplanned ignitions to meet desired conditions and objectives as defined in the Land Management Plan on a set number of acres per decade over the life of the plan. (FW-OBJ-FIRE-03).

Additionally, the Land Management Plan specifies that planned ignitions in areas highly susceptible to weed invasion should be planned and implemented with design features to address the spread of invasive species (FW-GDL-FIRE-02) and to restore fire as an ecological process, wildfire management strategy and tactics should utilize the opportunity to integrate wildland fire into other disturbances on the landscape (FW-GDL-FIRE-01). Opportunities for landscape scale restoration, 36 CFR 219.8(a)(1)(vi)

As noted above, the Nez Perce-Clearwater encompasses approximately four million acres and is adjacent to five other national forests. There are countless opportunities for landscape scale restoration given the size of the land base. The Nez Perce-Clearwater is also bordered by mixed ownership lands, including private, state, industrial forestry, and other federal lands. Conducting landscape scale restoration adjacent to or across mixed ownership lands requires coordination between entities, as well as an understanding of key ecosystem process and disturbance regimes.

The landscape is characterized as a defined area irrespective of ownership or other artificial boundaries, such as a spatial mosaic of terrestrial and aquatic ecosystems, landforms, and plant communities, repeated in similar form throughout such a defined area (36 CFR 219.19).

Landscape patterns that reflect natural disturbance regimes promote long-term ecological integrity and ecosystem diversity. Landscape pattern is defined as the arrangement, connectivity, composition, size, and relative abundance of ecosystem patches that occur within an area of land at a given time. Patches can be characterized by vegetation type, seral stage, habitat type, or other relevant features.

Land management in the Inland Pacific United States is facing extraordinary challenges, including increased risk of wildfires, declining plant and animal populations, increased demands for ecosystem services by a growing human population, and great uncertainty regarding the effects of future climate change. Management practices focused on stand level characteristics have created and continue to create landscapes that are less resilient to disturbance and are, in most cases, altering the physical processes by which these landscapes were developed (Northwest Fire Science Consortium 2016). To help guide landscape planning efforts, researchers have created a framework of seven core principles and their implications for management of fire-prone interior forest landscapes. As outlined in *Restoring Fire-Prone Inland Pacific Landscapes: Seven Core Principles* (Hessburg et al. 2015), the seven core principles are:

- **Broad regional landscapes are really landscapes nested within landscapes**. For example, tree neighborhoods nest within successional patches, which nest within local landscapes, eco-subregions, and ecoregions. Implementation of this principle could include planning and managing at appropriate scales to effectively restore connectivity, multi-level landscape patterns, processes, and dynamics.
- **Topography provides a natural template for restoring vegetation patterns**. Implementation of this principle could include the use of topography to guide restoration of successional and habitat patchworks. For example, partition the landscape into basic topographic settings, such as valley-bottoms, ridgetops, and south and north-facing slopes, rather than proximity to roads.
- **Major disturbances like fire and succession drive ecosystem change**. Implementation of this principle could include restoring natural fire regimes and the variation in successional patterns that supported them so that other processes may follow. This principle utilizes both the historical range of variability of regional successional patterns and a future range of variability to inform management targets.
- **Predictable patch size distributions historically emerged from linked climate-disturbance-topography-vegetation interactions**. Implementation of this principle could include restoring size distributions of historical successional patches and allow changing climate and disturbance regimes to modify them. Landscape prescriptions should focus on increasing the occurrence of different sized openings and successional patches.
- **Successional patches are "landscapes within landscapes."** Implementation of this principle could include restoring characteristic tree clump and gap variation in Ponderosa pine and mixed conifer patches. Patch level prescriptions should aim to restore variable patterns within stands and begin to break up uniformity.
- **Widely distributed large, old trees provide a critical backbone to dry pine and dry to moist mixed conifer landscapes.** Implementation of this principle could include retaining and increasing existing large, old trees, old forests, and large snags and down logs in these forest types. Land ownership, allocation, management and access patterns disrupt landscape and

ecosystem patterns. Implementation of this principle could include working collaboratively across ownerships to develop restoration projects.

In addition, researchers suggest that landscape prescriptions are fundamental to restoration, providing a strategy for the implementation of the seven principles, while moving away from stand-level management as a primary focus (Hessburg et al. 2015). Stand level management takes on new meaning within landscape prescriptions. They are the “plug and plays” that accomplish creation of vastly revised spatial patterns of forest conditions and their associated functionality. It is suggested that landscape prescriptions occur at three levels as described in Principle 1 above:

- **Large-scale eco-regional (100,000s to 1,000,000s of acres):** These are strategic prescriptions that identify priority areas for reconnecting habitats and conditions, identify where silviculture or burning may be appropriate, and recognize managed wildfires can contribute greatly to restoration efforts.
- **Local landscape (10,000s to 100,000s of acres; Principles 2, 3, 4 and 6):** These are tactical prescriptions that include the restoration of successional patch size distributions; the retention of old, legacy trees; and the restoration of wildfire and climate resilient landscapes through the use of a broad toolkit.
- **Patch-level (1s to 1,000s of acres; Principle 5):** These prescriptions provide targets for the heterogeneity of the structure, including numbers and sizes of individual trees, tree clumps, and openings.

Wildland fire, insect outbreaks, disease, invasive species, and changes in climate are expected to continue to be a part of the landscape into the foreseeable future. Landscape prescriptions can aim to restore more resilient vegetation patterns that will help adjust the severity and sizes of these disturbances, promote natural post-disturbance recovery, reduce the need for expensive active management, and drastically reduce the role and need of fire suppression.

Many of the wildlife, fire management, water, forestlands, and terrestrial ecosystems plan components included in the Land Management Plan were created using the above core principles. Since these principles form the foundation for many of the natural resource plan components, the Land Management Plan provides an integrated approach to facilitating landscape scale restoration to promote ecological sustainability at multiple spatial and temporal scales.

To achieve landscape scale restoration and work across boundaries, coordination with other adjacent land managers or interested parties is important. As discussed above, there are a variety of initiatives, such as the State Forest Action Plan, shared stewardship, The National Cohesive Wildland Fire Management Strategy, and good neighbor authority, that can facilitate landscape scale restoration. Also, as listed above, the Land Management Plan contains numerous goals that emphasize an all-lands approach, working across boundaries, and fostering partnerships. To better facilitate and align vison, plan components were developed with the consideration of state and county land management plans, as well as including recovery plans for federally listed species that occur at multi-state levels.

The Land Management Plan contains plan components that emphasize the creation of landscape patterns that promote long-term ecological integrity and ecosystem diversity at multiple spatial and temporal scales, as exemplified by:

FW-DC-TE-04. Vegetation reflects natural disturbance regimes. The composition, structure, function, and connectivity of native plant communities are appropriate for a given landscape and climatic setting.

FW-DC-WL-03. The arrangement and distribution of vegetation patches is consistent with the natural range of variation and varies widely in size, shape, and structure to provide connectivity for native wildlife.

FW-DC-WTR-01. National Forest System lands provide the distribution, diversity, and complexity of watershed and landscape-scale features including natural disturbance regimes and the aquatic and riparian ecosystems to which species, populations, and communities are uniquely adapted. Watersheds and associated aquatic ecosystems retain their inherent resilience to respond and adjust to disturbances, including climate change, without long-term, adverse changes to their physical or biological integrity.

FW-DC-TBR-04. Harvests, including regeneration harvests, reflect the scale and pattern of natural disturbances.

MA1-DC-WILD-01. Natural ecological processes and disturbances (for example, succession, wildfire, avalanches, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation.

The forestlands (FOR) and fire management (FIRE) desired conditions focus on creating landscape patterns of forests, meadows, grasslands, shrublands, and riparian areas that were created under ecological processes and landscape disturbance regimes that occurred before extensive human alteration. The forestlands (FOR) and fire management (FIRE) desired conditions and objectives were developed using a variety of data and modeling strategies that incorporated the natural range of variation conditions, including the scale, frequency, and intensity of system drivers of ecosystem change over time. These plan components facilitate the creation of a representative range of successional states for all ecosystems and in patch configurations similar to those that occurred under historical conditions, at a scale resilient to natural disturbances. The forestlands (FOR) plan components were designed to move vegetation toward desired conditions for dominance type, size class, density, structure, forest pattern, and patch size while maintaining connectivity and minimizing fragmentation of vegetation landscapes. The fire management (FIRE) desired conditions emphasize fire's role in the ecosystem and the importance of utilizing fire to achieve ecosystem sustainability, while also providing for public and firefighter safety.

In conjunction with facilitating management activities at the landscape scale, accounting for smaller scales is also important. The Land Management Plan includes desired conditions that focus on maintaining the integrity of scarce or unique smaller areas, as well as standards or guidelines that constrain the levels of disturbance for areas around them, such as the plan components associated with research natural areas (RNA), special areas (SA), and the Lower Salmon River geographic area (SR).

Air, Soil, and Water, 36 CFR 219.8(a)(2)

Air Quality

Air quality is one of the many resources the Forest Service is required to monitor and protect on public lands. Air quality is dependent on the type and amount of pollutants emitted into the atmosphere, the location and topography of an airshed, and the prevailing meteorological and weather conditions. Coordinating with partners and meeting applicable air quality standards are the primary mechanisms for managing air quality. Refer to the Air Quality section in the Final Environmental Impact Statement and Appendix 4 of the Land Management Plan for more information regarding air quality.

The Land Management Plan includes the following plan components that support the maintenance or improvement of air quality (36 CFR 219.8(a)(2)(i)):

FW-GL-AIR-01. Coordinate with local and regional partners to reduce cumulative air quality impacts prior to planned ignition activities.

FW-GL-AIR-02. The Nez Perce-Clearwater works with federal, state, and tribal partners to meet applicable air quality requirements.

FW-DC-AIR-01. Good air quality supports human and ecosystem health and quality of life over the long-term. It enhances visibility and the visual aesthetics of the planning area over the long-term.

FW-DC-AIR-02. The Nez Perce-Clearwater meets applicable federal, state, and tribal air quality standards.

Soils

Soils are an integral part of ecosystems, their function, and the above and below ground interaction of organisms. Soil functions, such as soil biology, soil hydrology, nutrient cycling, carbon storage, soil stability and support, and filtering and buffering, contribute to ecological resilience. Soils that are productive and functioning properly are resilient to natural disturbance and human caused stressors and provide for long-term ecological sustainability. Refer to Section 3.2.1.6 Soils Resource in the Final Environmental Impact Statement for more information regarding soil productivity and function and Appendix 4 of the Land Management Plan for potential management approaches to protect, maintain, or restore soil resources.

The Land Management Plan includes plan components that support the maintenance or restoration of soils and soil productivity, including guidance to reduce soil erosion and sedimentation (36 CFR 219.8(a)(2)(ii)). The following desired conditions emphasize the important role soils have in promoting a resilient and diverse ecosystem that supports ecological integrity:

FW-DC-SOIL-01. Soil productivity and function contributes to the long-term resilience of ecosystems.

FW-DC-SOIL-02. Soil organic matter and down woody material support healthy microbial populations, protect soil from surface erosion, facilitate soil moisture retention, provide nutrients, and maintain soil development and biochemical processes.

FW-DC-SOIL-03. Volcanic ash-influenced soils are intact and retain unique properties, including high soil porosity and high water and nutrient holding capacity.

GA-DC-SR-01. Forest vegetation grows on soils that support and developed under forested ecosystem. Grassland soils, including mollisol soils, support healthy grassland and shrubland communities with few trees.

As outlined in Table 302, the Land Management Plan also includes objectives, standards, and guidelines to protect sensitive soils, maintain or restore soil productivity and function, and reduce soil erosion.

Table 302. Soils Resource Plan Components

Plan Component	Subject
FW-OBJ-SOIL-01	Objective to restore impaired soils
FW-OBJ-WTR-05	Objective to improve soil and watershed conditions
FW-STD-SOIL-01	Maintenance of soil function and productivity
FW-STD-SOIL-02	Rehabilitation of newly created soil impairment
FW-STD-SOIL-03	Incorporation of best management practices
FW-GDL-SOIL-01	Limitation of activities in mass movement areas
FW-GDL-SOIL-02	Post activity ground cover requirements
MA2 and MA3-GDL-SOIL-01	Slope limitations for ground-based equipment
MA2 and MA3-GDL-SOIL-02	Reuse of existing disturbed areas to limit new disturbance
MA2 and MA3-GDL-SOIL-03	Rehabilitation of previously created soil impairment
MA2 and MA3-GDL-SOIL-04	Protection of high soil burn severity soils
MA2 and MA3-GDL-SOIL-05	Decommissioning of FS system and temporary roads
MA2 and MA3-GDL-FOR-01	Retention of coarse wood material

Water Quality

The goal of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the nation's water." The Idaho Department of Environmental Quality is responsible for ensuring that Idaho's surface, ground, and drinking water resources meet state water quality standards. A water quality standard defines the goals that have been set for a water body by designating uses for the water, sets criteria necessary to protect those uses, and prevents degradation of water quality. Refer to the Water Resources section and Appendix K in the Final Environmental Impact Statement and Appendix 4 and Appendix 6 of the Land Management Plan for more information regarding water quality.

The Land Management Plan includes plan components that emphasize the maintenance or improvement of water quality (36 CFR 219.8(a)(2)(iii)). The following three plan components specifically address water quality standards and control of non-point source pollution:

FW-DC-WTR-05. Water quality, including groundwater, meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, and is of sufficient quality to support surrounding communities, municipal water supplies, and natural resources. The national forest has no documented lands or areas that are delivering water, sediment, nutrients, or chemical pollutants that would result in conditions that violate the State of Idaho's water quality standards.

FW-STD-WTR-02. Project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet water quality desired conditions, and to protect beneficial uses.

FW-STD-WTR-06. To restore watersheds, management activities in watersheds with approved total maximum daily loads shall be designed to comply with the total maximum daily load allocations following project implementation.

The Land Management Plan also includes several objectives to maintain or improve water quality. These objectives focus on maintenance or restoration actions that eliminate or minimize non-point source pollutants or improve conditions so that ecosystems are better able to process pollutants, such as sediment. The objectives also promote functioning riparian areas that have vegetation that filters pollutants, provides shade to streams, and delivers stream nutrients. Other objectives aim at restoring groundwater dependent ecosystems that can provide cold water to streams during summer low flows. Additionally, the standards and guidelines included in the aquatic resources section set requirements or limitations of management actions to maintain water quality and minimize the input of pollutants, such as sediment or chemicals.

Water Resources

The watersheds, rivers, and streams of the Nez Perce-Clearwater provide many ecological, economic, and social benefits. Clean water is a critical resource with over 9,500 miles of perennial streams and 3,800 acres of lakes and ponds supporting high value recreation, municipal water, and habitat for unique and diverse populations of fish and wildlife.

Water draining off the Clearwater National Forest is often used for drinking water supplies. Source water protection areas include watershed areas not specifically designated as municipal watersheds that provide untreated water from streams, rivers, or lakes that are used to supply public drinking water. Refer to the Water Resources section and Appendix K in the Final Environmental Impact Statement and Appendix 4 and Appendix 6 of the Land Management Plan for more information regarding water resources.

The Land Management Plan includes plan components that promote the maintenance or restoration of water resources in the plan area, including lakes, streams, and wetlands; ground water; public water supplies; source water protection areas; and other sources of drinking water, including guidance to prevent or mitigate detrimental changes in water quantity, quality, and availability (36 CFR 219.8(a)(2)(iv)).

There are 34 plan components in the water and aquatic resources (WTR) and municipal watershed (MWTR) sections of the Land Management Plan, including goals, desired conditions, objectives, standards, and guidelines. There are an additional 31 plan components in two other sections of the Aquatic Resources category: riparian management zones (RMZ) and conservation watershed networks (CWN). The Aquatic Resources category also includes 43 additional plan components in sections that provide special guidance for other resource areas that have the potential to affect water, riparian areas, and stream habitat: infrastructure (ARINF), energy and minerals (AREM), livestock grazing (ARGRZ), lands and special Uses (ARLND), and recreation (ARREC). Restoration is emphasized in the Land Management Plan through objectives. Objectives related to water resources focus on reducing sediment from roads, trails, and dispersed camp sites, restoring floodplain function, restoring hydrologic connectivity in meadows, and improving overall watershed conditions.

The following are examples of plan components that support water resources:

FW-DC-WTR-06. Sediment delivery to streams is of the types, quantities, and rates that support the natural instream sediment transport and storage rates and instream sediment substrate composition. The sediment regime in water bodies is not chronically affected by management activities to the extent that the availability of functioning spawning areas and interstitial spaces are reduced.

FW-DC-WTR-07. Instream flows are sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows are retained. Stream flow regimes maintain riparian ecosystems and natural channel and floodplain dimensions. Stream channels transport sediment and woody material over time while maintaining reference dimensions (for example, bankfull width, depth, entrenchment ratio, slope, and sinuosity).

FW-DC-WTR-08. Groundwater dependent ecosystems, including peatlands, bogs, fens, wetlands, seeps, springs, riparian areas, groundwater-fed streams and lakes, and groundwater aquifers, persist in size and seasonal and annual timing and exhibit water table elevations within the natural range of variability. Surface and groundwater flows provide late-season stream flows, cold water temperatures, and sustain the function of surface and subsurface aquatic ecosystems.

FW-DC-WTR-09. Beavers are present in watersheds where their activities benefit ground water, surface water, and aquatic habitat complexity, and where their activities support conservation and recovery of imperiled aquatic species.

FW-DC-MWTR-01. Lands that contribute to municipal watersheds and source water protection areas are in a condition that contributes to consistent delivery of clean water and meets or exceeds State of Idaho water quality standards.

Riparian Areas, 36 CFR 219.8(a)(3)

Riparian areas are important elements of watersheds that provide critical transition zones linking terrestrial and aquatic ecosystems. To maintain the ecological integrity of riparian areas, the Land Management Plan includes plan components that promote riparian areas and are designed to maintain or restore structure, function, composition, and connectivity.

Riparian management zones (RMZs) are portions of a watershed where riparian-dependent resources receive primary emphasis. The Land Management Plan established default widths for riparian management zones around all lakes, perennial and intermittent streams, and open water wetlands (36 CFR 219.8(a)(3)(ii)). Riparian management zone widths are delineated into four categories based on the type of water body and duration of stream flow. All plan components in the riparian management zones section apply to the established zones.

Although 36 CFR 219.8(a)(3)(ii)) requires special attention to land and vegetation for approximately 100 feet from the edges of all perennial streams and lakes, the Land Management Plan defines default widths of 150 to 300 feet from the edges of perennial waterbodies and wetlands greater than one acre and 100 feet from the edges of intermittent streams and wetlands less than one acre.

Additionally, the Land Management Plan contains several standards and guidelines that constrain projects and activities to comply with requirements of the Planning Rule not to cause detrimental changes to water resources that "seriously and adversely affect water conditions or fish habitat" (36 CFR 219.8(a)(3)(ii)(B)). The establishment of riparian management zones does not prohibit projects that may have short-term adverse effects to water conditions and fish habitat, if the actions maintain or restore structure, function, composition, and connectivity of riparian areas over the long term.

Riparian management zones are not intended as exclusion areas or reserves. Instead, management activities designed to benefit aquatic and riparian-dependent resources and move the landscape towards desired conditions are allowed and encouraged within them. Although the default riparian management areas widths are uniform, the management of them is not intended to be.

For further information on riparian areas, see sections Forestlands, At-Risk Plant Species, Water Resources, Aquatic Ecosystems and Fisheries, and Abundance and Diversity of Wildlife in the Final Environmental Impact Statement.

Restoration of riparian areas may be accomplished through passive management or may require active management particularly in areas where natural disturbances, such as fire or flooding, have been prevented from occurring, or if past projects and activities have altered riparian functions, such as where roads are located within riparian areas. Restoration is emphasized in the Land Management Plan through objectives. Objectives related to improvement of riparian areas focus on improving riparian habitat, floodplain function, and hydrologic connectivity.

The Land Management Plan includes the plan components outlined in Table 303 and the following desired conditions to support the ecological integrity of riparian areas:

FW-DC-RMZ-01. Riparian Management Zones reflect a natural composition of native flora and fauna and a distribution of physical, chemical, and biological conditions as compared to reference conditions. The species composition and structural diversity of native plant communities in riparian management zones provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration. Nutrients, large woody debris, and fine particulate organic matter are supplied in amounts and distributions sufficient to sustain physical complexity and stability.

FW-DC-RMZ-02. Riparian Management Zones feature key riparian processes and conditions that function consistent with local disturbance regimes, including slope stability and associated vegetative root strength, wood delivery to streams and within the riparian management zones, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality.

FW-DC-TE-05. Riparian vegetation includes native assemblages of hardwood trees, deciduous shrubs, conifers and where appropriate, unique coastal disjunct species.

FW-DC-GS-04. Wetland graminoid and riparian shrub habitat type groups are comprised of a mosaic of communities dominated by native species which tolerate and are adapted to periodic flooding and an associated seasonally high-water table. These communities may be dominated by native graminoids, such as water sedge (*Carex aquatilis*) and tufted hairgrass (*Deschampsia cespitosa*), and a variety of native forbs. Native shrubs include willo*w (Salix* spp.), dogwood *(Cornus* spp*.)*, birch (*Betula occidentalis*), cottonwood (*Populus* spp.), alder (*Alnus* spp.) and other native mesic species. Invasive plant species either are not present or occur with low cover.

Table 303. Summary of plan components for riparian areas

Plan Component	Subject
FW-STD-RMZ-01	Vegetation management in riparian management zones
FW-STD-RMZ-04	Fuelwood cutting in riparian management zones
FW-STD-RMZ-05	Hazard tree management in riparian management zones
FW-STD-RMZ-06	Prescribed fire management in riparian management zones
FW-STD-RMZ-07	Riparian Management Zone width delineations
FW-STD-RMZ-02, FW-STD-RMZ-03, FW-GDL-RMZ-01, FW-GDL-RMZ-02, FW-GDL-RMZ-03, FW-GDL-RMZ-04, FW-GDL-RMZ-05, FW-GDL-RMZ-06, FW-GDL-RMZ-07, FW-GDL-RMZ-08, FW-GDL-RMZ-09, plus all plan components in ARINF, AREM, ARGRZ, ARLND and ARREC	Management activity limitations in riparian management zones

Best Management Practices for Water Quality, 36 CFR 219.8(a)(4)

Best management practices for water quality, often referred to as “BMPs”, are methods, measures, or practices used to meet nonpoint source control needs as directed by the Clean Water Act. Best management practices can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (36 CFR 219.19).

The National Best Management Practices Program is guided by the land management planning regulation 36 CFR 219.8 (a)(4), which requires the Chief of the Forest Service to establish requirements for National best management practices for water quality in the Forest Service Directive System. These requirements, and associated program direction, are outlined in Forest Service Handbook 2509.19, Chapter 10 National Core Best Management Practices and Forest Service Manual 2500, Chapter 30, Section 2532 Water Quality Management.

The National Core Best Management Practices (BMP) Technical Guide (U.S. Department of Agriculture 2012b) provides a standard set of core best management practices and a consistent means to track and document the use and effectiveness of best management practices on National Forest System lands. Appendix 4 outlines the management approaches of the Nez Perce-Clearwater Land Management Plan; Section 2.2.1 further describes federal and State of Idaho best management practices direction.

Plan component FW-STD-WTR-02 ensures implementation of national best management practices for water quality: Project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet soil and watershed desired conditions, and to protect beneficial uses.

Diversity of Plant and Animal Communities 36 CFR 219.9

The diversity of terrestrial, riparian, and aquatic ecosystems and habitats is fundamental to providing ecological conditions that support the abundance, distribution, and long-term persistence of native species and diversity of plant and animal communities. The 2012 Planning Rule outlines a complementary ecosystem and species-specific approach to maintaining the diversity of plant and animal communities and the persistence of native species in the plan area that is within Forest Service authority and consistent with the inherent capability of the plan area (36 CFR 219.9). The 2012 Planning Rule provides direction for diversity of plant and animal communities by addressing: 1) ecosystem plan components; 2) additional species-specific plan components; and 3) species of conservation concern.

Ecosystem Plan Components, 36 CFR 219.9(a)

Ecosystem plan components are broken out into two categories: ecosystem integrity and ecosystem diversity. As outlined above, the Land Management Plan includes many plan components that propose to maintain or restore ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area, including the maintenance or restoration of their structure, function, composition, and connectivity.

Ecosystem diversity is defined as the variety and relative extent of ecosystems (36 CFR 219.19). Diverse ecosystems provide the ecological conditions necessary to maintain the persistence or contribute to the recovery of native species within the plan area, including at-risk species. At-risk species are federally recognized threatened, endangered, proposed, and candidate species and species of conservation concern. The Land Management Plan includes plan components that propose to maintain or restore the diversity of ecosystems and habitat types throughout the plan area. In doing so, the Land Management Plan includes plan components to maintain or restore 1) key characteristics associated with terrestrial and aquatic ecosystem types; 2) rare aquatic and terrestrial plant and animal communities; and 3) the diversity of native tree species similar to that existing in the plan area.

Key Characteristics Associated with Terrestrial and Aquatic Ecosystems

The Nez Perce-Clearwater spans four Idaho ecoregions, ranging from the arid grassland and sagebrush steppe of the Columbia Plateau ecoregion to the mountainous Blue Mountains, Northern Rockies, and Idaho Batholith ecoregions.

The Nez Perce-Clearwater has a wide diversity of terrestrial vegetation communities due to its geographic location, geology, topography, range in elevation, and climate. Vegetation ranges from dense coniferous forests in warm, moist or dry valley bottoms to sparsely forested types on cold, steep, high-elevation sites. Forested vegetation is categorized into four broad potential vegetation type groups: warm dry, warm moist, cool moist, and cold. There are 14 native conifer tree species found on the Nez Perce-Clearwater, as well as a variety of hardwood species. Plan components in the terrestrial ecosystems (TE) and forestlands (FOR) sections promote the maintenance or restoration of terrestrial vegetation communities within the plan area.

Meadows, grasslands, and shrublands support native plant communities and forage for animals. The Nez Perce-Clearwater contains a mosaic of grassland, meadows, and shrubland vegetation and are generally categorized into five groups: xeric grasslands dominated by bluebunch wheatgrass habitat type groups, mesic grasslands dominated by fescue habitat type groups, xeric shrublands, wetland graminoid and riparian shrub, and subalpine herbaceous and shrub. Plan components in the terrestrial ecosystems (TE); meadows, grasslands, shrublands (GS); and riparian management zones (RMZ) sections promote the maintenance or restoration of native plant communities within the plan area.

Rare plant species occur throughout the Nez Perce-Clearwater, but sites of high representation and general floral diversity occur in areas of coastal disjunction in the low elevations of the larger Clearwater Basin tributaries, larger grassland complexes, and arid non-forest habitats that form islands in the general mesic forest types. There are an identified 52 at-risk plant species located within or near the boundaries of the Nez Perce-Clearwater. Habitats for at-risk plants are broken out into seven different guilds: grasslands, meadows, mesic forests, rocky habitats, subalpine forests, transitional habitats, and wetlands.

Rocky habitats are often associated with the alpine habitats, including rock outcrops and scree. Vegetation is sparse or largely lacking. Bryophytes and lichens often occur in crevices and flourish on open rock surfaces where the competition from vascular plants is absent. Rock outcrop and scree habitats may also be found at lower elevations. Rocky habitats are often fragile systems. Plan components in the terrestrial ecosystems (TE) section provide protections for rocky habitats.

Wildlife habitat conditions vary widely from the dry, rugged canyons of the Salmon River to the moist cedar forests of the Selway River drainage, the rolling uplands of the Palouse, and the high-elevation mountains across the Nez Perce-Clearwater. The diversity in habitat and topography contributes to the biodiversity of wildlife communities. There have been recorded observations of approximately 364 species of wildlife within the Nez Perce-Clearwater, including 201 birds, 67 mammals, 9 reptiles, 11 amphibians, 67 gastropods, 3 mussels, and 6 invertebrates. Key habitat groupings important for wildlife species include aquatic, wetland, water and riparian habitats; forested habitats, non-forested, or early seral habitats; substrate habitats, such as rock outcrops, soils, downed wood, cliffs, talus, or caves; ecotone, forest edge, or habitat grouping combinations; and alpine, boreal, or high elevation habitats. A number of species are reliant on available resources, such as nectar, fruit, seeds, plant forage, or prey, rather than specific habitat types or structure. Plan components in the terrestrial ecosystems (TE); cave and karst features (CAVE); forestlands (FOR); meadows, grasslands, shrublands (GS); fire management (FIRE); riparian management zones (RMZ); wildlife (WL); multiple uses wildlife (WLMU); elk (ELK); and Lower Salmon River area (SR) sections promote the maintenance or restoration of wildlife habitats within the plan area.

The Nez Perce-Clearwater contains diverse landscape conditions spanning five different fire regimes. A fire regime describes the frequency, predictability, and severity of fire in an ecosystem. Natural fire regime groups are broken out by fire return intervals and fire severity types. Approximately 54 percent of the Nez Perce-Clearwater occurs in Fire Regime III, characterized by a fire return interval or frequency of 35 to 200 years and a low to mixed fire severity. Approximately 33 percent of the national forest occurs in Fire Regime IV, characterized by a fire return interval or frequency of 35 to 200 years and a high fire severity. Plan components in the fire management (FIRE) section promote the maintenance or improvement of desired forest and grassland vegetation conditions to create resilient ecosystems and provide quality habitat for plant and animal species.

The three major river systems—Salmon, Clearwater, and Snake—and their accompanying tributaries provide important aquatic and riparian habitat for many species. The Nez Perce-Clearwater supports approximately 18 native fish species, three non-native fish, and many native aquatic invertebrates, macroinvertebrates, amphibians, and mussels. Aquatic ecosystems are varied, ranging from high gradient, steep canyon tributaries to lower gradient rivers with wide flood plains. Streams provide important spawning and rearing habitat for anadromous fish species. Other aquatic ecosystems include high mountain lakes and groundwater dependent ecosystems, such as meadows, seeps/springs, and peatlands. Plan components in the terrestrial ecosystems (TE); cave and karst features (CAVE); and aquatic ecosystems (WTR, RMZ, CWN, ARINF, AREM, ARGRZ, ARLND, ARREC) sections promote the maintenance or restoration of aquatic and riparian habitats.

Rare Aquatic and Terrestrial Plant and Animal Communities

The Nez Perce-Clearwater possesses a tremendous range and unusual diversity of habitats, from boreal and coastal elements in the north to extensive grasslands and pine forests in the south. The maritime influence of the Pacific Ocean also contributes to a unique coastal disjunct ecosystem with associated species uncommon to the northern Rockies, such as the Coeur d’Alene and Idaho giant salamanders, deer fern, and Pacific dogwood. The local climatic transition caused by extreme terrain differences result in high floral diversity, including endemic species like the evergreen kittentail, Dasynotus, Idaho barren strawberry, spacious monkeyflower, the federally listed Spalding's catchfly, and four species of pine.

Persistent hardwood-dominated plant communities are rare on the Nez Perce-Clearwater but are important components of diversity, providing habitat for a variety of birds and other wildlife species. Aspen may occur as a persistent community in riparian areas or as a transitional community in upland areas. These communities often dominate in the early stages of forest succession immediately after disturbance. Aspen is more common than cottonwood on the Nez Perce-Clearwater, which is confined to riparian areas with fluctuating water tables and is more common on the private lands outside of the national forest boundary.

In addition, the diverse vegetative communities on the Nez Perce-Clearwater provide terrestrial habitats that host several regionally unique native wildlife populations. This includes native lineages of fisher and bighorn sheep, as well as mountain quail, the white-headed woodpecker, and the harlequin duck.

The Salmon, Clearwater, and Snake Rivers and their accompanying tributaries offer important aquatic and riparian habitat for many species, including lamprey, bull trout, steelhead trout, westslope cutthroat trout, and Chinook salmon. The Nez Perce-Clearwater's substantial spawning and rearing habitat for steelhead trout and Chinook salmon provides a large portion of the total returns of adult anadromous salmonids in the Snake and Columbia River basins.

Additionally, a large number of endemic gastropods are found in the major river systems, particularly in the Salmon River. The sheer number and diversity of endemic aquatic species within the planning area is notable and exemplary within the western United States. Many species of gastropods in the plan area are regional endemic species limited to northern Idaho, western Montana, southern British Columbia, and eastern Washington. Others are Idaho endemics limited in many cases to Idaho, while some are local endemics with distributions limited to parts of the Nez Perce-Clearwater and some lands just outside the plan area. The Selway forestsnail, the Mission Creek Oregonian, and the nimapuna disc are some examples of local endemic gastropods.

The lower Salmon River canyon has exceptional landsnail diversity, and several landsnail species are local endemics limited to the lower Salmon River canyon. Most of these species occur outside of the plan area boundaries at lower elevations but some taxa have been observed on the Nez Perce-Clearwater. The Land Management Plan establishes the Lower Salmon River Geographic Area to emphasize and better protect endemic gastropod habitats and other unique ecological conditions.

Endangered Species Act, Federally Listed Threatened and Endangered Species, and Candidate Species

As shown in Table 304, the Nez Perce-Clearwater currently supports one species federally listed as endangered under the Endangered Species Act, eight listed as threatened, and one candidate species.

Table 304. Species listed by the Endangered Species Act (ESA) as federally listed threatened, endangered, candidate, and proposed species in the plan area

Species[1]	ESA Status
Snake River spring and summer Chinook salmon (*Oncorhynchus tshawytscha*), Salmon River Basin	Threatened

Species[1]	ESA Status
Snake River fall Chinook salmon (*Oncorhynchus tshawytscha*), Clearwater and Salmon River Basins	Threatened
Snake River sockeye salmon[2] (*Oncorhynchus nerka*), Salmon River Basin	Endangered
Snake River steelhead trout (*Oncorhynchus mykiss*), Clearwater and Salmon River Basins	Threatened
Columbia River bull trout (*Salvelinus confluentus*), Clearwater and Salmon River Basins	Threatened
Spalding's catchfly (*Silene spaldingii*)	Threatened
Canada Lynx (*Lynx canadensis*)	Threatened
Grizzly Bear (*Ursus arctos horribilis*)	Threatened
Whitebark pine (*Pinus albicaulis*)	Threatened
Monarch Butterfly (*Danaus* plexippus)	Candidate
Wolverine (*Gulo gulo*)	Candidate

1 - Water howellia (*Howellia aquatilis*) was included in early analysis but has been delisted. Macfarlane's four-o'clock (*Mirabilis macfarlanei*) is listed as threatened, but there is not known occurrence on lands administered by the Nez Perce-Clearwater, although it is known to occur very close to the Nez Perce-Clearwater boundary.

2 - Although species are present, sockeye salmon spawning or rearing does not occur on the Nez Perce-Clearwater.

As discussed in previous sections above, the Land Management Plan includes plan components to maintain or restore rare aquatic and terrestrial plant and animal communities. The Land Management Plan also includes plan components that emphasize the protection, preservation, management, or restoration of natural environments and ecological communities to recover federally listed endangered and threatened species and potentially avoid federally listing of proposed and candidate species, for example:

FW-GL-WL-01. Through cooperation and collaboration with the U. S. Fish and Wildlife Service, other federal agencies, state agencies, and tribes on conservation strategies, recovery plans, and habitat management, ecological conditions on National Forest System lands contribute towards recovery of federally listed threatened or endangered species, candidate, and proposed species are conserved and future listings are prevented.

FW-DC-WL-01. The Nez Perce-Clearwater provides habitat conditions for federally listed threatened, endangered, and candidate plant and animal species that contribute to their recovery to the point at which listing is no longer appropriate. Habitat used by federally listed species provide conditions to meet their life history needs.

Canada Lynx

The Canada lynx is federally listed as threatened under the Endangered Species Act. Lynx and snowshoe hares, the lynx's primary winter prey, are strongly associated with moist, cool, boreal spruce-fir forests. Lynx habitat may be affected by changes in climate, as snowpack is projected to decline.

The U.S. Fish and Wildlife Service prepared a recovery outline for the Canada lynx (U.S. Department of the Interior 2005a) that was to provide interim guidance until a formal recovery plan had been approved. No recovery plan has yet been developed for the lynx.

The Northern Rockies Lynx Management Direction (NRLMD) amended 18 forest plans for the national forests in Idaho, Montana, Utah, and Wyoming, including the Nez Perce-Clearwater (U.S. Department of Agriculture 2007c). Under the Northern Rockies Lynx Management Direction, the

Nez Perce National Forest is considered unoccupied, and the Clearwater National Forest is considered occupied. The U.S. Fish and Wildlife Service has determined that lynx “may be present” on both Forests, and both Forests are considered to be secondary areas. No critical habitat on the Nez Perce-Clearwater has been designated by the U.S. Fish and Wildlife Service.

Coarse filter plan components provide for habitat diversity that benefit lynx, and plan components FW-GL-WL-01 and FW-DC-WL-01 support federally listed threatened or endangered species. Lynx are the only federally listed species with a species specific plan component: Canada lynx habitat shall be managed in accordance with the Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f) and Record of Decision (U.S. Department of Agriculture 2007e) and any amendments, updates, or new direction forthcoming (FW-STD-WL-01).

This standard incorporates all the components included in the Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007f) and Record of Decision (U.S. Department of Agriculture 2007e), which is included in Appendix 5 of the Land Management Plan. Table 305 summarizes the number and type of components for general management actions, vegetation management, livestock grazing, human uses, and linkage areas. The components were developed to conserve and promote the recovery of lynx by reducing or eliminating adverse effects from land management activities on National Forest System lands while preserving the overall multiple-use direction.

Table 305. Summary of components in the northern Rockies lynx management direction

Category	Objectives/Desired Conditions	Standards	Guidelines
General Management Actions	1	2	1
Vegetation Management	4	4	5
Livestock Grazing	1	0	4
Human Uses	6	0	12
Linkage Areas	1	1	2

Data Source: Northern Rockies Lynx Management Direction

Grizzly Bear

Grizzly bears may be present within the Nez Perce-Clearwater. See the section Threatened, Endangered, Candidate, and Proposed Wildlife Species for more information on grizzly bear and records of occurrence. The Nez Perce-Clearwater contains a large proportion of the Bitterroot grizzly bear recovery zone. The Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness make up the core of the Bitterroot ecosystem recovery zone for the federally listed threatened grizzly bear. Reestablishment of the grizzly bear in this recovery zone is currently through natural dispersal. This zone is in relatively proximity to other grizzly bear recovery zones and encompasses areas where grizzly bears could come from the north and east into the Bitterroot Recovery Zone. The Grizzly Bear Recovery Plan (U.S. Department of the Interior 1993) and Supplement: Bitterroot Ecosystem Recovery Plan Chapter (Servheen 1996) outline the criteria needed for recovery.

The Nez Perce-Clearwater Land Management Plan would maintain the ecological conditions for grizzly bears to recolonize the Bitterroot recovery zone, allow for migration, dispersal, and genetic interchange between grizzly bear recovery zones, and reduce grizzly bear and human conflict through the following plan components.

FW-DC-WL-06. The grizzly bear Bitterroot Recovery Zone provides the ecological conditions to support recolonization of grizzly bears. Land Management Plan land use allocations provide connectivity to allow secure passage from occupied habitat to the Bitterroot Recovery Zone.

FW-DC-WL-07. The risk of grizzly bear-human conflict is reduced through awareness. The public, Forest Service employees, contractors, volunteers, and permittees are knowledgeable of conflict prevention strategies through education and interpretation.

FW-DC-WL-08. Within occupied grizzly bear habitat, developed recreation sites, administrative sites, and dispersed recreation sites where garbage disposal services are provided, facilities are equipped with necessary infrastructure so that food, garbage, and other attractants can be made inaccessible to grizzly bears to reduce the potential of human-bear conflict.

FW-DC-WL-09. Wide-ranging species are free to move across and between habitats, allowing for dispersal, migration, genetic interaction, and species recruitment.

FW-GDL-WL-05. To maintain large areas of unfragmented habitat for wide-ranging species, such as elk and grizzly bear, new motorized trails open to the public should not be authorized in unroaded areas unless there are adjacent areas of 5,000 acres without open motorized system routes. This guideline does not apply to Community Protection Zones (CPZs) as defined by the Idaho Roadless Rule.

Fish Species

The Nez Perce-Clearwater supports five fish species currently listed as threatened or endangered under the Endangered Species Act (Table 304) and contains designated critical habitat for these species. Critical habitat is the specific areas within the geographic area, occupied by the species at the time it was listed, that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation.

Recovery plans identify actions needed to restore threatened and endangered species to the point that they are again self-sustaining elements of their ecosystems and no longer need protection under the Endangered Species Act. Although recovery plans are not regulatory documents, they serve as a central organizing tool for guiding and coordinating recovery efforts across a wide spectrum of federal, state, tribal, local, and private entities. The following recovery plans include portions of the Nez Perce-Clearwater. In 2015, the U.S. Fish and Wildlife Service completed the Columbia River bull trout recovery plan (U.S. Department of the Interior 2015c) and recovery unit implementation plans for the Mid-Columbia and Upper Snake recovery areas (U.S. Department of the Interior 2015a, d). The National Marine Fisheries Service published the recovery plan for Snake River sockeye salmon in 2015 (National Oceanic and Atmospheric Administration 2015); the recovery plan for Snake River spring/summer Chinook salmon and steelhead in 2017 (National Oceanographic and Atmospheric Agency 2017); and the Snake River recovery plan for fall Chinook salmon, also in 2017 (National Oceanic and Atmospheric Administration 2017).

Of special note, coho salmon (*Oncorhynchus kisutch*) were historically believed to be native to the Clearwater basin but were officially declared extirpated, or non-existent, in 1985. Efforts to re-introduce the species are ongoing, and returning adults have been documented in several areas, including the Clear Creek tributary to the Middle Fork Clearwater River.

The Land Management Plan direction related to aquatic ecosystems is designed to move towards recovery of fish listed under the Endangered Species Act through restoration and conservation of designated critical habitat and streams across the planning area. Direction is also intended to conserve and restore habitat for aquatic species of conservation concern and to prevent future listings. One of the mechanisms for achieving these goals is the establishment of a conservation watershed network.

A conservation watershed network is a designated collection of watersheds where management emphasizes habitat conservation and restoration to support federally listed fish and species of conservation concern. Using specific criteria, 81 HUC12 watersheds were identified, forming a network of existing or historic population strongholds and habitats with high potential for productivity and fish abundance. These areas support freshwater life stages and demographic processes that are crucial for maintaining viable populations of wide-ranging fish. Selected conservation watershed network watersheds are expected to provide a pattern of protection across the landscape where the habitat of migratory salmonids receives special attention and treatment.

The desired conditions for Conservation Watershed Networks are intended to be used in conjunction with desired conditions for Water and Aquatic Resources and Riparian Management Zones. Conservation Watersheds are intended to sustain the integrity of key aquatic habitats and maintain multi-scale connectivity for at-risk fish and aquatic species, identifying important areas needed for conservation or restoration, and ensuring ecosystem components needed to sustain long-term persistence of species.

Conservation Watershed Networks are the highest priority for restoration actions for the aquatic environment. Restoration would be achieved through the collective objectives within the Aquatic Ecosystem plan components. Aquatic restoration is also encouraged in HUC12 subwatersheds outside of the conservation watershed network that are important for native fish species.

Coarse filter plan components in the aquatic ecosystems (WTR, RMZ, CWN) section provide for ecological conditions and habitat diversity that benefit fish species and FW-GL-WL-01 and FW-DC-WL-01 support federally listed threatened or endangered species. The Land Management Plan also includes other plan components specific to the recovery of threatened and endangered fish species, for example:

FW-DC-WTR-03. Aquatic habitats contribute to ecological conditions capable of supporting self-sustaining populations of native species and diverse plant, invertebrate, and vertebrate aquatic and riparian-dependent species. Aquatic habitats are key contributors to for the recovery of threatened and endangered fish species and provide important habitat components for all native aquatic species.

FW-DC-WTR-10. Critical habitat components (primary biological features) provide the ecological conditions necessary to achieve species recovery. Spawning, rearing, and migratory habitats are widely available and inhabited. Listed aquatic species have access to historic habitat and appropriate life history strategies (for example, bull trout resident, fluvial, adfluvial, and anadromy) are supported.

FW-GL-CWN-01. The Nez Perce-Clearwater works with the Nez Perce Tribe, State of Idaho, National Marine Fisheries Service, U. S. Fish and Wildlife Service, and other governmental organizations to plan and implement projects that contribute to recovery goals for aquatic species listed under the Endangered Species Act and their designated critical habitat, such that protective measures under the Act are no longer necessary.

FW-GL-CWN-02. The Nez Perce-Clearwater partners with federal agencies, including Section 7 consultation, as required; state agencies; tribes; counties; interested groups; and interested private landowners to recover threatened and endangered species.

FW-DC-CWN-01. Conservation Watershed Networks have functionally intact ecosystems that provide high-quality water and contribute to and enhance the conservation of aquatic species of conservation concern and recovery of threatened or endangered fish species.

FW-DC-CWN-02. Streams within the Conservation Watershed Network provide habitat that supports robust native fish populations, which can expand to and recolonize adjacent unoccupied habitats. These areas conserve key demographic processes likely to influence the sustainability of aquatic species.

FW-DC-CWN-03. Roads in the Conservation Watershed Network present minimal risk to aquatic resources.

FW-STD-CWN-01. In Conservation Network Watersheds not meeting aquatic and riparian desired conditions, activities shall be designed and implemented in a manner that supports or contributes towards the recovery of federally listed species and the achievement of these desired conditions and does not retard them when evaluated at the HUC12 subwatershed scale. Short-term adverse effects from project activities may occur when they support the long-term recovery of aquatic and riparian desired conditions and federally listed species.

FW-STD-ARINF-07. In the Conservation Watershed Network and HUC12 subwatersheds with Endangered Species Act critical habitat or listed aquatic species, when constructing or reconstructing roads, projects shall result in a net decrease in the hydrologic connectivity of the road system and stream channel network unless no further decreases are needed to meet desired conditions for Water and Aquatic Resources or Conservation Watershed Network. Treatment priority shall be given to roads or road segments that pose the greatest relative ecological risk to riparian and aquatic ecosystems. The net decrease is measured by project area.

Spaulding's Catchfly

Spalding's catchfly, federally listed as threatened, is naturally found infrequently on the Nez Perce-Clearwater. It is a perennial herb located in grassland habitats dominated by Idaho fescue and prairie June grass that generally support a diverse array of forbs on well-developed soils. While the U.S. Fish and Wildlife Service intends to identify critical habitat for this species, critical habitat designation was precluded at the time of listing due to a lack of funding. The recovery plan for Spalding's catchfly was completed in 2007 (U.S. Department of the Interior 2007) and outlines the recovery strategy, recovery goals, objectives, and delisting criteria.

Although there is no species-specific plan component for Spalding's catchfly, desired condition FW-DC-GS-02 promotes Spalding's catchfly habitat and FW-GL-WL-01, FW-DC-WL-01 and FW-GDL-GRZ-02 support federally listed threatened or endangered plant species.

Whitebark Pine

The U.S. Fish and Wildlife Service published a final rule (87 FR 76882) on December 15, 2022 to list the whitebark pine as a threatened species under the Endangered Species Act. Included in the rule is a special rule pursuant to section 4(d) of the act that identifies actions necessary to conserve and recover the whitebark pine, as well as a limited number of prohibited acts (87 FR76882). The Service has concluded that the whitebark pine is likely to become endangered in the foreseeable future throughout its range. Regulation and policy governing whitebark pine and associated habitats provide measures that are necessary and advisable to provide for the conservation of the species. The U.S. Fish and Wildlife Service determined that designation of critical habitat for the whitebark pine was not prudent at the time of the notice.

Whitebark pine is associated with high elevation and its distribution has been primarily influenced by the cold continental air masses in higher elevations in northern Idaho. On the Nez Perce-Clearwater, whitebark pine is typically found above 6,500 feet elevation. Whitebark pine is considered a “keystone” and “foundation” species because of its significant role in subalpine ecosystems (Keane and Parsons 2010, Jenkins 2011). As a keystone species, this five-needled pine influences the health and life cycle of other native plants and animals. White pine blister rust remains the primary threat to whitebark pine. This blister rust is a non-native fungal disease that harms whitebark pine trees across the West. Additional threats impacting the health of the species include mountain pine beetles, altered fire regimes, and climate change.

Whitebark pine is included in several plan components in the Forestlands section that are designed to maintain or improve composition, structure, function, and connectivity of cool moist and cold potential vegetation type groups (FW-DC-FOR-09, FW-DC-FOR-10, MA1 and MA2-DC-FOR-09, MA3-DC-FOR-07, MA3-DC-FOR-08, MA3-OBJ-FOR-03, MA3-OBJ-FOR-04, MA2-OBJ-FOR-01, MA2-OBJ-FOR-04, MA2-OBJ-FOR-05). The Land Management Plan also includes plan components MA2 and MA3-DC-FOR-10, MA3-STD-FOR-01, MA2 and MA3-GDL-FOR-02, MA2 and MA3-GDL-FOR-03, and MA2 and MA3-GDL-FOR-04, which are designed to maintain or increase old growth conditions, including those for whitebark pine. Although not specifically mentioned, all the plan components in the Forestlands section associated with cool moist and cold potential vegetation type groups benefit whitebark pine species.

Monarch Butterfly

On December 15, 2020, the U.S. Fish and Wildlife Service announced that listing the monarch butterfly under the Endangered Species Act is warranted but precluded. This makes monarch butterflies a “candidate species” that are re-evaluated annually for potential listing. The monarch will remain a candidate species until it is determined that listing is warranted, or that current conservation actions have recovered the population enough that listing is not warranted.

Although there is no species-specific plan component for monarch butterfly, FW-GL-WL-01 and FW-DC-WL-01 support federally listed threatened, endangered, or candidate species. Desired condition FW-DC-TE-03 promotes monarch butterfly habitat, emphasizing that plant communities are comprised of a diverse mix of native grass, forb, shrub, and tree species, which provide forage for pollinator species.

Wolverine

The wolverine is listed as an Endangered Species Act candidate species. Wolverine live at low densities and occupy remote areas with persistent snowpack, which they use for denning. Winter food resources influence habitat selection. They rely on small mammals and ungulates as food sources, both scavenging and hunting their prey. Wolverine habitat may be affected by changes in climate, as snowpack is projected to decline. More than 80 percent of modeled wolverine habitat occurs in designated or recommended wilderness areas and Idaho Roadless areas.

Although there is no species-specific plan component for wolverines, coarse-filter plan components provide for habitat diversity that benefits wolverines and FW-DC-TE-05, FW-GL-WL-01, and FW-DC-WL-01 support federally listed threatened or endangered species. Also, plan components associated with wilderness and roadless area also benefit wolverines. See the lands with distinctive classifications below.

For further information on federally listed threatened, endangered, candidate, and proposed species, see Sections Forestlands, At-Risk Plant Species, Aquatic Ecosystems and Fisheries, and Threatened, Endangered, Candidate, and Proposed Wildlife Species in the Final Environmental Impact Statement. Species of Conservation Concern, 36 CFR 219.9(c)

A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area.

The regional forester's species of conservation concern list (Marten 2019) identifies six animal species: bighorn sheep, fisher, mountain quail, white-headed woodpecker, harlequin duck, and pacific lamprey. The regional forester's list of species of conservation concern also identifies 30 plant species. See the At-Risk Plant Species section for a full list of plant species and associated habitats.

The species identified in the list meet the criteria for species of conservation concern as defined by the 20I2 Planning Rule and its implementing directives. The 20I2 Planning Rule requires forest plans to include plan components that provide the ecological conditions necessary to maintain a viable population of each species of conservation concern within the plan area (36 CFR 219.9(b)(1)).

For further information on species of conservation concern see Final Environmental Impact Statement Sections At-Risk Plant Species, Aquatic Ecosystems and Fisheries, and Abundancy and Diversity of Wildlife.

The Land Management Plan emphasizes species of conservation concern by emphasizing that ecological conditions on the Nez Perce-Clearwater contribute sustainable habitat to maintain species of conservation concern. Habitat is resilient and adaptable to stressors and likely future environments (FW-DC-WL-02).

Coarse filter plan components in the terrestrial ecosystems (TE); cave and karst features (CAVE); forestlands (FOR); meadows, grasslands, shrublands (GS); fire management (FIRE); aquatic ecosystems (WTR, RMZ, CWN); wildlife (WL, WLMU, and ELK); and Lower Salmon River area (SR) sections provide for the maintenance and improvement for habitats supporting species of conservation concern. The Land Management Plan also includes other plan components specific to species of conservation concern, as shown in Table 306, to provide for ecological conditions that promote the diversity of plant and animal communities.

Table 306. Summary of plan components for species of conservation concern

Plan Component	Subject
FW-DC-GS-07	Desire for persistence of Daubenmire's dasynotus (*Dasynotus daubenmirei*) and Pacific dogwood (*Cornus nuttallii*)
FW-DC-GS-08	Desire for persistence of Douglas' clover (*Trifolium douglasii*) and sticky goldenweed (*Pyrrocoma hirta* var. *sonchifolia*)
FW-GDL-RMZ-10	Requirement to relocate pacific lamprey prior to channel dewatering

Plan Component	Subject
FW-DC-CWN-01	Desire for conservation watershed networks to have functionally intact ecosystems that contribute to and enhance the conservation of aquatic species of conservation concern
FW-DC-CWN-02	Desire for streams in the conservation watershed network to provide habitat that supports robust native fish populations
FW-DC-CWN-03	Desire for roads in the conservation watershed network present minimal risk to aquatic resources
FW-OBJ-CWN-02	Objective to stormproof road in conservation watershed networks
FW-DC-WL-04	Description of desired fisher habitat
FW-DC-WL-05	Description of desired bighorn sheep habitat
FW-GL-WL-03	Goal for public education to help reduce disease transmission to bighorn sheep from pack goats
FW-STD-WL-02	Limits domestic sheep and goat grazing authorization within 16 miles of bighorn sheep ranges
FW-GDL-WL-04	Requirement to include provisions in permit authorizations for domestic goat packing to prevent disease transmission to bighorn sheep
FW-STD-ARGRZ-03	Requires measures be included in annual operating instructions to prevent trampling of fish redds of species of conservation concern
FW-DC-ARREC-01	Recreation facilities and their use have minimal impacts on aquatic resources, including species of conservation concern
GA-DC-SR-02	Desire for maintenance or improvement of Ponderosa pine ecosystems and habitat for Ponderosa pine associated species, which include white-headed woodpecker and mountain quail
GA-OBJ-SR-01	Objective to improve mountain quail habitat

For further information on species of conservation concern, see the sections At-Risk Plant Species, Aquatic Ecosystems and Fisheries, and Abundance and Diversity of Wildlife in the Final Environmental Impact Statement.

Monitoring Plan and Focal Species

Appendix 3 of the Land Management Plan includes monitoring questions to track the status of a select set of the ecological conditions required under 36 CFR 219.9 to contribute to the recovery of federally listed threatened and endangered species, conserve proposed and candidate species, and maintain a viable population of each species of conservation concern.

The monitoring plan also includes monitoring questions to evaluate the status of focal species as a means to assess the ecological conditions required under 36 CFR 219.9. Focal species are a small subset of species whose status permits inference to the integrity of the larger ecological system to which it belongs. Monitoring focal species provides meaningful information regarding the effectiveness of the plan in maintaining or restoring the ecological conditions to maintain the diversity of plant and animal communities in the plan area.

Focal species are commonly selected on the basis of their functional role in ecosystems. The monitoring program must include one or more monitoring questions addressing the status of focal species as a means to assess the ecological conditions required under 36 CFR 219.9. Focal species for the Nez Perce-Clearwater are Western Pearlshell Mussel, Ponderosa Pine Xeric Habitat Ecotone, and Elk.

Western Pearlshell Mussel

The western pearlshell is long-lived, sedentary, and sensitive to environmental change, so it is considered an excellent indicator of water quality and overall watershed integrity. This species appears to be intolerant of sedimentation and increases in stream temperature. The desired condition for streams that support mussels is for aquatic habitats to contribute to ecological conditions capable of supporting self-sustaining populations of native species and diverse plant, invertebrate, and vertebrate aquatic and riparian-dependent species (FW-DC-WTR-03). The most effective means to improve western pearlshell mussel habitat is to minimize impacts by following Land Management Plan standards and guidelines and to utilize best management practices. Implementing water and aquatic resource objectives can restore habitat and improve riparian and stream functions.

Ponderosa Pine Xeric Habitat Ecotone

The Ponderosa Pine Xeric Habitat Ecotone is a transitional area of vegetation between low elevation, dry site Ponderosa pine and xeric grasslands and shrublands. This ecotone is threatened by a variety of stressors, including invasive species expansion, altered fire regimes, risk of severe wildfire, and changing climate. Decades of fire exclusion have resulted in an increase in understory ladder fuels, shifts in species composition toward shade tolerant species less resistant to fire, increases in crown fires, higher canopy densities, and forest succession. This habitat would otherwise have been maintained at more open densities by frequent low intensity fire. The change in disturbances shifts these forests away from the natural range of variability in terms of age structure, patch size, and species composition. Non-native, invasive, and noxious plants are an additional threat and are a pervasive problem in these dry habitats.

The ecotone supports wildlife species associated with Ponderosa pine dominated habitats, including two species of conservation concern, including the White-headed woodpecker, and the Mountain quail. Additionally, other Ponderosa pine associated species have drawn conservation interest or attention over time. The long-term persistence of these species can be achieved by restoring and conserving these important habitats and monitoring these habitats as a focal species will track the status and progress of conserving and restoring Ponderosa pine habitats.

Desired conditions (FW-DC-FOR-02) for the hot dry and warm dry Ponderosa pine habitat types in the warm dry broad potential vegetation type group[24] include stand densities that reflects the historic fire regime, which typically included frequent underburns, so stands are open and many-aged with younger trees occurring as small even-aged groups or individuals interspersed among the larger, long-lived trees. The overstory is dominated by large Ponderosa pine and the understory is composed of native grasses, forbs, and low shrubs.

The desired condition (FW-DC-GS-01) of xeric grassland communities, such as the bluebunch wheatgrass habitat type groups, is to have vegetation dominated by native bunchgrasses while conifers are absent or occur as scattered individuals. Xeric shrubland plant communities occur infrequently on drier sites, and the desired condition (FW-DC-GS-03) is to support shrub species, such as mountain mahogany and sumac. The understory should typically be dominated by native grass species. Canopy cover varies depending on the site and growing conditions but should typically be low to moderate.

[24] This is meant to include only the warmest and driest Ponderosa pine and Douglas-fir habitat types that historically experienced low severity underburns almost exclusively. This includes the Hot Dry and Warm Dry Northern Region (Region 1) Habitat Type Groups as described in (Milburn et al. 2015)

Management of these ecotones requires increasing the resiliency of hot/warm-dry Ponderosa pine habitat types as well as maintaining the non-forested xeric plant communities along this gradient. Managed wildland fire and associated pre-fire vegetation treatments are critical tools needed to maintain these sites and associated habitat characteristics.

Elk

Elk are one of Idaho's most iconic wildlife species and are one of the most highly sought-after big game animals in the state. Population declines have impacted this herd previously renowned for its abundance and trophy opportunity, which used to draw hunters from all over the country. The elk herds in the plan area play a distinctive role in the local communities and contribute to social and economic sustainability. There is a strong desire by the public, local and state governments, tribes, outfitter and guides, sportsman's groups, and other interest groups to improve habitat conditions for elk and recover and grow elk populations.

Elk herd numbers are influenced by both ecological and anthropogenic factors, such as forage availability, habitat quality, predation, and hunter harvest. Threats and stressors that can affect elk or their habitat include invasive weeds, departed fire return intervals and forest succession, timber harvest activities and associated road use, livestock grazing, human development adjacent to National Forest System lands, and motorized use on roads and trails.

The plan contains several desired condition that direct the management of elk habitats and include an emphasis on providing moderate or high quality nutrition and in particular to provide that nutrition in areas that are usable by elk. The amount and distribution of early seral nutritional resources are consistent with the desired conditions in the Forestlands and Meadows, Grasslands, and Shrublands sections of the Land Management Plan. The desired condition for Management Area 1 is that forage is created and maintained through natural disturbance processes and elk habitat quality is not degraded by invasive plant species. Additionally, it is desired that motorized access does not preclude use of high-quality nutritional resources or winter ranges.

On the Nez Perce-Clearwater, the most effective means to increase moderate or high-quality nutritional forage is through disturbance to forested habitats to create more early seral stage openings, particularly in those areas with higher nutritional capacity as modeled. Disturbance may include timber harvest, natural fire, prescribed fire, or other activities that reduce canopy cover.

Lands with distinctive classifications

Lands with distinctive classifications contain habitats that provide for rare aquatic and terrestrial plant and animal communities. These lands include the Lower Salmon River geographic area; research natural areas; special areas; recommended and designated wilderness areas; Idaho roadless areas; and eligible, suitable and designated wild and scenic rivers. Although these specially classified lands sometimes overlap with more than one designation, these areas still cover over 60 percent of the Nez Perce-Clearwater.

Lower Salmon River Geographic Area

The Lower Salmon River Geographic Area contains rich geological complexity, contributing to a biological community that is unique within the plan area. This geographic area contains a large portion of the driest of the warm dry potential vegetation group dominated by Ponderosa pine under a frequent low intensity fire system. These habitats support species associated with Ponderosa pine dominated habitats, including several species of conservation concern. The Lower Salmon River Geographic Area is host to most observations of Ponderosa pine species of conservation concern. For example, the Idaho Department of Fish and Game's Species Diversity Database (accessed January

2017) shows most observations of white-headed woodpecker, Lewis's woodpecker, fringed myotis, Townsend's big eared bats, and mountain quail occur within this geographic area. Similarly, the area contains substantial amounts of habitat for the flammulated owl and pygmy nuthatch.

The area is home to remarkable biodiversity and high endemism of land and aquatic snails. The lower Salmon River canyon has long been known as a hot spot of biodiversity for land snails, where more than 60 species have been identified to date, which represents more than half of the land snail biodiversity within the State of Idaho. Many of the land snail species are thought to be restricted to the lower Salmon River corridor, with some occupying this area and portions of the nearby Snake River while others are only known to inhabit a few rock outcrops. This area also provides habitat for wintering elk and important habitat for mule deer and contributions towards habitat for bighorn sheep. The Lower Salmon River geographic area totals approximately 210,695 acres.

The Land Management Plan includes the following plan components to support ecological intergrity in the Lower Salmon River Geographic Area:

GA-DC-SR-01. Forest vegetation grows on soils that support and developed under forested ecosystem. Grassland soils, including mollisol soils, support healthy grassland and shrubland communities with few trees.

GA-DC-SR-02. Habitat for Ponderosa pine associated species, including legacy trees and snags, are within desired conditions within Ponderosa pine systems (See FW-DC-FOR-02, FW-DC-FOR-03, FW-DC-FOR-04, and FW-DC-FOR-05). Understory characteristics do not facilitate stand replacing fires and are composed of native plants that provide insect populations as forage for Ponderosa pine associated species. These habitats are resilient to changes due to climate change.

GA-DC-SR-03. Habitat for endemic terrestrial snails is available.

GA-OBJ-SR-01. 100 acres of mountain quail habitat are restored in each five-year period.

Research Natural Areas

Research natural areas are permanently established to maintain areas of natural ecosystems and areas of special ecological significance. Research natural areas provide protection for biological diversity, affording some degree of assurance that a wide array of plant and animal species will be afforded a high degree of protection in the future. This protection may be most important for soil microorganisms, fungi, insects, and other forms of biological diversity on which ecosystems often depend the most, but which are the least understood. Research natural areas also can be selected to help protect specific populations of threatened, endangered, or sensitive species.

The Nez Perce-Clearwater has 18 designated research natural areas, totaling approximately 29,500 acres. The established research natural areas on the Nez Perce-Clearwater are permanently designated for the purpose of conserving biodiversity, conducting non-manipulative research and monitoring and fostering education. They serve as high-quality representative areas of the major forms of vegetative variability found in the Nez Perce-Clearwater, and they present reference areas for the study of natural ecological processes, including disturbances and climate change. They are also useful as controls, providing reference conditions when evaluating the impact of management on an area. In addition, the Land Management Plan includes four proposed research natural areas and the expansion of an existing research natural area under all action alternatives, totaling approximately 2,946 acres. The proposed research natural areas would be established through a separate decision by the regional forester. Forest Service Manual 4063 provides direction in the management of these areas and would be followed to conserve the plant associations or other features for which they were established. See Section 3.6.3 Research Natural Areas for more information.

The Land Management Plan includes a desired condition for research natural areas emphasizing designated and proposed research natural areas maintain a representation of natural systems found on the Nez Perce-Clearwater as a baseline for research, monitoring, and education by the agency, academia, and public interests. Wildfire, insects, and pathogens, along with other processes and disturbances, continue to affect vegetation, reflecting the dynamic nature of the systems they represent. Research natural areas contribute to ecological sustainability and biological diversity (MA2-DC-RNA-01).

Special Areas

Special areas are a category of administratively designated areas defined as an area or feature managed to maintain its unique special character or purpose (36 CFR 219.19), including those that may be botanical, geological, recreational, scenic, zoological, paleontological, or historical in nature. Such areas are protected and managed for public use and enjoyment and are identified due to their unique or special characteristics. Special areas are not congressionally designated but are administratively designated by the Chief of the Forest Service, regional forester, or forest supervisor (FSM 2372). The Nez Perce-Clearwater has eight designated areas covering 602 acres that would maintain their designations under all Action Alternatives. The Land Management Plan also includes six proposed special areas under all Action Alternatives, totaling 1,403 acres. Forest Service Manual 2372 provides direction in the management of these areas and would be followed to conserve the features for which they were established. See Section 3.6.4 Special Areas for further information.

The Land Management Plan includes a desired condition emphasizing that pecial Areas provide for public use and enjoyment and protect areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or unique values on the Nez Perce-Clearwater. Education and interpretation of these areas promote public awareness of these special features (GA-DC-SA-01).

Recommended and Designated Wilderness Areas

Wilderness areas allow natural ecological processes and disturbances to dominate and are important for maintaining species diversity and conserving threatened and endangered species. The Nez Perce-Clearwater contains the entire Gospel-Hump Wilderness and portions of the Selway-Bitterroot and Frank Church-River of No Return Wilderness areas, totaling approximately 1,139,000 acres within the national forest boundary. The combination of these three wilderness areas comprise an expansive block of nearly four million acres of wilderness in central Idaho and western Montana. Additionally, the Preferred Alternative proposes to recommend portions of four Idaho Roadless areas as recommended wilderness: East Meadow Creek, Hoodoo, Mallard-Larkins, and West Meadow Creek. Recommended wilderness areas are lands that have wilderness characteristics and may be suitable for inclusion in the National Wilderness Preservation System.

The Land Management Plan includes the following plan components to support ecological integrity in Recommended and Designated Wilderness Areas:

MA1-DC-WILD-01. Natural ecological processes and disturbances (for example, succession, wildfire, avalanches, insects, and disease) are the primary forces affecting the composition, structure, and pattern of vegetation.

MA2-DC-RWILD-01. Recommended wilderness areas maintain their existing wilderness characteristics to preserve opportunities for inclusion in the National Wilderness Preservation System.

MA2-DC-RWILD-02. Recommended wilderness areas are characterized by a natural environment where ecological processes and disturbances, such as natural succession, fire, avalanches, insects, and diseases, are the primary forces affecting the composition, structure, and patterns of vegetation.

MA2-DC-RWILD-03. Recommended wilderness areas facilitate the connectivity and movement of wildlife species across the Nez Perce-Clearwater by remaining large areas with little human activity.

Idaho Roadless Areas

The Nez Perce-Clearwater contains 34 separate Idaho roadless areas, totaling approximately 1,482,000 acres. Each area is assigned one or more management theme as outlined in the Idaho Roadless Rule—wild land recreation; primitive; backcountry/restoration; general forest, rangeland, and grassland; special areas of historic and tribal significance; and forest plan special areas. Each theme has established prohibitions with exceptions or conditioned permissions governing road construction, timber cutting, and discretionary mineral development. There are no open roads within the roadless areas.

The Land Management Plan includes the following plan components to support ecological integrity in Idaho Roadless Areas:

MA2-DC-IRA-01. Roadless Areas maintain the roadless characteristics and themes assigned to them in the Idaho Roadless Rule.

MA2-DC-IRA-02. The composition, structure, and pattern of vegetation reflect natural disturbances and follow Idaho Roadless Rule themes, as assigned.

MA2-DC-IRA-03. Roadless areas contribute habitats for wide ranging species and connectivity for movement of wildlife. These areas also provide foraging, security, denning, and nesting habitat for wildlife.

MA2-DC-IRA-05. Habitat configuration, distribution, and composition provide ecological conditions that increase elk herds.

Eligible, Suitable and Designated Wild and Scenic Rivers

Congress passed the National Wild and Scenic Rivers System Act in 1968 for the purpose of preserving rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. Natural values include water quality, geology, botany, fish, and wildlife. The act is recognized for safeguarding the special character of these rivers while also allowing for their appropriate use and development. The Nez Perce-Clearwater has three designated Wild and Scenic Rivers: Middle Fork Clearwater River, Salmon River, and Rapid River. The Middle Fork Clearwater includes the Lochsa and Selway Rivers. Designated Wild and Scenic River acres within the Nez Perce-Clearwater's administrative boundary total approximately 57,890 acres.

Additionally, the Preferred Alternative identified twelve river segments as eligible or suitable for inclusion as part of the Wild and Scenic Rivers System. Eleven rivers were identified as suitable: Salmon River, Weitas Creek, Kelly Creek, North Fork Kelly Creek, Middle Fork Kelly Creek, South Fork Kelly Creek, Cayuse Creek, Colt Killed Creek, Fish Creek, Hungery Creek, and Meadow Creek

(Selway). The Little North Fork Clearwater River is to remain eligible with no suitability decision made as part of the Land Management Plan. Interim protection measures would still apply. The Land Management Plan includes the following plan components to support ecological integrity in Designated and Eligible and Suitable Wild and Scenic Rivers:

MA1-DC-DWSR-01. Designated wild, scenic, and recreational rivers retain their free-flowing condition, water quality, and the outstandingly remarkable values for which the river was designated.

MA2-DC-E&SWSR-01. Eligible and suitable wild, scenic, and recreational rivers retain their free-flowing condition, preliminary classification, and the outstandingly remarkable values that provide the basis for their eligibility or suitability for inclusion in the system.

Diversity of Native Tree Species

The Nez Perce-Clearwater has a wide diversity of terrestrial vegetation communities due to its geographic location, geology, topography, range in elevation, and climate. Vegetation ranges from dense coniferous forests in warm, moist or dry valley bottoms to sparsely forested types on cold, steep, high-elevation sites. Forested vegetation is categorized into four broad potential vegetation type groups – warm dry, warm moist, cool moist, and cold.

The Nez Perce-Clearwater supports 14 native conifer tree species found on the Nez Perce-Clearwater: Ponderosa pine, Douglas-fir, grand fir, lodgepole pine, western larch, western white pine, western red cedar, western hemlock, mountain hemlock, Pacific yew, Engelmann spruce, subalpine fir, alpine larch, and whitebark pine. Several hardwood tree species are present and may be intermixed with conifer species or may occur as single species patches on suitable landscapes. Hardwood species include quaking aspen, paper birch, water birch, cottonwood spp., mountain ash, mountain mahogany, and Rocky Mountain maple.

An important feature to note about the forests of the northern Rocky Mountain ecosystem is the influence of long-lived, fire tolerant, early successional species in the successional process and in the composition and structure of forests at all stages of development and on all sites. Species, such as western larch, Ponderosa pine, western white pine, whitebark pine, and Douglas-fir, are able to survive for several centuries. In many areas, the fully developed "true" climax forest conditions may be relatively uncommon due to the long-term persistence of these early successional species. These species tolerance of low or even moderate severity fire allows some to survive through the less severe fire events. Though they may or may not be numerous, they grow to large stature and become prominent features of the overstory tree canopy, providing important structural components of late successional and old growth forests. When severe stand replacing fire occurs, they are well adapted to take advantage of the open burned forest conditions and reforest the site.

The ecosystem elements, such as species composition, structural stage, stand age, canopy closure, and fuel loadings, are representative of the potential vegetation types' resilience to current and future disturbance. Fire is a primary ecological process that has created, maintained, and renewed vegetation on the Nez Perce-Clearwater. With fire exclusion, dense understories and thickets of conifers have produced stands that are highly susceptible to a variety of insect and disease epidemics and uncharacteristic wildfire effects. The fire regimes within the warm dry and warm moist potential vegetation type have moderate to high departures, indicating that many of these areas have missed one or more fire return intervals and have the potential for higher severity fire as a result. The cool and cool moist potential vegetation types have low to moderate departure but could move toward a higher departure without disturbance.

Old growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics, which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function. The Land Management Plan provides direction for managing old growth that is consistent with natural patterns and ecological processes and includes plan components MA2 and MA3-DC-FOR-10 and MA3-STD-FOR-01, which are designed to maintain or increase old growth conditions.

MA2 and MA3-DC-FOR-10. Amounts of Ponderosa pine, western larch, western white pine, and whitebark pine dominant old growth cover types are maintained or increased from existing amounts. Amounts of western redcedar, Pacific yew, and western hemlock dominant old growth cover types are maintained through time.

MA3-STD-FOR-01. Within Ponderosa pine, western larch, western white pine, Pacific yew, western redcedar, western hemlock, and whitebark pine old growth stands, vegetation management activities shall not be authorized if the activities would likely modify the characteristics of the stand to the extent that the stand would no longer meet the definition of old growth ten years post activity. See glossary for old growth definition.

Plan components MA2 and MA3-GDL-FOR-02, MA2 and MA3-GDL-FOR-03, and MA2 and MA3-GDL-FOR-04 also provide guidance for maintaining old growth cover types.

For further information on terrestrial ecosystem integrity and diversity, see the section Forestlands in the Final Environmental Impact Statement.

The Land Management Plan includes numerous plan components to maintain or restore the persistence and diversity of native tree species within the plan area, as shown in Table 307. The plan components in the forestlands section were developed to maintain or restore the composition, structure, function, and connectivity of terrestrial ecosystems, considering multiple spatial and temporal scales.

Table 307. Summary of plan components that maintain or restore the persistence and diversity of native tree species

Plan Component	Subject
FW-DC-TE-04	Desired condition for native plant communities
FW-DC-TE-05	Desired condition for riparian vegetation, including conifers and hardwoods
FW-DC-FOR-01	Aspen persists as vigorous; multi-age stands over time across its range
FW-DC-FOR-02, FW-DC-FOR-04, FW-DC-FOR-07, FW-DC-FOR-10, MA1 and MA2-DC-FOR-09, MA3-DC-FOR-07	Desired condition for within-stand characteristics for each potential vegetation type
FW-DC-FOR-03, FW-DC-FOR-06, FW-DC-FOR-09, FW-DC-FOR-13	Desired condition for vegetation composition for each potential vegetation type
MA1-DC-FOR-01, MA2-DC-FOR-01, MA3-DC-FOR-01, MA1-DC-FOR-02, MA2-DC-FOR-02, MA3-DC-FOR-03, MA1-DC-FOR-03, MA2-DC-FOR-03, MA3-DC-FOR-05, MA1-DC-FOR-04, MA2-DC-FOR-04, MA3-DC-FOR-08	Desired condition for stand density for each potential vegetation type
FW-DC-FOR-05, FW-DC-FOR-08, FW-DC-FOR-11, FW-DC-FOR-12	Desired condition for size class distribution for each potential vegetation type

Plan Component	Subject
MA1 and MA2-DC-FOR-05, MA1 and MA2-DC-FOR-06, MA3-DC-FOR-02, MA1 and MA2-DC-FOR-07, MA3-DC-FOR-04, MA1 and MA2-DC-FOR-08, MA3-DC-FOR-06, MA3-DC-FOR-09	Desired condition for landscape pattern and patch size for each potential vegetation type
MA3-DC-FOR-11	Description of snag densities and distribution to contribute to diversity of structure and habitat
MA3-DC-FOR-12	Description of the role of timber harvest to affect composition, structure, and pattern of vegetation
FW-OBJ-FOR-01	Objective to restore aspen
FW-OBJ-TE-01	Objective to restore hardwood species in riparian areas
MA3-OBJ-FOR-01, MA3-OBJ-FOR-02, MA3-OBJ-FOR-03, MA3-OBJ-FOR-04	Objective to restore vegetation acreage in Management Area 3 through timber harvest for each potential vegetation type
MA2-OBJ-FOR-01	Objective to restore vegetation acreage in Management Area 2 through timber harvest and prescribed fire for all potential vegetation types
MA2-OBJ-FOR-02, MA2-OBJ-FOR-03, MA2-OBJ-FOR-04, MA2-OBJ-FOR-05	Objective to increase seral species through artificial regeneration following wildfire for each potential vegetation type
MA3-GDL-FOR-06	Guidance for live tree retention
MA3-GDL-FOR-07, MA2 and MA3-GDL-FOR-05	Guidance for snag retention
MA2 and MA3-GDL-FOR-01	Guidance for Coarse Woody Material retention by potential vegetation type group

Additional, Species-specific Plan Components, 36 CFR 219.9(b)

The Land Management Plan also includes species specific plan components for species not federally listed or identified as species of conservation concern, as shown in Table 308, to further provide for ecological conditions that promote the diversity of plant and animal communities.

Table 308. Summary of general species-specific plan components

Plan Component	Subject
FW-GDL-TE-01	Limits the removal or alteration of habitat of at-risk plants, terrestrial invertebrate animals, and Coeur d'Alene salamanders assigned a particular NatureServe ranking
FW-DC-CAVE-04	Provision for maintenance of bat habitat and limitation of bat diseases
FW-STD-CAVE-02	Requires decontamination procedures to prevent the introduction or spread of disease to bats
FW-GDL-CAVE-02	Provision for bat population enhancement and protection measures
FW-DC-FOR-01	Desire for persistence of aspen
FW-GL-WTR-03	Goal of improving habitat for beaver where appropriate
FW-DC-WTR-09	Desire for beaver presence in suitable areas to improve aquatic conditions
FW-GDL-WTR-07	Requirement to relocate western pearlshell mussel prior to channel dewatering
FW-GDL-WL-02	Requires avoidance of impacts to bats when closing mines
FW-DC-WLMU-03	Desire for the persistence of pacific yew, which provides moose winter habitat
MA1-DC-WLMU-01, MA2-DC-WLMU-01, MA3-DC-WLMU-01	Desire for habitat conditions to maintain or improve elk habitat use and provide high-quality nutritional resources sufficient to support productive elk populations

Plan Component	Subject
FW-DC-WLMU-07	Elk habitat is provided though the planning area to contribute to elk populations
MA2-DC-WLMU-02	Desire for areas at least 5000 acres in size to exist without motorized access
MA1-OBJ-WLMU-01, MA2-OBJ-WLMU-01, MA3-OBJ-WLMU-01	Objectives to improve elk habitat and produce high-quality nutritional resource areas
MA3-GDL-WLMU-01	Guidance to improve elk habitat to improve predicted cow elk body fat condition
MA2-GDL-WLMU-01, MA2-GDL-WLMU-02	Guides the increase of available summer forage for elk
FW-OBJ-TT-01	Restore forested stands to promote huckleberry abundance
FW-OBJ-TT-02	Increase camas production

Conclusions

The Land Management Plan provides for ecological integrity in an integrated manner. The Land Management Plan, under all Action Alternatives, includes plan components that:

- provide for ecological sustainability (36 CFR 219.8) and the diversity of plant and animal communities and persistence of native species (36 CFR 219.9);
- specify direction to restore, establish, and maintain functioning ecosystems that would have greater adaptive capacity to withstand stressors and recover from disturbances, especially changing and uncertain environmental conditions and extreme weather events; and
- give direction to retain or restore ecological conditions to sustain ecosystems that maintain the diversity of plant, fish, and animal communities and the persistence of native species in the plan area.

The Land Management Plan also includes plan components that address the effects of a changing climate and provide climate change adaptation strategies. See Appendix G for examples of climate change adaptation strategies and the plan components that support the strategies.

3.3 Tribal Trust and Responsibilities

Trust responsibilities arise from the United States' unique legal relationship with Indian tribes. It derives from the Federal Government's consistent promise in the treaties that it signed to protect the safety and well-being of the Indian tribes and tribal members. Federal Indian Trust responsibility is now defined as a legally enforceable fiduciary obligation, on the part of the United States, to protect tribal lands, assets, resources, and reserved rights, as well as a duty to carry out the mandates of federal law with respect to American Indians and Alaska Native tribes. This responsibility requires that the Federal Government consider the best interests of the Indian tribes in its dealings with them and when taking actions that may affect them. The trust responsibility includes protection of the sovereignty of each tribal government. The United States recognized tribes by treaty, executive order, or statute; each method reserved rights in different ways. The Nez Perce-Clearwater National Forest is responsible for the government’s trust responsibility by ensuring actions do not diminish rights of Indian tribes and tribal members and by treating National Forest System resources as trust resources where fiduciary rights exist.

The intent of this report is to analyze the extent to which each alternative protects tribal resources and reserved rights on the Nez Perce-Clearwater.

The Nez Perce-Clearwater is considered part of the aboriginal homeland of the Nez Perce Tribe, herein referred to as Tribe, and the Nez Perce-Clearwater's boundaries lie within the territories ceded to the United States by the Nez Perce Tribe in the Treaty of 1855. At that time, Nez Perce leaders reserved hunting, fishing, gathering, and pasturing rights on "open and unclaimed land," which the courts later determined included lands now managed by the Nez Perce-Clearwater. Although subsequent treaties in 1863 and 1868 diminished the size of the original reservation from 7.5 million acres to its current 750,000 acres, all off-reservation rights were preserved. The Nez Perce Tribe is extremely interested in nearly all activities proposed on the Nez Perce-Clearwater and is actively engaged in implementing many projects on the Nez Perce-Clearwater.

Following the Nez Perce War of 1877, many Nez Perce were exiled in Oklahoma. Most survivors later returned to the Nez Perce Tribe in Idaho, the Confederated Tribes of the Umatilla Indian Reservation in Oregon, and the Colville Confederated Tribes in Washington. Therefore, those tribes occasionally indicate an interest in the Nez Perce-Clearwater projects, especially projects in the vicinity of the Nez Perce (Nee-Me-Poo) National Historic Trail, which was designated by Congress to commemorate the flight of about 750 Nez Perce men, women, and children during that war.

Currently, there are about 3,500 enrolled Nez Perce citizens and roughly 60 percent of those live on the Nez Perce Reservation, adjacent to the Nez Perce-Clearwater's boundary. The Dawes Act opened about 500,000 acres of the Nez Perce Reservation to non-Indian settlement, leaving only 250,000 acres for the Nez Perce people. This increases the importance of the Nez Perce-Clearwater for subsistence. Modern Nez Perce people hunt, fish, and gather traditional foods and medicines on the Nez Perce-Clearwater. Many Nez Perce people continue to access traditional sites for religious and spiritual purposes.

The Nez Perce-Clearwater and Nez Perce Tribe actively cooperate in areas of treaty interest, rights, traditional and cultural resources, and ecosystem integrity by maintaining opportunities for traditional land and resource use. The presence of healthy habitats is fundamental to the achievement of both usable and harvestable levels of resources significant to American Indians, as well as to ecosystem integrity.

Since the 1990s, the Nez Perce Tribe has continued to increase internal capacity to engage with the Forest Service in a variety of ways. The Nez Perce Tribe began leveraging Bonneville Power Association funds to invest in habitat improvements to mitigate the effects of hydropower dams in the Snake River Basin. In 1998, the Tribe and the Clearwater National Forest jointly completed aquatic habitat improvement work in the Lochsa drainage. The project's success quickly led to a dynamic aquatic restoration partnership that exists to this day and extends across the entire Nez Perce-Clearwater, south into the Payette and Boise National Forests, and west into the Wallowa-Whitman and Umatilla National Forests. In addition to the aquatic restoration partnership, the Nez Perce Tribe and the Nez Perce-Clearwater also have robust relationships around invasive weeds, fire management, youth engagement, and a growing relationship in climate change adaptation.

With the Nez Perce Tribe's cultural connection to salmon and their contributions to habitat improvement, the Tribe tends to be very cautious of soil disturbance from vegetation-related activities and their comments typically favor minimal harvest and road construction.

Nez Perce-Clearwater leadership seeks to learn from both tribal leaders and tribal citizens to improve understanding of how Nez Perce-Clearwater actions can impact treaty-protected resources, access to exercise treaty rights, and the tribal economy. The federal government has trust responsibilities to tribes under a government-to-government relationship to ensure that the Tribe's reserved rights are protected. Consultation with tribes in the early phases of project planning helps the Nez Perce-Clearwater meet trust responsibilities. The Nez Perce-Clearwater strives to protect treaty rights and adhere to trust responsibilities in a variety of ways, including the following:

- Employ a full-time tribal liaison to be a single point of contact and track issues and identify emerging opportunities.
- Meet at least quarterly with Nez Perce Tribe professional staff to provide early and frequent opportunities to communicate about proposed projects and to inform both Nez Perce-Clearwater and tribal decision makers.
- Consult with the Nez Perce Tribal Executive Committee, as needed, when staff identify possible project impacts or when Nez Perce-Clearwater or Nez Perce Tribe leadership deems it necessary.
- Provide annual opportunities for Nez Perce Tribal Executive Committee field visits to build and maintain interpersonal relationships with the Nez Perce-Clearwater leadership team and to gain shared understanding around land management issues and opportunities.
- Participate in the Nez Perce Tribe's bi-annual General Council meetings with tribal members to interact with and learn from Nez Perce citizens.
- Train Nez Perce-Clearwater employees on treaty rights, trust responsibilities, and Nez Perce culture to raise awareness and sensitivity.
- Reach out to neighboring tribes on projects in areas of known interest.

Tribal consultation on the current revision of the Land Management Plan began in 2012 when the Nez Perce-Clearwater was initially identified as an "early adopter." The Nez Perce-Clearwater and Nez Perce Tribe cooperated to provide a liaison to the revision efforts to help coordinate internal staff meetings and external tribal public meetings. A Nez Perce Tribal Executive Committee representative and the Land Management Plan liaison participated in several public collaboration events. Dozens of staff meetings and conversations with Nez Perce Tribe specialists helped to inform the team of the Nez Perce Tribe's unique perspectives. The Land Management Plan team accepted invitations from the Nez Perce Tribe to speak with tribal citizens at community meetings on the Nez Perce Reservation and at the General Council.

The Nez Perce Tribe accepted an invitation to be a cooperating agency in July of 2014.

The team invited the Coeur d'Alene Tribe, Confederated Salish-Kootenai Tribes, and the Confederated Tribes of the Colville Reservation to consult. Traditionally the Coeur d'Alene and Confederated Salish-Kootenai tribes have deferred to the Nez Perce Tribe on management recommendations for the Nez Perce-Clearwater.

The Coeur d'Alene Tribe was established by Executive Order in 1873. A small portion of the Palouse Ranger District abuts the Coeur d'Alene Reservation. To date, the Coeur d'Alene Tribe has been most interested in Palouse District projects nearest their reservation.

The Idaho-Montana border is a natural geographic division between the Nez Perce and Confederated Salish-Kootenai Tribes. The Confederated Salish-Kootenai tend to be most interested in activities proposed adjacent to the Montana border and along the Lolo Trail, which was a traditional travel corridor for them.

3.3.1 Relevant Laws, Regulations, and Policy

Federal Laws

Treaty with the Nez Perce of 1855, Article 3: Secured for the Nez Perce, “"...the right, in common with citizens of the United States, to travel upon all public highways...the exclusive right of taking fish in all the streams where running through or bordering said reservation...also the right of taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.” National Forest System lands have been determined to be “opened and unclaimed” and are subject to these treaty-reserved rights.

Treaty with the Nez Perce of 1863, Article 8: “The United States also agrees to reserve all springs or fountains not adjacent to, or directly connected with, the streams or rivers within the lands hereby relinquished...and further, to preserve a perpetual right of way to and from the same, as watering places, for the use in common of both whites and Indians.”

The Hellgate Treaty of 1855: The Flathead, Kootenai, and Upper Pend d'Oreilles Indian Tribes reserved rights under the Hellgate Treaty of 1855 (July 16, 1855). These rights include the "right of taking fish at all usual and accustomed places, in common with citizens of the Territory, and of erecting temporary buildings for curing; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.”

National Historic Preservation Act of 1966 (P.L. 89-665, as amended, P.L. 91- 423, P.L. 94-422, P.L.94-458 and P.L. 96-515) – Regulations 36 CFR Part 800 and 36 CFR 36 CFR Part 7: This act pertains only to tangible properties, such as buildings, structures, sites, or objects, which are important in history and prehistory. It requires agencies to consider the effects of undertakings on properties eligible to or listed in the National Register of Historic Places by following the regulatory process specified in 36 CFR 800. The portions of that act that relate specifically to coordination with Indian Tribes were added in the 1992 amendments. These additions reflect the increased importance placed on tribal relations. A section of the act directs state and federal governments to assist in the establishment of preservation programs on Indian lands.

The portions of Section 2 pertaining to tribal relations state the following:

It shall be the policy of the federal government, in cooperation with other nations and in partnership with the state, local governments, Indian Tribes, and private organizations and individuals to:
(2) Provide leadership in the preservation of the prehistoric and historic resources of the United States and of the international community of nations and in the administration of the national preservation program.
(6) Assist state and local governments, Indian Tribes and Native Hawaiian organizations and the National Trust for Historic Preservation in the United States to expand and accelerate their historic preservation programs and activities.

National Environmental Policy Act of 1969 (P.L .91-190) and Regulations 40 CFR 1500-1508: With this act, federal agencies began to invite Indian Tribes to participate in forest management projects and activities that may affect them.

National Forest Management Act of 1976 (P.L. 4-588): This act directs consultation and coordination of National Forest System planning with Indian Tribes.

American Indian Religious Freedom Act of 1978 (P.L.95-341 as amended, P.L. 103-344): This act states that "...it shall be the policy of the United States to protect and preserve for American Indians their inherent right for freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to site, use and possession of sacred objects, and the freedom to worship through ceremonies and traditional rites."

Agencies must make a good faith effort to understand how Indian religious practices may come into conflict with other forest uses and consider any adverse impacts on these practices in their decision-making practices. The consideration of intangible, religious, ceremonial, or traditional cultural values and concerns which cannot be tied to specific cultural sites and properties could be considered under this act.

Archaeological Resources Protection Act of 1979 (P.L. 96-95) and Regulations 43 CFR Part 7: This act establishes a permit process for the management of cultural sites on federal lands, which provides for consultation with affected tribal governments.

Native American Graves Protection and Repatriation Act of 1990 (P.L. 101- 601, 25 U.S.C. 3001-3013) and Regulations 43 CFR Part 10: This act addresses the rights of lineal descendants and members of Indian Tribes, Alaska Native, and native Hawaiian organizations to certain human remains and precisely defined cultural items. It covers items currently in federal repositories, as well as future discoveries. The law requires federal agencies and museums to provide an inventory and summary of human remains and associated funerary objects. The law also provides for criminal penalties in the illegal trafficking in Native American human remains and cultural items.

Healthy Forest Restoration Act of 2003 (P.L. 108-148): This act directs the Forest Service to include tribes in collaboration efforts for planning and multi-party monitoring of hazardous fuels reduction projects.

Tribal Forest Protection Act of 2004 (P.L. 108-278): This act directs the Forest Service to accept and analyze proposals for restoration activities on National Forest System lands that pose a fire, disease, or other threat to Indian forest land. The act also authorizes the Forest Service to enter into agreements or contracts with tribes to implement those projects.

Food, Conservation, and Energy Act of 2008 (P.L. 110-234, "The Farm Bill"): This act authorizes reburial of human remains on National Forest System lands, prevents unauthorized disclosure of cultural information, ensures access for traditional cultural purposes, and authorizes forest products for traditional cultural purposes.

Federal Lands Recreation Enhancement Act of 2004 (16 U.S. Code Chapter 87): §6802.d.1.(I) and (J) of U.S. Code Chapter 87 prohibits the Forest Service from collecting fees from:

- Any person who has a right of access for hunting or fishing privileges under a specific provision of law or treaty.
- Any person who is engaged in the conduct of official federal, state, tribal, or local government business.

Executive Orders

Executive Order 12866 of 1993 – Regulatory Planning and Review: This order enhances planning and coordination with respect to both new and existing regulations and makes the process more accessible and open to the public. Agencies shall seek views of tribal officials before imposing regulatory requirements that might affect them.

Executive Order 12898 of 1994 – Environmental Justice in Minority Populations and Low-Income Populations: This order directs federal agencies to focus on the human health and environmental conditions in minority and low-income communities, especially in instances where decisions may adversely impact these populations.

Executive Order 13007 of 1996 – Indian Sacred Sites: This order acknowledges the role of federal agencies to protect and preserve the religious practices and places of federally-recognized tribes and enrolled tribal members. It also requires agencies to consult with federally recognized tribes to address tribal concerns for sacred sites on public land and to ensure access to religious places and avoidance of adverse effects to sacred sites in accordance with existing legislation.

Executive Order 13084 of 1998 – Consultation and Coordination with Indian Tribes Governments: This order calls upon agencies to use flexible policy approaches at the Indian tribal level in cases when a proposed waiver is consistent with applicable federal policy objectives. The order calls upon agencies to grant waivers in areas where the agency has discretion to do so. This should be done when a tribal government makes a request and, for those instances where the agency may decline such a request, a reason must be supplied to the tribe.

Executive Order 13175 of 2000 – Consultation and Coordination with Indian Tribal Governments: This order provides direction for consultation with tribal governments for formulating or implementing policies that have tribal implications. The order also provides direction regarding consultation and coordination with Indian Tribes relative to fee waivers and calls upon agencies to use a flexible policy with tribes in cases where proposed waivers are consistent with applicable federal policy objectives. It directs agencies to grant waivers in areas where the agency has the discretion to do so when a tribal government makes a request. When a request is denied, the agency must respond to the tribe in writing with the rationale for denial.

Executive Order 14008 of 2021, Tackling the Climate Crisis at Home and Abroad: This order provides direction for a government-wide approach to combat the climate crisis. The order requires a coordinated approach from planning to implementation coupled with substantive engagement by stakeholders, including state, local, and tribal governments. This order also created the Justice40 Initiative that sets the goal that 40% of covered investments will benefit disadvantaged communities and required the development of an online assessment tool to identify disadvantaged communities. Finally, the order also established the Environmental Justice Scorecard.

Executive Order 13985 - Advancing Racial Equity and Support for Underserved Communities Through the Federal Government: This order recognizes the unbearable human costs of systemic racism that arise from entrenched disparities in our laws and public policies, and in our public and private institutions that have often denied equal opportunity to individuals and communities. Consequently, this order 1) provides a definition of equity and underserved communities; 2) direct the Domestic Policy Council to coordinate efforts to embed equity principles, policies, and approaches across the Federal Government; 3) direct OMB to study methods and identify best practices for equity assessments then conduct equity assessment of agency policies, programs, and actions; 4) **establish an Equitable Data Working Group; and 5) require equity action plans for each agency.**

Executive Order 14072 of 2022 – Strengthening the Nation's Forests, Communities, and Local Economies: This order established a policy to, among other things, pursue science-based, sustainable forest and land management; conserve America's mature and old-growth forests on Federal lands; invest in forest health and restoration; support indigenous traditional ecological knowledge and cultural and subsistence practices in our Nation's forests; and honor Tribal treaty rights. A November 2022 letter (Guidance for Federal Departments and Agencies on Indigenous Knowledge) issued guidance and promising practices that Agencies should consider when working with Tribal Nations and Indigenous Peoples to include Indigenous Knowledge in Federal policy, research, or other decision making. It reaffirms that Agencies should recognize and, as appropriate, apply Indigenous Knowledge in decision making, research, and policies across the Federal Government.

Executive Order 14096 of 2023 - Revitalize Our Nation's Commitment to Environmental Justice for All: This order revitalizes and builds on the federal government's commitment to environmental justice. It adds achieving environmental justice to the mission of each agency and recognizes communities with environmental justice concerns experience disproportionate and adverse human health or environmental burdens. This order also updates the definition of environmental justice; 2) create environmental justice strategic plans and subsequent environmental justice assessments; 3) establish an Environmental Justice Subcommittee of the National Science and Technology Council, the White House Environmental Justice Interagency Council, and the White House Office of Environmental Justice is hereby established within the Council of Environmental Quality.

Agency Regulations

36 CFR 261 – Prohibitions in Areas Designated by Order (2011): This regulation enforces the closure of National Forest System lands to protect privacy of tribal activities and "provides regulations regarding special closures to provide for closure of National Forest System lands to protect the privacy of tribal activities for traditional and cultural purposes…to ensure access to National Forest System land, to the maximum extent practicable, by Indian and Indian Tribes for traditional and cultural purposes."

36 CFR 223.239 and 36 CFR 223.240 – Sale and Disposal of National Forest System Timber, Special Forest Products, and Forest Botanical Products: Section 223.239 provides regulations for free-use without a permit for members of tribes with treaty or other reserved rights related to special forest products. It also provides regulations for free-use without a permit upon the request of the governing body of a Tribe. Section 223.240 provides regulations regarding harvest of special forest products by tribes with treaty or other reserved rights.

Policy

Forest Service Manual 1500: External Relations – Chapter 1560: State, Tribal, County, and Local Agencies; Public and Private Organizations – Interim Directive No. 1560-2010-1: This policy provides an interim directive for implementing Sections 8103 and 8106 of the "2008 Farm Bill" regarding reburial sites on National Forest System land, reburial, and prohibition on disclosure.

Forest Service Handbook 2409.18: Timber Sale Preparation Handbook – Chapter 80: Uses of Timber Other than Commercial Timber Sales, Special Forest Products–Forest Botanical Products – Section 82.5: Forest Products for Traditional and Cultural Purposes – Amendment No. 2409.18-2017-1: This policy provides directive for granting trees, portions of trees, or forest products to federally recognized Indian Tribes free-of-charge for non-commercial traditional and cultural purposes, per Section 8105 of the "2008 Farm Bill."

#30-MOU-98-001 – "Campground MOU": Local policy between the Nez Perce Tribe and six National Forests within their ceded territories exempting enrolled Nez Perce tribal members from campground fees and camping stay limits.

Nez Perce Tribe Firewood Policy Letter (May 28, 2006): Letter from six Forest Supervisors in the Nez Perce Tribe's ceded territories exempting enrolled tribal members from fees to collect firewood. Letter describes ways to obtain firewood while complying with public health and safety restrictions and good stewardship practices.

Joint Secretarial Order 3403 on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters of 2021: This order establishes how the Departments of Agriculture and Interior will fulfill their obligations to Federally recognized Indian Tribes by directing Agencies to, among other things, 1) ensure that all decisions relating to Federal stewardship of Federal lands, waters, and wildlife under their jurisdiction include consideration of how to safeguard the interests of any Indian Tribes such decisions may affect, 2) make agreements with Indian Tribes to collaborate in the co-stewardship of Federal lands and waters, and 3), identify and support Tribal opportunities to consolidate Tribal homelands and empower Tribal stewardship of those resources.

Memorandum of Understanding Regarding Interagency Coordination and Collaboration for the Protection of Tribal Treaty Rights of 2021: This memo affirms the protection of tribal treaty rights, reserved rights and similar tribal rights to natural and cultural resources when federal action is taken. More specifically, it emphasizes that Treaty-protected rights to use of and access to natural and cultural resources are an intrinsic part of tribal life and are of deep cultural, economic, and subsistence importance to tribes. It underscores that treaties protect not only the right to access natural resources, such as fisheries, but also protect the resource itself from significant degradation.

Presidential Memo on Indigenous Traditional Ecological Knowledge and Federal Decision Making of 2021: This memo recognizes Indigenous Traditional Ecological Knowledge (ITEK)—a form of Indigenous Knowledge—as one of the many important bodies of knowledge that contributes to the scientific, technical, social, and economic advancements of the United States and to our collective understanding of the natural world. Furthermore, it emphasizes the rights of Indigenous knowledge holders to control access to their knowledge, to grant or withhold permission, and to dictate the terms of its application. It created the Interagency Working Group on Indigenous Traditional Ecological Knowledge to enhance interagency collaboration and coordination and create guidance for including ITEK into Federal scientific and policy decisions.

Presidential Memo on Guidance for Federal Departments and Agencies on Indigenous Knowledge of 2022: This document directs Agencies to include Indigenous Knowledge as an aspect of best available science. More specifically, to assist Agencies in (1) understanding Indigenous Knowledge, (2) growing and maintaining the mutually beneficial relationships with Tribal Nations and Indigenous Peoples needed to appropriately include Indigenous Knowledge, and (3) considering, including, and applying Indigenous Knowledge in Federal research, policies, and decision making. It also identifies promising practices—based on agency experience and Tribal and Indigenous input—for collaborating with Tribal Nations and Indigenous Peoples, considering and applying Indigenous Knowledge in implementing statutory and regulatory requirements, and respecting the decisions of

Tribal Nations and Indigenous Peoples to engage or decline to participate in Federal processes, on their terms.

Strengthening Tribal Consultations and Nation-to-Nation Relationships: A USDA Forest Service Action Plan (February 2023): This Action Plan provides agency guidance and assistance to fulfill the Federal trust responsibility, honor treaty obligations, and support Tribal self-determination. It is divided into four focus areas and is designed to address barriers identified during consultation with Tribes and Alaska Native Corporations and by staff in the Tribal Relations Program. The Action Plan includes tables of action items and responsible staff and program areas across the Forest Service with an intended completion date. The action items are centered on the agency, but may require upward coordination with U.S. Department of Agriculture (USDA). The Action Plan provides a framework for advancing existing laws, regulations, and policies in the Forest Service and is not intended to amend or establish new policy or directive.

USDA Forest Service Equity Action Plan of 2023: Required under Executive Order 13985 - Advancing Racial Equity and Support for Underserved Communities Through the Federal Government, this plan outlines the USDA Forest Service's commitment and supports the U.S. Department of Agriculture's and Administration's leadership in advancing racial equity and support for underserved communities. It describes 10 high-impact Agency-wide actions that will benefit Tribes, partners, the public, and employees.

Memorandum on Restoring Healthy and Abundant Salmon, Steelhead, and Other Native Fish Populations in the Columbia River Basin (Sep 7, 2023): This memorandum sets forth the following language as the policy:

Section1. Policy. It is a priority of my Administration to honor Federal trust and treaty responsibilities to Tribal Nations — including to those Tribal Nations harmed by the construction and operation of Federal dams that are part of the Columbia River System (CRS) — and to carry out the requirement of the Pacific Northwest Electric Power Planning and Conservation Act (Public Law 96-501) to operate, manage, and regulate the CRS to adequately protect, mitigate, and enhance fish and wildlife affected by the Federal dams in the Basin in a manner that provides equitable treatment for fish and wildlife with the other purposes for which the Federal dams are managed and operated.

In recognition of these priorities, it is the policy of my Administration to work with the Congress and with Tribal Nations, States, local governments, and stakeholders to pursue effective, creative, and durable solutions, informed by Indigenous Knowledge, to restore healthy and abundant salmon, steelhead, and other native fish populations in the Basin; to secure a clean and resilient energy future for the region; to support local agriculture and its role in food security domestically and globally; and to invest in the communities that depend on the services provided by the Basin's Federal dams to enhance resilience to changes to the operation of the CRS, including those necessary to address changing hydrological conditions due to climate change.

It also includes instructions to federal agencies regarding implementation, and directs federal agencies to use their authorities and available resources to further the policy found in Section 1.

State and Local Plans

Nez Perce Tribe Department of Fisheries Resource Management Plan (2013–2028): The Nez Perce Tribe's fisheries resource management plan includes a set of management goals and management objectives to achieve those goals. Management objectives include those related to achievement of escapement goals for anadromous fish, including habitat management of key populations within the Nez Perce-Clearwater, such as Lolo Creek, the Potlatch River, the Upper South Fork Clearwater River, the Lochsa River, Meadow Creek, Moose Creek, and the Upper Selway River. Habitat management objectives include emphasis on watershed restoration within a "ridge-to-ridge" management philosophy where stream habitat is degraded. The government-to-government relationship with the U.S. Forest Service, including the Nez Perce-Clearwater, is also described. Co-management of federal lands and cooperation on an extensive body of work, including restoration projects, fish and habitat monitoring, operation of acclimation sites, facility use, harvest access, and effects of forest management actions, transpires on the 11 National Forests with which the Nez Perce Tribe shares a working relationship.

Nez Perce Tribe's Draft Integrated Resource Management Plan: The Nez Nez Perce Tribe is currently in the process of developing an integrated resource management plan. This plan seeks to "establish programmatic resource management direction and balance the Tribe's economic development and resource stewardship goals within the boundaries of the Nez Perce Reservation" (Nez Perce Tribe 2023). The plan is in draft form at present, and the tribe is soliciting comments and holding public meetings. However, it is expected that a final version will be produced that articulates the Tribe's values and objectives with regard to natural resources on their lands. Because this plan is an ongoing planning effort subject to future revision, the following is quoted from the current version of the plan:

"This Integrated Resource Management Plan describes the Nez Perce Tribe's vision and strategy for the management of our natural and cultural resources. It has been developed to express the cultural values of the Nimiipuu; sustain and promote the welfare and opportunities of current and future generations; protect, perpetuate, and enhance the ecological diversity and long-term sustainability of our homeland; and enhance our sovereignty. It specifically describes our overall natural and cultural resource management vision, our desired future condition of our Reservation and its resources, and our strategy to make that vision a reality for our descendants. It is the first such plan developed by and for the Nimiipuu" (Nez Perce Tribe 2023).

The Nez Perce Tribe Integrated Resource Management Plan is similar to the revised forest plan in that it identifies long term desired conditions, however its scope is broader in that it describes desired conditions for not only environmental resources, but also social and cultural conditions as well.

Nez Perce Tribe Forestry and Fire Management Plan: The Nez Perce Tribe manages some 770,000 acres of tribal trust lands in North and Central Idaho; a portion of which is adjacent to the Nez Perce-Clearwater. The Nez Perce Forest Management Plan provides for economically, socially, and environmentally sustainable forest management of tribal lands.

3.3.2 Methodology

Spatial Scale

Nearly all the plan area is within the ceded territory of the Nez Perce Tribe and the entire Nez Perce-Clearwater is subject to the Treaty of 1855. There are about 3,500 enrolled citizens and roughly 60 percent of those live on the Nez Perce Reservation. The Dawes Act opened about 500,000 acres of the Nez Perce Reservation to non-Indian settlement, leaving only 250,000 acres for the Nez Perce people. This increases the importance of the Nez Perce-Clearwater for subsistence. Modern Nez Perce people hunt, fish, and gather traditional foods and medicines on the Nez Perce-Clearwater. Many Nez Perce people continue to access traditional sites for religious and spiritual purposes.

The spatial scale for analyzing both indirect and cumulative effects is the administrative boundary of the Nez Perce-Clearwater.

Temporal Scale

It is important to understand the past context of the Nez Perce separation from their traditional homelands in considering effects. 1855, when the *Treaty with the Nez Perce's* was signed outlining the rights of the Nez Perce Tribe, was chosen as a starting point. Many subsequent activities have happened since that time. The Forest Service mission charges management to "meet the needs of current and future generations." Nez Perce and neighboring tribes typically look seven generations, or roughly 140 years, to the future when making decisions. However, to account for emerging technologies and changes in social norms, the standard planning time frame of 15 years is what will be considered here.

Past, Present, and Future Activities used in the Analysis

The following past actions seem to have influenced the existing condition of tribal resources on the Nez Perce-Clearwater:

Roads: Primitive harvest systems of the past required an extensive road system. Benefits of these road systems to tribal members include motorized access to areas once only accessible by foot or horse. As lifeways changed for many Nez Perce families who were expected to adopt the European lifestyle of living in one place and finding work for pay, they no longer had time to travel by foot or horse to the forests. Roaded access allowed for evening and weekend trips to hunt, gather, or travel to religious sites.

On the flip side, roads also created access for all citizens, resulting in increased competition for resources. Another unintended impact of primitive roads was not fully understood until much later. Roads have the potential to degrade fish and aquatic organism habitat where culverts block passage, surfaces erode, or failures trigger mass wasting. Roads can interfere with habitat security for some wildlife species. Today the Nez Perce Tribe voices concerns about impacts of roads to habitat quality and some tribal leaders and citizens are concerned about competition for resources, especially big game, huckleberries, and firewood.

In the 2000s, the Nez Perce and Clearwater Forests and the Nez Perce Tribe jointly increased efforts to reduce road-related impacts on aquatic and terrestrial habitats. Road densities and some motorized accesses were reduced. Some tribal members have voiced concern over loss of motorized access to hunt, gather, and cut firewood.

Fire Suppression and Timber Harvest: Prior to the westward expansion and European settlement, fire was the primary disturbance mechanism in the forests. Lightning was not the only source of fire. According to Nez Perce Tribe Cultural Resource Director Nakia Williamson, the Nez Perce have managed the landscape with fire for countless generations. Fire rejuvenated botanical foods and medicines and provided forage for livestock and big game. Fire kept conifers and brush from encroaching on meadows and camp areas.

Williamson further described the symbiotic relationship between the Nez Perce people and the botanical resources. In addition to the Nez Perce use of fire, disturbances like digging roots and pruning limbs from shrubs aerated soils and invigorated new growth. Williamson noted that the declining interaction between the Nez Perce people, and the botanical resources led to declining numbers and quality of those resources.

Following the 1910 fires, land managers took a very aggressive fire suppression approach. Timber harvest became the predominant disturbance mechanism. The Forest Service met the post-World War II wood product needs of the growing country with an active timber program. Later, broad social support, especially at the national level, for aggressive timber harvest from National Forests faltered. By the late 1980s, timber harvest on the Nez Perce and Clearwater Forests was greatly reduced while aggressive fire suppression continued. With reduced fire and harvest on the landscape, the general trend has been denser forests dominated by species less resilient to insects, disease, and fire (See the Forestlands section for additional information). Many plant and animal species important to tribes rely on some level of disturbance. The Nez Perce Tribe has voiced concern about appropriately balancing vegetation and fuels treatment needs with the potential impacts those treatments might have on aquatic habitat and big game security.

Recreation: The Nez Perce people, and neighboring tribes, have moved across these forests for thousands of years, camping in flat areas near water and accessing the highest points for exceptional views and spiritual purposes. Today, those same flat areas near water and high mountain vistas are popular with Nez Perce-Clearwater visitors. Areas near water became recreation campsites and high points were used for lookout towers. Travel routes carved out by Native American use over thousands of years later became Forest Service trails or roads. Improved access to special places; improved motorized technology, such as motorcycles, all-terrain vehicles, and snowmobiles; and increased visitor numbers amplify challenges associated with protecting special places, culturally important flora and fauna, and cultural sites.

Most Nez Perce people do not view hunting, fishing, camping, berry picking, or cutting firewood as “recreation.” These activities are integral to the Nez Perce culture, religion, health, and economy. Furthermore, they are legally protected rights. Care is taken to protect archaeological resources associated with camp sites, trails, and other recreation facilities when managing for recreational use. It is important to consider that actions designed to benefit recreational users can also have negative impacts on the ability of tribal members to exercise treaty-protected rights.

Aquatic Restoration: Salmon are a cornerstone of the Nez Perce culture. Declining salmon runs from a combination of the Columbia River hydroelectric system, ocean conditions, commercial harvest, and fragmented habitat greatly impacted the Nez Perce and other salmon-dependent tribes. Improving anadromous fish habitat to aid in the recovery of threatened and endangered and listed species has been a priority for the Nez Perce Tribe since the mid-1990s. The Tribe has committed considerable time and energy to leveraging hydropower mitigation funds to invest in habitat improvements on the Nez Perce-Clearwater. Reducing road densities, eliminating aquatic barriers, and reducing road-related sediment to streams have been primary focus areas for two decades. More recently there has been an emphasis on in-stream channel and meadow habitat restoration. Occasionally, these projects run counter to tribal members’ desire for access.

Mining: Discovery of gold on the original 1855 Nez Perce Reservation triggered two treaties that effectively reduced the original reservation from 7.5 million to 750,000 acres, creating an understandable disdain for mining that continues to this day. Currently, there are dozens of active claims and recreational mining activities across the Nez Perce-Clearwater. Level of activity rises and falls with the market price of gold and other locatable minerals. The Tribe is very concerned about the impacts of mining on cultural sites and aquatic habitat and water quality.

Grazing: One of the many rights reserved by the Nez Perce in the 1855 Treaty was “the privilege of…pasturing their horses and cattle upon open and unclaimed land.” Currently, no enrolled Nez Perce people are exercising the right to graze on lands managed by the Nez Perce-Clearwater. One person is pasturing cattle in an area managed by the Wallowa-Whitman within the administrative boundaries of the Nez Perce-Clearwater. Some tribal members have indicated possible interest in exercising this right on the Nez Perce-Clearwater. As a legal right, tribal grazing would not require a permit and would likely be regulated and enforced by the Tribe. The Tribe acknowledges the potential for grazing impacts on other resources and Nez Perce Tribal Executive Committee has requested the Nez Perce-Clearwater work with the Tribe to identify suitable grazing allotments and monitoring plans for tribal grazing.

Methods and Assumptions

Desired future conditions were carefully drafted to protect tribal rights and resources. It is assumed all alternatives for achieving those desired future conditions protect tribal rights and resources.

Measurement Indicators

Three indicators were used to assess the extent that each alternative responds to particular tribal rights and interests.

- Access
- Places
- Resource Usability

"Access" was measured using the theme of each alternative combined with road and trail management objectives and standards. "Places" were measured by relatively ranking alternative objectives and standards for access and management of significant locations for the tribe. "Resource usability" was measured by a relative ranking of each alternative based on biophysical trends and tribal interest species habitat trends. Together, these measurement indicators give an overview of the major concerns and relative means of ranking alternatives.

3.3.3 Affected Environment

Tribal Rights and Interests

Each tribe has slightly different rights according to treaties, executive orders, and various laws, regulations, and court orders. The Nez Perce Tribe clearly retained off-reservation treaty rights across the entire Nez Perce-Clearwater. While the Confederated Salish-Kootenai Tribes have similar off-reservation rights, the Nez Perce-Clearwater is entirely within the Nez Perce Tribe's ceded territories. For this reason, the Salish-Kootenai have typically deferred to the Nez Perce Tribe on management recommendations and consultation.

This analysis will mostly focus on the Nez Perce Tribe because the Nez Perce-Clearwater lies within the Nez Perce Tribe's aboriginal homeland, is subject to their treaty, and because of the level of cooperation and involvement between the Nez Perce Tribe and the Nez Perce-Clearwater. Even though other tribes are not mentioned in detail, analysis of effects should be relatively similar for all tribes.

Nearly all of the Nez Perce-Clearwater is within the ceded territory of the Nez Perce Tribe, and the entire Nez Perce-Clearwater is subject to the Treaty of 1855. In this treaty, the Nez Perce Tribe reserved the right of "taking fish at all usual and accustomed places in common with citizens of the Territory; and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Roughly 60 percent of the 3,500 enrolled Nez Perce citizens with treaty-reserved rights live on the reservation, a relatively short distance from the Nez Perce-Clearwater. The Nez Perce-Clearwater provides essential locations for traditional foods, including game, salmon, roots, berries, and mushrooms; wood for firewood and tipi poles; and for traditional botanical medicines. The Nez Perce-Clearwater is also home to countless culturally and spiritually significant areas.

The Nez Perce-Clearwater plays an important role in the Nez Perce Tribe's economy. Nez Perce-Clearwater resources provide a healthy, affordable source of foods and medicines, as well as firewood. These resources are also part of a direct production economy where trading of goods is part of an ongoing barter and gifting system of trade. Additionally, many family-wage jobs on the reservation are directly and indirectly related to resource-related activities.

To date, no tribal members have exercised the right to graze on lands directly managed by the Nez Perce-Clearwater; some are, however, exercising that right on adjacent forests. The Nez Perce Tribe Executive Committee has informed the Nez Perce-Clearwater that they may be reducing grazing on tribal lands and that tribal members would likely seek to exercise grazing rights on the Nez Perce-Clearwater. Thus, it is reasonable to expect an increase in tribal grazing on the Nez Perce-Clearwater.

The Nez Perce do not see themselves as separate from the lands they inhabit. They have always lived here and interacted with the plants and animals in an interdependent relationship. It was this relationship Nez Perce leaders sought to preserve when they signed the 1855 Treaty. For the modern Nez Perce, protecting and exercising those rights remains core to maintaining who they are as a people. In recent years, there has been a broad scale effort by the Nez Perce to rebuild and strengthen that relationship and interdependence with the land. As such, they actively engage the Forest Service at all levels: locally, regionally, and nationally.

When the original Nez Perce and Clearwater Forest Plans were written, tribal treaty rights and the federal trust responsibility were not broadly understood. Several executive orders, statutes, and subsequent directives have helped clarify and define agency roles and tribal trust responsibilities. Subsequently, awareness, understanding, and incorporation of those rights into management has steadily improved.

In 1998, five National Forests in the Nez Perce Tribe's ceded territories acknowledged the need for improved communication between the Forest Service and tribal leadership and created a full-time tribal liaison position. Around that same time, the Clearwater Forest and Nez Perce Tribe began collaborating on three activities: aquatic restoration to improve salmon habitat; an inter-tribal natural resource youth camp; and protection and interpretation of resources within the Lolo Trail National Historic Landmark during the Lewis and Clark bicentennial commemoration. These partnerships led to a robust and dynamic Forest Service-Nez Perce Tribe relationship and have informed and shaped how projects are developed and implemented on the Nez Perce-Clearwater today.

The Nez Perce and Clearwater National Forests administratively combined in 2013; yet, the Nez Perce-Clearwater is still managed under two separate plans. Furthermore, there are prescriptive elements in each that dictate the use of specific models and methods that are no longer relevant. This has been the source of frustration and confusion for Nez Perce-Clearwater and Nez Perce Tribe staff and leadership seeking to understand and comply with the Land Management Plans. Additionally, the Tribe's ceded territories and off-reservation rights span at least 13 National Forests in 3 different Forest Service Regions, resulting in considerable variation and complexity for the Tribe to navigate.

With all of the above in mind, to protect tribal rights and interests in the Land Management Plan, the Nez Perce Tribe generally advocates for enforceable standards and plan components, protection of population strongholds of fish and wildlife and riparian management zones, improvement of watershed conditions, and improved methods of identifying traditional cultural properties and sacred sites.

Access

There is a challenging balance between protecting treaty-reserved resources and providing sufficient access to allow Nez Perce tribal members to exercise treaty rights. Tribal resource specialists, as well as written comments from the Nez Perce Tribal Executive Committee, tend to advocate for reduced road densities and motorized access. This largely stems from a legacy of primitive logging systems that required substantially more roads than modern systems. Many of those roads were abandoned and left to revegetate naturally but were later determined to be the sources of slope stability and sediment issues. The Nez Perce Tribe has been a proponent for decommissioning roads and has leveraged significant funding and resources to decommission and obliterate hundreds of miles of both system and non-system forest roads to improve both fish and wildlife habitat.

Conversely, several tribal citizens have voiced concerns over reduced access to favorite hunting sites, botanical and firewood gathering spots, and spiritual places. Hunting and gathering food and firewood are not lifestyle choices nor recreation for most Nez Perce. For many, these activities are economically necessary means by which they feed their families and heat their homes. An abundance of resources means little to them without access to those resources.

Prior to the 1990s, motorized access across the Nez Perce-Clearwater was fairly unrestricted. As road-related impacts to aquatic health and wildlife security were identified, limits on motorized access and removal of roads deemed unnecessary for management needs became increasingly common. Since 1998, the Nez Perce-Clearwater has decommissioned over 900 miles of system and non-system roads in partnership with the Nez Perce Tribe. It is important to acknowledge many of these roads were not easily accessible, even by foot. It is equally important to acknowledge that tribal members say some access important to them has been eliminated. The increased popularity of all-terrain vehicle, utility terrain vehicle, and over-snow motorized use by many forest visitors has not extended to the Nez Perce people. While some choose to hunt or gather on foot or by horseback, the preferred method of access is by full-sized motor vehicles. Many note they simply cannot afford the expensive trail machines or describe the trail vehicles as undesirable as they are incapable of transporting entire families, including infants and elders who cannot access areas by other means.

Access to traditional campsites is a concern. Places popular to camp hundreds of years ago are still favored today. Many traditional camp and village sites are now developed or dispersed recreation sites. In 1998, five National Forests in the Nez Perce Tribe’s ceded territory established a policy eliminating fee and stay limits for enrolled Nez Perce. Initially, some user conflict was anticipated but did not seem to materialize. For the most part, the favored time for tribal members to use river campsites is during the early spring and late fall salmon and steelhead seasons. In the heat of the summer, when visitor recreation use is highest on the rivers, many Nez Perce prefer to be in the mountains gathering huckleberries, camas, and other foods and medicines.

Places

It is difficult to convey the depth of importance many places on the Nez Perce-Clearwater hold for the Nez Perce. The Nez Perce trace their origins to a specific site near the Nez Perce-Clearwater boundary, and thousands of years’ worth of deeply rooted interaction with the resources define them as a people. The Nez Perce named each place for its significance. Unlike Europeans who later settled the area, local bands did not name places after people. Instead place names described a significant event, a special resource, or a meaningful activity. As a result, generations of people would know the unique value of each place by its descriptive name.

In the years following relocation to the reservation, speaking their native language, and practicing their native religion was discouraged. A new life emphasizing the English language, school education, agricultural practices, and jobs for pay was expected. Not only were they geographically separated from many important places, but most Nez Perce also no longer had time to travel as the new job-based economy would not allow free time. Places were renamed by incoming settlers and many original names and significances faded from memory. The Nez Perce describe a challenging time in which they were in danger of losing their native language and knowledge of important places altogether.

For the past three decades, the Tribe has prioritized preserving their language. Through robust youth and language programs they are reestablishing connections to well-known significant places and are working with elders to identify lesser-known areas. There have been cooperative efforts between the Nez Perce-Clearwater and tribal elders to identify and re-name offensive place names. As these efforts continue, it can be expected that new places of importance will emerge.

While some tribally significant places have been identified, place identification and, therefore, protection remains a challenge. There is some reluctance on the part of any tribe to share locations for fear of disclosure and potential threat of vandalism and looting. There are other sites that are known only to, and held closely by, certain family circles. Neither tribal leaders nor tribal cultural program managers know these family locations.

Many commonly known sites occur on high ridgetops or on flats near water. Places that were popular thousands of years ago are likely popular today, posing unique management challenges. Important sites near water can be at risk from recreation-related resource damage. Higher elevation sites are more remote, making monitoring and protection against vandalism more difficult.

One particularly challenging site is Pilot Knob. Pilot Knob is geographically situated with a nearly unobstructed 360 view for miles, making it not only a place for spiritual renewal for countless generations of Nez Perce but also a desirable location for non-tribal recreationists and a strategically important location for emergency communication equipment. Many entities, including interagency emergency service providers, rely on communication towers on Pilot Knob for critical communications across a landscape otherwise unreachable by radio or cell service. In order to remove the communication equipment and still provide for public safety, new equipment would need to be installed at multiple sites across the Nez Perce-Clearwater; all with their own unique access, resource, and economic challenges that have, to date, been determined unfeasible.

Resource Usability

In addition to the availability of and access to resources, usability of those resources is also very important. The biophysical environment and habitat for species of interest to tribal trends can have significant effects to tribal resource use. Considering the effects of each alternative on these resources can help determine which alternatives have the least impact. Items of special interest mentioned during Land Management Plan and project consultation include fish, big game, camas, berries, and firewood gathering. Many of the big game, upland and migratory birds, and aquatic species of concern to tribes are the same ones in which the Land Management Plan provides direction for protection. Specific management activities are analyzed during NEPA analysis of the effects; effects are generally mitigated through best management practices in other highly managed areas.

It should be noted that the quantity of a specific resource is different than quality. For instance, a particular root species commonly gathered by Nez Perce is prolific across the Nez Perce-Clearwater. However, there are a few key areas in which the quality and potency of the root is known to exceed all others. Protecting and managing for the "usability" of resources such as these is challenging. Like sacred places, particular botanicals and favorite gathering locations are rarely disclosed for fear of exploitation. If known, managers could propose beneficial treatments and avoid actions that could negatively impact these resources.

Camas has long been known by Nez Perce-Clearwater managers to be important to tribes. While camas plants themselves may be plentiful in some areas, gatherers note a decline in the size and quality of camas bulbs over the past decades. Other than fencing known camas meadows to exclude livestock, a "hands-off" approach has been taken where camas occurs; harvest and fuels treatments have been excluded in these areas. Recent conversations with elders and gatherers indicate that the Nez Perce traditionally actively managed for camas. In addition to aerating the soil during camas harvest with *tú·kes,* or digging sticks, gatherers often set fire to the meadows as they left, both stimulating next year's soil productivity and preventing encroachment from surrounding conifers.

Usability can be applied to the land in general, as well. Not all acres of land are equal. This is important to note when analyzing impacts for proposals like land exchanges. For instance, exchanging 50 acres of easily accessible land with meadow ecosystems that produce important traditional foods for 100 acres of valuable timber might not be favorable or beneficial to a tribe, even if the Forest Service stands to gain 50 acres. First, land under historic Forest Service management is subject to tribal treaty rights; lands acquired might not be. Second, unless the acquired acres have similar usable and equally accessible resources to those being exchanged, there might be no benefit to the tribe.

3.3.4 Environmental Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications, or longer-term environmental consequences, of managing the Nez Perce-Clearwater under this programmatic framework.

The previous sections generally described the American Indian Affected Environment within the Nez Perce-Clearwater. More specifically, the Affected Environment section provides a baseline understanding of the relationship between the lands managed by the Nez Perce-Clearwater and the Nez Perce people who have always occupied these lands. The following section considers the potential impacts of alternative management scenarios on this relationship. This section provides a brief summary of the expected impacts to the key benefits the Nez Perce-Clearwater provides and explores how those impacts may affect tribal trust responsibilities. For more details and the complete analysis of effects to specific Nez Perce-Clearwater resources, please see the relevant resource analysis.

Effects Common to All Alternatives

Under all alternatives, the Nez Perce-Clearwater will continue to provide the full suite of treaty-protected resource benefits as described in the Affected Environment section. Over the life of the plan, no consequential adverse impacts are expected to tribal rights in the primary analysis area or to any of the key treaty-reserved resources that the Nez Perce-Clearwater currently provides. For more details on each benefit, please see the relevant resource analysis.

Effects Common to Action Alternatives

Contributions to treaty-reserved resources are expected to be different under the action alternatives than under the No Action Alternative. This is due in part to tribal-specific plan components and desired future conditions carefully designed to acknowledge and incorporate the unique cultural and ecological perspectives and rights of native peoples and to new management direction across resource areas focused, to varying degrees, on increasing vegetation management through fuels treatments and harvest, increasing opportunities for motorized and mechanized access, and specifically identifying geographic areas of tribal interest for added protection. The relative contributions vary by alternative.

To recap, access, places, and resource usability were used to evaluate alternatives.

Access

The alternatives primarily affect access to important hunting, fishing, gathering, and spiritually significant places by increasing or decreasing the percentage of available full-sized motorized and non-motorized routes, particularly in the summer. As noted earlier, the most common method for tribal members accessing areas for culturally and economically important activities is by full-sized motorized vehicles and typically occurs during snow-free months. Alternatives that provide for more off-highway vehicle use can also help alleviate congestion and user-conflict on full-sized routes.

The No Action Alternative offers 45 percent of the Nez Perce-Clearwater as suitable for summer motorized use. The Preferred Alternative and Alternative X propose the greatest departure from the No Action Alternative, with an increase to 55 and 58 percent, respectively. Alternative W proposes a slight increase to 47 percent. The motorized access proposed in Alternative Z decreases summer use to 43 percent, increases winter use from 39 to 70 percent. Alternative Z is not expected to provide a broad benefit to tribal access unless there is a dramatic change in tribal members' methods of travel.

Tribal communities, like any community, are incredibly diverse. Whether increased access is perceived positively or negatively largely depends upon how individuals or family units relate to the landscape and the resources. Those who actively subsist or seek spiritual opportunities on the Nez Perce-Clearwater may prefer increased access opportunities and argue that it is essential to their ability to exercise their rights. Others who are content in knowing those special place and resources exist without a need to obtain those resources or personally visit those areas may feel differently.

Places

As described earlier, the importance of "place" to the Tribe collectively, to tribal families, or to individuals is difficult to describe and evaluate; this is compounded by a general reluctance to share details of specific places for fear of exploitation. Years' worth of coordination with tribal staffs and conversations with tribal members yielded information that helped to identify and delineate geographic areas of importance, as well as identify desirable habitat conditions that make a "place" desirable.

Pilot Knob Geographic Area

Pilot Knob has long been known as a significant spiritual site for the Nez Perce Tribe. Its location and geographic formation also made it the best-known location for communication equipment, a use that continues today. The Nez Perce-Clearwater and Nez Perce Tribe have grappled with the conflicting needs for decades.

The plan identifies the Pilot Knob Geographic Area for its significance to the Nez Perce Tribe. All action alternatives include the goal of co-managing Pilot Knob with the Nez Perce Tribe to develop, analyze, implement, and monitor activities. Desired conditions describe the area from the Tribe's perspective and look to reduce the communication facility footprint.

The Preferred Alternative includes an objective to initiate a study of suitable replacements for communication sites within five years and a guideline to seek approval from the Nez Perce Tribe Executive Committee prior to authorizing activities within the geographic area. Alternative Y proposes not renewing communication leases and not approving new authorizations.

Alternative Y provides the most immediate protection of the prehistoric and historic integrity of the geographic area and provides for the least disturbance to tribal members seeking spiritual solace. It does not resolve the need for a communication site(s) to adequately provide emergency and non-emergency communications for several entities, including the Nez Perce Tribe. While the Preferred Alternative does not immediately satisfy the desire to rid Pilot Knob of the communication equipment and protect the solitude of tribal members, it does establish a time frame for the Forest Service to initiate a study in which the Tribe and the Nez Perce-Clearwater would cooperatively explore options. The Preferred Alternative also provides for flexibility to propose management activities within the geographic area with the Tribe's support.

Lochsa Corridor

An increase in proposed commercial traffic use along U.S. Highway 12 elevated awareness of the significance of the Lochsa Corridor to the Nez Perce Tribe. The Lochsa Corridor is much closer to communities on the Nez Perce Reservation and is frequently used by tribal and non-tribal locals, as well as forest visitors from afar. The corridor is popular for hunting, fishing, and gathering.

Special Areas

In all action alternatives, the Land Management Plan proposes to designate over 1,000 acres as special areas due to unique botanical, historical, or recreational values. Inclusion of these special areas would enhance and protect the places of importance to the Nez Perce Tribe.

The effects from fuels treatments and timber harvest can be perceived as positive or negative depending upon the relationship to a place. For instance, if a place derives its significance as a family location to gather huckleberries or to hunt big game, timber harvest and fire might be beneficial, as habitats for both big game and huckleberry can be stimulated by these activities. Conversely, if significance is derived because the place is a traditional gathering spot for a shade-tolerant plant that thrives under thick overstory, the effects could be negative. The intent of the tribal trust and resource-specific goals, desired conditions, objectives, standards, and guidelines is to provide appropriate direction for achieving mutually desirable and beneficial outcomes on the ground.

Tribal-specific plan components and desired future conditions can also drive proposed activities on the ground, using timber harvest and wildland fire as tools to enhance important places by promoting their vigor and resilience, or by reducing fuels to protect them.

Recognizing that forests are dynamic ecosystems and that no single place will remain unchanged, it can be helpful to look at the overall desired conditions for forested vegetation and how quickly the desired outcome could be achieved to evaluate effects. Tribal and other resource-specific components describe desired future conditions that provide guidance during project development and are designed to identify and consider tribal uses and minimize impacts to those uses.

Desired forest conditions are predicted to be met in 20 years under Alternative X. Under Alternative W, desired conditions would be achieved in 30 years. A combination of natural processes and timber harvest would take about 50 years to attain under Alternative Y. Alternative Z would rely largely on natural processes to meet desired conditions in 100 or more years.

Resource Usability

Many Nez Perce members describe how some areas produce more “potent” medicines. Some share concerns that, despite availability, the quality of some resources is declining. Both are examples of usability. The mere presence of a resource does not necessarily make it useful as a food or medicine. Conversations during the development of the Land Management Plan raised awareness of optimal habitat conditions and beneficial management activities used for generations to stimulate growth of culturally important species. These conversations, and the information shared on climate change and the potential impacts to terrestrial and aquatic habitats and species of tribal significance, resulted in several plan components to promote collaborating with the Nez Perce Tribe and tribal members to actively manage for increased usability of important species. For example, desired conditions call for sustainable diversity of habitats to provide habitat for tribally important species and objectives were added to promote huckleberry and camas health. Similar to above, the alternatives can be compared by how quickly desired forest conditions are met.

Effects to Resource from Other Resources

Fire Management

Fire and fuels management may lead to the loss of some species of interest while benefitting others. Likewise, access to sacred and archaeological sites of importance to tribes can be affected. The effects of fire on major species are well known; however, there has been little study of more obscure resources. Therefore, the only way to analyze the effects is to look at major habitats. It is also important, when planning for the potential use of natural, unplanned ignitions, to meet land management plan objectives that take into account the timing in relation to tribal resource use and sacred traditions.

Again, depending on the resource or sacred use, it is difficult to analyze the effects numerically, and a relative ranking based on qualitative factors is the only practical analysis to determine the effects from fire and fuels management. With the move toward managing natural, unplanned ignitions to meet land management plan objectives, management areas will be analyzed for specific effects. However, if considered in the larger context of the Land Management Plan, a return to a more natural fire regime could be considered preferable to the tribes, depending on resources, tribal use, and timing.

Timing and location of wildland fire management activities should consider necessary access for tribal resources and sacred site uses through appropriate consultation.

Fisheries

As mentioned in multiple sections of this report, fisheries are of extreme cultural and economic importance to the Nez Perce Tribe. For this reason, the Nez Perce-Clearwater actively involved Nez Perce Tribe specialists in the development of a Nez Perce-Clearwater Aquatic and Riparian Conservation Strategy. Because of the forestwide direction in the Aquatic and Riparian Conservation Strategy, it is expected that the action alternatives would have the same or similar outcomes as the No Action Alternative. See the Aquatic Ecosystems and Fisheries section for more detailed information.

Forest Products (other than timber)

Special forest products are treaty-protected resources and adequate access to such resources is important. Certain mushrooms, berries, and firewood tend to be more prevalent in areas of disturbance. Alternative X provides for the greatest level of vegetation manipulation to potentially benefit tribally significant special forest products and access to them. For resources, such as fir or cedar boughs or shade-tolerant shrubs that may be more sensitive to disturbance, it can be generally assumed the greater the disturbance, the slower the rate of recovery.

Invasive Species

Invasive species are of grave concern to the Nez Perce Tribe. Invasive species impact habitat for tribally significant wildlife and botanicals. The Nez Perce Tribe has been an important partner in controlling invasive species on National Forest System lands, including back-country and wilderness areas, as well as on adjacent ownerships. They operate a Biocontrol Center in which insects that prey on invasive plant species are incubated. They have trained staff certified to use a wide variety of chemical controls.

Lands and Lands Special Uses

The Nez Perce Tribe objects to the loss of aboriginal lands through exchange or sale. Only Congress can abrogate treaty rights. Since lands managed by the Nez Perce-Clearwater are subject to the 1855 Treaty, it seems likely that Congressional involvement could be necessary. Some consideration may be given where access, opportunities, or resources equivalent or greater than those lost are provided.

None of the alternatives propose a change in land ownership.

There is an assumption that increased special use requests will come with population increases and increased uses of lands adjacent to National Forest System lands.

Alternative Y proposes that no new communication site authorizations will be renewed, and no new authorizations will be approved on Pilot Knob throughout the life of the Land Management Plan. These proposed changes address the cultural concerns raised by the Nez Perce Tribe but do not acknowledge a shared interest in ensuring emergency communications across the area. The Preferred Alternative directs a study to be initiated in five years to explore alternative sites, which both addresses the need for change and establishes a timeframe in which to work on the solution.

Livestock Grazing

The Nez Perce people historically grazed horses and cattle within the area now known as the Nez Perce-Clearwater. The right to continuing grazing livestock was reserved in the 1855 Treaty. The Nez Perce-Clearwater acknowledges the Nez Perce primacy to graze. Therefore, none of the alternatives are expected to change or affect this right. No tribal members currently graze on the Nez Perce-Clearwater.

Many Nez Perce Tribe resource specialists, especially in the fields of fisheries, exotic weeds, and wildlife, raise concerns about the impacts of grazing on aquatic and wildlife habitat. Additional information and analysis may be found in the respective sections of this environmental impact statement.

Sustainable Recreation (including developed and dispersed recreation)

It is assumed that recreation will likely increase over time. Recreation and road access are significant issues to tribes. Recreation sites, both developed and dispersed, often overlay archaeological and resource use sites. High-density recreation especially tends to indirectly reduce Tribal use, given the conflicts between traditional uses and modern recreation activities. Tribal members use some Nez Perce-Clearwater recreation facilities and need access to certain areas to exercise their treaty rights.

Existing developed recreation sites are retained in all alternatives. Direction in the Land Management Plan for developed recreation does not change across alternatives and does not include discussion of increasing the number nor size of sites. Therefore, there is not expected to be any impact to the tribal trust resource under any of the Land Management Plan alternatives. Site specific planning for developed recreation might have impacts in the future to the tribal trust resource; those developments would be proposed and impacts disclosed and considered in future site-specific NEPA analyses.

Dispersed use, especially camping and motorized open use areas, overlapping traditional gathering or resource use areas may have significant impacts on the ability of traditional practitioners to access and gather resources.

Motorized and road access is a significant issue to the Tribe. While younger tribal members may be able to reach resource and religious areas on foot or by horseback, elderly practitioners may require motorized access to effectively reach these same areas. While this is an issue to the Tribe, access is guaranteed under treaty, law, regulation, and policy, to some extent. Increased motorized suitable access could be a benefit to the Tribe by increasing their ability to exercise their treaty rights. Conversely, it is possible for increased motorized suitable access and overall increased recreational use to affect tribal uses by increasing the overlapping areas and quantity of tribal uses and non-tribal recreational use.

The amount of motorized access varies by alternative. Since not all locations, times, and uses are disclosed by tribal practitioners, it is difficult to analyze alternative trade-offs regarding the differences in recreation opportunity spectrum classes. Specific authorities do allow line officers to temporarily close areas for cultural purposes, which may mitigate some of the possible effects of increasing overall recreation and increased motorized suitable access acres. Alternative X finds the most acres of the Nez Perce-Clearwater suitable for motorized use. This does not ensure that motorized use will actually occur nor that the Nez Perce-Clearwater will develop more opportunities for this use, just that it is suitable. Site specific analysis regarding development of expanded motorized access would need to be conducted and a tribal trust analysis would be conducted at that time and would influence the design of these types of projects. On the opposite end of the spectrum is Alternative Z, which finds the least number of acres suitable for motorized use.

Timber

Depending on the habitat type and management action, vegetation management may cause both beneficial and harmful effects to resources, traditional uses, sacred sites, and cultural properties of interest to the tribes.

For use of traditional resources, the differences between alternatives are so complex that they can only be discussed in relative terms, while the use and management of sacred sites and cultural properties may be discussed in more specific terms if their location and description are known to the Nez Perce-Clearwater.

Identifying the better alternative would depend on the types of traditional resource and whether mechanical treatment or natural succession is the better route. Alternative X would be favored where mechanical treatment would yield best benefits; Alternative Z favors resources that do not respond well to disturbance.

Cultural Resources

The locations of so few sacred sites are known that it is difficult to argue for differences in the effect between alternatives. The Tribe must evaluate the impacts from the alternatives where information is not shared with the Nez Perce-Clearwater.

For cultural properties, there is not a significant amount of difference between the alternatives because, depending on where treatable acres are in each alternative, the difference may be irrelevant. See the Cultural Resources section for more detail.

Water Resources

High quality water is essential for the aquatic resources used by tribes for many thousands of years and is central to the circle of life. Fish species, particularly salmon and steelhead, have been a cornerstone of Nez Perce survival and core to their culture for countless generations. While the Forest Service does not manage "fisheries" (fish populations), it does manage the access and biological habitats and disturbances that effect water quality, and the longer-term viability of aquatic species and overall management of the water quality and aquatic habitat management is of concern to tribes.

For use of traditional resources, the differences between alternatives are so complex that they should be discussed in relative terms, while use and management of water quality and aquatic habitat may be discussed in more specific terms. Additional information and analysis may be found in the respective sections of this environmental impact statement.

Watershed Restoration Program

The watershed restoration program and Forest Service-Nez Perce Tribe partnership is of great interest and concern to the Nez Perce Tribe. Habitat improvement and species recovery are among the Nez Perce Tribe's highest priorities. Furthermore, the Tribe has noted the partnership work performed on the Nez Perce-Clearwater provides many jobs within the Tribe and in the surrounding communities. Alternative X provides the highest potential for aquatic restoration activities. Alternative Z provides the least.

Wildlife

For countless generations, tribes used, and continue to use, wildlife for sustenance, clothing, and tools, and for religious articles and purposes. While the Forest Service does not manage wildlife populations, it does manage the access and biological habitats that effect wildlife numbers and longer-term viability. As such, overall management objectives of the habitat are of concern to tribes.

For use of traditional resources, the differences between alternatives are so complex that they should be discussed in relative terms, while the effects of each alternative on wildlife habitats may be discussed in more specific terms.

Alternatives X and W allow for the greatest ability to restore ecosystems that are out of desired conditions with respect to wildlife. The No Action Alternative does not provide adequate direction and breaks up habitats more than other alternatives. While Alternative Z provides more undisturbed land for protection of wildlife, it does not allow active restoration to the extent found in Alternative X and W, leaving natural processes on their own to bring habitats back to a desired condition. While Alternative X provides more potential for active restoration, it has the most disturbances and least emphasis on security habitat essential for some species. Additional information and analysis may be found in the respective sections of this environmental impact statement.

3.4 Human Uses

The human uses section includes subsections on cultural resources, sustainable recreation, scenery, and infrastructure, as well as land ownership and land uses.

3.4.1 Cultural Resources

Cultural resources are considered in a manner in the proposed Land Management Plan that is a notable departure from the framework presented in the current forest plans. The 1987 plans reflect a distant point in time on the ever-evolving continuum of federal cultural resource management business practices. Those plans captured the administrative reality of the time whereby the agency was learning to embrace the regulatory compliance procedures set forth in the multitude of laws emerging from the 1960s and 1970s. As such, many standards of the day were a quasi-reiteration of then extant laws meant to locate and protect historic properties but did little to advocate the actual enhancement of those properties. The proposed Land Management Plan makes little attempt to repackage federal mandates meant to locate and protect historic properties as compliance with those laws is mandatory. Instead, the proposed plan attempts to move cultural resource management constructs more firmly into the enhancement arena by crafting desired conditions and indicators meant to improve the condition classification of the Nez Perce-Clearwater's historic properties that have been, or otherwise will be, located and protected from project activities through the commonplace adherence to existing federal laws. The assumption (explained below in the Analysis Methods and Assumptions section) is that these federal laws and executive orders will continue to exist during the life of the Land Management Plan.

An exception to the above statement concerns plan components related to the management of the Lolo Trail National Historic Landmark. Those components are more prescriptive than other cultural resource plan components as they reflect a need for change in how the Landmark is managed that has only recently been recognized.

Relevant Laws, Regulations, and Policy

Federal Laws

Organic Act of 1897 (Title 16, United States Code (U.S.C.), section 473-478, 479-482, 551) is the original organic act governing the administration of National Forest System lands. It is one of several federal laws under which the Forest Service operates. Under this act, the Secretary of Agriculture may make regulations and establish services necessary to regulate the occupancy and use of National Forest System lands and preserve them from destruction. Persons violating the act or regulations adopted under it are subject to fines or imprisonment. The Organic Act is one authority used to issue permits for Archaeological Investigations.

Antiquities Act of 1906 (16 U.S.C. 431) provides for permits, for misdemeanor-level penalties for unauthorized use, and for presidential designation of national monuments for long-term preservation. The Archaeological Resources Protection Act has replaced the Antiquities Act as the authority for special use permits if the resource involved is 100 years old or greater. Uniform regulations at 43 Code of Federal Regulations (CFR) part 3 implement the act.

Historic Sites Act of 1935 (16 U.S.C. 461) declares national policy to "preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States." The act authorizes the National Park Service's National Historic Landmarks Program. The National Historic Landmarks Program is implemented by regulations at 36 CFR part 65.

National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470), as amended, extends the policy in the Historic Sites Act to state and local historical sites as well as those of national significance, expands the National Register of Historic Places, establishes the Advisory Council on Historic Preservation and the State Historic Preservation Officers, and requires agencies to designate Federal Preservation Officers.

National Historic Preservation Act Section 101(d)(2) establishes criteria for designating Tribal Historic Preservation Officers to assume the functions of a State Historic Preservation Officer on Tribal lands.

National Historic Preservation Act Section 106 directs all federal agencies to take into account the effects of their undertakings, including actions, financial support, and authorizations, on properties included in or eligible for the National Register. Advisory Council on Historic Preservation regulations at 36 CFR part 800 implement National Historic Preservation Act Section 106.

National Historic Preservation Act Section 110 establishes inventory, nomination, protection, and preservation responsibilities for federally owned historic properties.

National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321-4346) establishes national policy for the protection and enhancement of the environment. Part of the function of the federal government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." The act is implemented by the Council on Environmental Quality regulations at 40 CFR 1500-1508.

The Archeological and Historic Preservation Act of 1974 (AHPA) (16 U.S.C. 469) is also known as the Archeological Recovery Act and the Moss-Bennett Bill. The Archeological and Historic Preservation Act amended and expanded the Reservoir Salvage Act of 1960 and was enacted to complement the Historic Sites Act of 1935 by providing for the preservation of historical and archaeological data which might be lost or destroyed as the result of the construction of a federally authorized dam or other construction activity. This greatly expanded the number and range of federal agencies that had to take archeological resources into account when executing, funding, or licensing projects. The Archeological and Historic Preservation Act also allows for any federal agency responsible for a construction project to appropriate a portion of project funds for archaeological survey, recovery, analysis, and publication of results.

Federal Land Policy and Management Act of 1976 (FLPMA), (43 U.S.C. 1701), directs the Forest Service to manage National Forest System lands on the basis of multiple use, in a manner that "recognizes the Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands" and that will "protect the quality of…historical…resources, and archeological values." The act provides for the periodic inventory of public lands and resources; for long-range, comprehensive land use planning; for permits to regulate the use of public lands; and for the enforcement of public land laws and regulations. The Federal Land Policy and Management Act compels agencies to manage all cultural resources on public lands through the land management planning process.

National Forest Management Act of 1976 (NFMA) (16 U.S.C. 1600) directs the Forest Service to develop renewable resource plans through an interdisciplinary process with public involvement and consultation with other interested governmental departments and agencies.

Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. 47Oaa *et seq.*), as amended, provides civil penalties and felony and misdemeanor criminal penalties for the unauthorized excavation, removal, damage, alteration, defacement, or the attempted unauthorized removal, damage, alteration, or defacement of any archaeological resource, more than 100 years of age, found on public lands or Indian lands. The act includes National Forest System lands in its definition of public lands. The act also prohibits the sale, purchase, exchange, transportation, receipt, or offering of any archaeological resource obtained from public lands or Indian lands in violation of any provision, rule, regulation, ordinance, or permit under the act, or under any federal, state, or local law. No distinction is made regarding National Register of Historic Places eligibility. The act establishes permit requirements for removal or excavation of archaeological resources from federal and Indian lands. The act further directs federal land managers to survey land under their control for archaeological resources and create public awareness programs concerning archaeological resources. Uniform regulations and departmental regulations at 36 CFR part 296 implement Archaeological Resources Protection Act.

Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. 3001) provides a process for museums and federal agencies to return certain Native American cultural items — human remains, funerary objects, sacred objects, or objects of cultural patrimony — to lineal descendants, and culturally affiliated Indian tribes and Native Hawaiian organizations. The Native American Graves Protection and Repatriation Act includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional excavation and unanticipated discovery of Native American cultural items on federal and Tribal lands, and penalties for noncompliance and illegal trafficking. The act requires agencies and museums to identify holdings of such remains and objects and to work with appropriate Native American groups toward their repatriation. Permits for the excavation or removal of "cultural items" protected by the act require Tribal consultation, as do discoveries of "cultural items" made during activities on federal or Tribal lands. The Secretary of the Interior's implementing regulations are at 43 CFR part 10.

Federal Lands Recreation Enhancement Act of December 8, 2004, (REA) (16 U.S.C. 6801-6814) permits federal land management agencies to charge modest fees at recreation facilities that provide a certain level of visitor services. The Recreation Enhancement Act also permits fees for specialized recreation permits necessary when recreation activities require exceptional visitor safety measures, extraordinary natural and cultural resource protection, or dispersal of visitors to ensure that good experiences are sustainable. The Recreation Enhancement Act includes provisions that require the use of Recreation Resource Advisory Committees to provide the public with information about fees and how fee revenues will be used. The primary goal of the Recreation Enhancement Act is to enhance visitor facilities and services to provide a quality recreation program.

Other Acts such as Multiple-Use Sustained-Yield Act of 1960 (16 U.S.C. 528-531) and the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA) (17 U.S.C. 1600-1674)) include authorities that establish national forest management direction and thereby may affect Heritage Program activities.

Executive Orders

Executive Order 11593 - Protection and Enhancement of the Cultural Environment, issued May 13, 1971, directs federal agencies to inventory cultural resources under their jurisdiction, nominate all federally owned properties that meet the criteria to the National Register of Historic Places, use due caution until the inventory and nomination processes are completed, and assure that federal plans and programs contribute to preservation and enhancement of non-federally owned properties.

Executive Order 13007 - Indian Sacred Sites, issued May 24, 1996, directs federal land management agencies, to the extent permitted by law, and not clearly inconsistent with essential agency functions, to accommodate access to and use of Indian sacred sites, to avoid affecting the physical integrity of such sites wherever possible, and, where appropriate, to maintain the confidentiality of sacred sites. Federal agencies are required to establish a process to assure that affected Indian tribes are provided reasonable notice of proposed federal actions or policies that may affect Indian sacred sites.

Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments, issued November 6, 2000, directs federal agencies to establish regular and meaningful consultation and collaboration with Tribal officials in the development of federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian tribes and to reduce the imposition of unfunded mandates upon Indian tribes. Public Law (P.L.) 108-199 and 108-477 added language that directed the Office of Management and Budget and all federal agencies to consult with Alaska Natives and Alaska Native Corporations on the same basis as Indian tribes under E.O. 13175.

Executive Order 13287 – Preserve America, issued March 3, 2003, establishes federal policy to provide leadership in preserving America's heritage by actively advancing the protection, enhancement, and contemporary use of the historic properties owned by the federal government. The order encourages agencies to seek partnerships with state, tribal, and local governments, and the private sector to make more efficient and informed use of historic properties for economic development and other recognized public benefits. The order requires federal agencies to review and report on their policies and procedures for compliance with National Historic Preservation Act, Section 110 and 111, improve federal stewardship of historic properties, and promote long-term preservation and use of those properties as federal assets contributing to local community economies.

The order requires the head of each agency to designate a Senior Policy Official. In addition, it directs the Secretary of Commerce, working with other agencies, to use existing authorities and resources to assist in the development of local and regional heritage tourism programs.

Executive Order 13327 – Federal Real Property Asset Management, issued February 4, 2004, establishes the Federal Real Property Council to develop guidance for each agency's asset management plan. The Senior Real Property Officer of each agency is required to develop and implement an agency asset management planning process that meets the form, content, and other requirements established by the Federal Real Property Council. In relation to cultural resources, the Senior Real Property Officer shall incorporate planning and management requirements for historic properties under E.O. 13287 – Preserve America. E.O. 13327, para. 2(a) defines "federal real property" as any real property owned, leased, or otherwise managed by the federal Government, both within and outside the United States, and improvements on federal lands.

Agency Regulations

The principal regulations for the administration of the Forest Service Heritage Program are:

Protection of Historic Properties (36 CFR part 800). These regulations implement Section 106 of the National Historic Preservation Act and define how federal agencies meet the statutory responsibility to take into account the effects of their undertakings on historic properties. The regulations identify consulting parties as State Historic Preservation Officers, Indian tribes, and Native Hawaiian organizations, including Tribal Historic Preservation Officers; representatives of local governments; applicants for Federal assistance; and additional consulting parties. The Advisory Council on Historic Preservation issues these regulations and oversees the operation of the National Historic Preservation Act Section 106 process. The regulations identify the goal of consultation, which is "to identify historic properties potentially affected by the undertaking, assess its effects, and seek ways to avoid, minimize or mitigate any adverse effects on historic properties" (36 CFR 800.1).

National Register of Historic Places (36 CFR part 60). These regulations establish the National Register of Historic Places, referred to as the National Register for the remainder of this section, as a planning tool to help federal agencies evaluate cultural resources in consultation with State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (Advisory Council). 36 CFR 60.4 provides the criteria for determining whether cultural resources are eligible for listing on the National Register.

Protection of Archaeological Resources Uniform Regulations (36 CFR part 296). These regulations implement the Archaeological Resources Protection Act by establishing the uniform definitions, standards, and procedures for federal land managers to follow in providing protection for archaeological resources located on public lands and Indian lands. The regulations define the prohibited acts, which include excavating, removing, damaging, or otherwise altering or defacing archaeological remains; and selling, purchasing, exchanging, transporting, or receiving any archaeological resource that was removed from federal land in violation of Archaeological Resources Protection Act or any other federal law. The regulations also provide requirements for issuing permits under the authority of the Archaeological Resources Protection Act to any person proposing to excavate or remove archaeological resources from public lands or Indian lands.

Native American Graves Protection and Repatriation Regulations (43 CFR part 10, Subpart B – Human Remains, Funerary Objects, Sacred Objects, or objects of Cultural Patrimony from Federal or Tribal Lands). These regulations carry out provisions of the Native American Graves Protection and Repatriation Act of 1990. The regulations establish a systematic process for determining the rights of lineal descendants and Indian tribes and Native Hawaiian organizations to certain Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony with which they are affiliated. The regulations pertain to the identification and appropriate disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony that are in federal possession or control or in the possession or control of any institution of state or local government receiving federal funds. The regulations pertain to these objects whether they are inadvertently discovered or excavated intentionally under a permit issued under the authority of the Antiquities Act or Archaeological Resources Protection Act.

Curation of Federally-owned and Administered Archaeological Collections (36 CFR part 79). These regulations establish definitions, standards, procedures, and guidelines for federal agencies to preserve collections of pre-Contact and historic material remains, and associated records recovered under the authority of the Antiquities Act, Reservoir Salvage Act, National Historic Preservation Act, and Archaeological Resources Protection Act.

Planning (36 CFR part 219). These regulations set forth a process for developing, adopting, and revising land and resource management plans for the National Forest System and prescribe how land and resource management planning is to be conducted on National Forest System lands.

Statement of Federal Financial Accounting Standards 29, Heritage Assets and Stewardship Land, July 7, 2005, (SFFAS 29). The Federal Accounting Standards Advisory Board issued this statement, which changes the classification of information reported for heritage assets and stewardship land provided by SFFAS 8. SFFAS 29 reclassifies all heritage assets and stewardship land information as basic except for condition information, which is reclassified as required supplementary information. This standard requires additional reporting disclosures about stewardship policies and an explanation of how heritage assets and stewardship land relate to the mission of the agency.

Policy

It is the policy of the Forest Service to:

- Establish and maintain effective relationships with federal, state, tribal, and local governments and historic preservation organizations at all levels of the agency to ensure protection of cultural resources and to promote Heritage Program efficiencies.
- Fully integrate opportunities for preservation, protection, and utilization of cultural resources into land use planning and decisions.
- Manage cultural resources through a process of identification, evaluation, and allocation to appropriate management categories that protect cultural resource values and benefit the public.
- Recognize cultural resources through National Register of Historic Places nomination, National Historic Landmark recommendation, and other special designations.
- Provide opportunities for public use and enjoyment of cultural resources through education and outreach programs that promote resource stewardship.
- Facilitate scientific research of cultural resources to increase understanding of past human cultures and environments.
- Use cultural resource data to increase scientific understanding of the evolution and condition of ecosystems and to benefit Forest Service land management practices.
- Protect cultural resources from the effects of Forest Service or Forest Service-authorized undertakings, unauthorized use, and environmental damage.

State and Local Law

Protection of Graves - 2005 Idaho Code, Title 27, Chapter 5. Prohibits the willful removal, mutilation, defacement, injury, or destruction of a grave or a cairn used as a memorial to the dead.

The law also prohibits the possession of artifacts or human remains taken from a cairn or grave on or after January 1, 1984, publicly displaying or exhibiting human remains, or selling any human artifacts or human remains taken from a cairn or grave.

State and Local Plans

The Idaho Historic Preservation Plan. The plan establishes the priorities and goals for the historic preservation community throughout the State of Idaho and attempts to take purposeful steps and actions to create a state-culture in which Idaho's historic, archaeological, and cultural resources are recognized as important in the lives of Idahoans. The plan encourages the active engagement in preserving, sharing, and using cultural resources to inform and positively influence the future of the State of Idaho.

The plan has four goals consisting of:

- Ensure that decision makers, at all levels, and the public are informed and knowledgeable about historic preservation issues, practices, opportunities, and its value, and take an active role in historic preservation efforts.
- Take the appropriate steps to help historic preservation efforts transition into the 21st century using current and future best practices and the development and adoption of new and emerging technologies.
- Ensure that historic preservation efforts throughout the state are aware of and have access to sufficient and sustainable sources of financial support.
- Continue to ensure that archaeological resources and documents are accorded permanent curation in accredited facilities in the State of Idaho.

Methodology

Spatial Scale

36 CFR 800.16 (d) defines the area of potential effects concerning cultural resource management as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

Accordingly, the spatial scale for both indirect and cumulative effects associated with programmatic decisions made within the Land Management Plan is the administrative boundary of the Nez Perce-Clearwater — excepting potential effects to the Lolo Trail National Historic Landmark. Because the Landmark extends into Montana on the Lolo National Forest, effects to the integrity of the Landmark occurring on the Nez Perce-Clearwater could foreseeably affect the integrity of the Landmark in Montana. The reverse is also true.

Temporal Scale

The length of time used for considering effects to cultural resources is the life of the plan. The year 1861 was chosen as a starting date to coincide with the discovery of gold in north Idaho and the notable landscape disturbance resulting from that activity. A multitude of other disturbance activities followed and continue to the present. Fifteen years into the future is the expected duration of the Land Management Plan.

Past, Present, and Future Activities used in the Analysis

Beginning with the 1861 placer mining boom, a succession of events and technologies began in use on what is now the Nez Perce-Clearwater that affected or destroyed untold numbers of cultural resource sites. An example of other activities that have impacted cultural resources consist of, but are not limited to, the following:

- Mining
- Road construction
- Logging activities
- Aquatic restoration
- Recreation development
- Railroad construction
- Grazing activities
- Prescribed fires
- Forest Service facility management

Wildfire has also adversely affected cultural resources.

Slowly, the value and recognition of cultural resources resulted in laws and regulations promoting the protection of this disappearing resource. Nonetheless, the sites remaining today are indicative of fractured, non-renewable data sets which must be considered in conducting cumulative effects analyses.

Analysis Methods and Assumptions

A notable assumption made in the formulation of cultural resource plan components and associated effects analysis is that federal cultural resource laws listed above in the Relevant Laws, Regulations, and Policy section will continue to exist throughout the entirety of the new planning cycle. It is these laws that provide the necessary protection to cultural resources such that the Land Management Plan can move beyond protection requirements and focus on resource enhancement including, but not limited to, preservation, rehabilitation, restoration, and interpretation activities. If these federal laws were to change during the life of the Land Management Plan, the effects analysis included herein would likely cease to have the necessary relevancy to aid resource management decisions.

Measurement Indicators

To facilitate the protection and enhancement of historic properties throughout the duration of the new planning cycle, the concept of integrity is being used as an indicator. Integrity is the means in which a cultural resource eligible for, potentially eligible for, or listed in the National Register of Historic Places conveys its significance. Without integrity a cultural resource cannot qualify for the National Register. If a significant cultural resource loses important aspects of its integrity, it will no longer qualify for the National Register.

Integrity has seven elements as described in 36 CFR 60.4 consisting of:

- Location
- Design

- Setting
- Materials
- Workmanship
- Feeling
- Association

Each of the seven elements of integrity are described below following definitions offered by the Advisory Council on Historic Preservation.

Location. Location is the place where the historic property was constructed or the place where the historic event occurred. The relationship between the property and its location is often important to understanding why the property was created or why something happened. The actual location of a historic property, complemented by its setting, is particularly important in recapturing the sense of historic events and persons. Except in rare cases, the relationship between a property and its historic associations is destroyed if the property is moved.

Design. Design is the combination of elements that create the form, plan, space, structure, and style of a property. It results from conscious decisions made during the original conception and planning of a property, or its significant alteration, and applies to activities as diverse as community planning, engineering, architecture, and landscape architecture. Design includes such elements as organization of space, proportion, scale, technology, ornamentation, and materials.

A property's design reflects historic functions and technologies as well as aesthetics. It includes such considerations as the structural system; massing; arrangement of spaces; pattern of fenestration; textures and colors of surface materials; type, amount, and style of ornamental detailing; and arrangement and type of plantings in a designed landscape.

Design can also apply to national register districts, whether they are important primarily for historic association, architectural value, information potential, or a combination thereof. For districts primarily significant for historic association or architectural value, design concerns more than just the individual buildings or structures located within the boundaries. It also applies to the way in which buildings, sites, or structures are related. For example, the spatial relationships between major features, the visual rhythms in a cultural landscape, the layout and materials of walkways and roads, and the relationship of other features and any extent archeological component or site.

Setting. Setting is the physical environment of a historic property. Whereas location refers to the specific place where a property was built or an event occurred, setting refers to the *character* of the place in which the property played its historical role. It involves *how*, not just where, the property is situated and its relationship to surrounding features and open space.

Setting often reflects the basic physical conditions under which a property was built and the functions it was intended to serve. In addition, the way in which a property is positioned in its environment can reflect the designer's concept of nature and aesthetic preferences.

The physical features that constitute the setting of a historic property can be either natural or manmade, including such elements as:

- Topographic features such as a gorge or the crest of a hill
- Vegetation

- Simple manmade features including paths or fences
- Relationships between buildings and other features or open space

These features and their relationships should be examined not only within the exact boundaries of the property but also between the property and its *surroundings*. This is particularly important for national register districts.

Materials. Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. The choice and combination of materials reveal the preferences of those who created the property and indicate the availability of particular types of materials and technologies. Indigenous materials are often the focus of regional building traditions and thereby help define an area's sense of time and place.

A property must retain the key exterior materials dating from the period of its historic significance. If the property has been rehabilitated, the historic materials and significant features must have been preserved. The property must also be an actual historic resource, not a re-creation; a recent structure fabricated to look historic is not eligible. Likewise, a property whose historic features and materials have been lost and then reconstructed is usually not eligible.

Workmanship. Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. It is the evidence of artisans' labor and skill in constructing or altering a building, structure, object, or site. Workmanship can apply to the property as a whole or to its individual components. It can be expressed in vernacular methods of construction and plain finishes or in highly sophisticated configurations and ornamental detailing. It can be based on common traditions or innovative period techniques.

Workmanship is important because it can furnish evidence of the technology of a craft, illustrate the aesthetic principles of a historic or prehistoric period, and reveal individual, local, regional, or national applications of both technological practices and aesthetic principles.

Feeling. Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. For example, a rural historic district retaining original design, materials, workmanship, and setting will relate the feeling of agricultural life in the nineteenth century. A grouping of prehistoric petroglyphs, unmarred by graffiti and intrusions and located on its original isolated bluff, can evoke a sense of tribal spiritual life.

Association. Association is the direct link between an important historic event or person and historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character. For example, the Lolo Trail whose natural and manmade elements have remained intact since the nineteenth century will retain its quality of association with the historic travel route.

Because feeling and association depend on individual perceptions, their retention alone is insufficient to support investment in the property.

Affected Environment

Existing Condition - General Historic Properties

In the centuries preceding Lewis and Clark and the Corps of Discovery's arrival in 1805, the Inland Northwest was a kaleidoscope of cultures. A span of time exceeding 10,000 years gave rise to a complex array of aboriginal cultures finely honed to the resources and seasonal rhythm of their respective areas. Historically, the Nez Perce-Clearwater's area was primarily the homeland to hunting, fishing, and gathering bands collectively referred to as the Nez Perce Indians. While the primacy of the Nez Perce use and presence across the Nez Perce-Clearwater is unquestionable, other peripheral groups also used the area. Most prominent among these proximally situated groups were those historically known as the Pend d' Oreille and Flathead Bitterroot Salish, Coeur d' Alene, and Northern Shoshone Indians. Today all these groups retain an ongoing vibrant culture with an unbroken tie to the Nez Perce-Clearwater.

Historically situated at the edge of the Columbia Plateau and Great Basin aboriginal cultural areas, the Nez Perce-Clearwater's locality existed at a crossroad of cultures. While the nature of the region's resources necessitated a similar economy among these groups, each nonetheless brought with them a differing language and orientation. Cultural interaction such as trade and marriage served to weave this diverse cultural landscape together, but the culture of each group retained a core identity.

As noted above, the Nez Perce-Clearwater's landscape is largely characterized by deep canyons possessing elevation-dependent ecosystems within. The vertical compression of these ecotones within the canyons resulted in a multitude of resources being available within a limited area throughout the seasons. This allowed small, extended family groups to largely orient themselves to a given watershed area and obtain the necessary resources to live throughout the year. The seasonal timing of resource availability within a watershed largely predicated the movement of groups as well as the type of resource collection activity. Ethnographically, winter was a more sedentary time generally spent at villages along the lower stream courses subsisting largely on stored foods. This successful approach to resource utilization allowed a given band to live for generations within a greater watershed area and develop sophisticated knowledge of the landscape. The acquisition of the horse at the dawn of the 18th century notably transformed this subsistence cycle. This equestrian use increased mobility, expanded use areas, altered relationships amongst Tribes, and transformed their economies and way of life.

American Indian use of the Nez Perce-Clearwater over the centuries is thus manifest in hundreds of archaeological sites in addition to ancient trails, areas of traditional importance, sacred sites, and oral traditions. Discrete and ever-disappearing, archaeological sites and the myriad of activities they reflect represent only a very small sample of the complex, rich, and dynamic past lifeways associated with each group.

The arrival of the Corps of Discovery to the Nez Perce-Clearwater's area in 1805 marks the beginning of the historic period for central Idaho. With it came a succession of events that dramatically changed American Indian culture. Although Euro-American trade items, the acquisition of the horse and early waves of communicable diseases had reached the Inland Northwest prior to the Corps' arrival, it was the succeeding 75 years which were to have a profound effect. The Coeur d' Alene War of 1858, the Nez Perce War of 1877, and the Sheepeater War of 1879, along with the reservation system, largely brought an end to the transhumant lifeways which had characterized American Indian culture for centuries.

Following the Corps of Discovery's eastward departure from the Nez Perce-Clearwater in 1806, a slow trickle and then tide of Euro-American fur trappers and explorers entered the Inland Northwest. In 1811 Donald McKenzie of the Pacific Fur Company led a small contingent of "Overland Astorians" to Fort Astoria on the Oregon coast following a route along the western flank of the Nez Perce-Clearwater through Hells Canyon (Cox 1832). The following year the Pacific Fur Company established a small post near present day Lewiston, Idaho, along the Clearwater River (Jones 1993). Later, in 1831, John Work of the Hudson's Bay Company led a fur brigade east across the Lolo Trail corridor into Montana (Lewis and Phillips 1923).

Indeed, transient travels through central Idaho typify the documented Euro-American use of the Nez Perce-Clearwater for the next several decades. Presbyterian minister Samuel Parker traversed the Southern Nez Perce Trail in 1835 as he traveled west on a reconnaissance mission for the American Board of Commissioners for Foreign Missions (Parker 1838). Likewise, Bitterroot Valley resident and prolific traveler John Owen travelled east and west across the Southern trail in 1854. John Owen had two years earlier traversed the Lolo Trail corridor and continued to do so several times as late as 1863 (Baird and Baird 2003). John Mullan also travelled westward on the Lolo Trail corridor in 1854 as part of a railroad survey for the War Department (Stevens and Palmer 1855).

The discovery of gold near present-day Pierce in 1860, and a year later at Elk City and Florence, ushered in a wave of settlement and land use that transformed the Nez Perce-Clearwater's natural and political landscape. Thousands of miners and accompanying tag-along businesses sprang up overnight in makeshift towns along with a nascent transportation network connecting each. Millions of dollars of gold were extracted from the Nez Perce-Clearwater, with the Florence Basin itself producing almost $10 million dollars in the 1860s (Idaho State Historical Society 1960). This locally produced capital provided an important source of hard currency for the Union during the Civil War (Idaho State Historical Society n.d.). Thus, the economic impetus for, and political organization of, the Idaho Territory at the time of its formation in 1863, and later State of Idaho in 1890, had its initial origins squarely within the Nez Perce-Clearwater's area. Today, thousands of historic mining features can be found throughout central Idaho and embody an historic theme replete with ecological, economic, political, and social implications.

Continued mining, small-scale lumbering, hard-scrabble farming and ranching, and homesteading typified the use on and around the Nez Perce-Clearwater during the 1870s and 1880s. This time period also saw the beginning of conservation related concerns expressed over the condition of forested watersheds on public lands in the eastern United States. These initial concerns eventually culminated in the Forest Reserve Act of 1891. The Act allowed the President to set apart and reserve forested public lands as an initial step in their protection from unregulated use (Steen 1976). In 1897, the amount of forested acreage reserved under the Act was doubled by President Grover Cleveland. As a part of this augmentation, 4.1 million acres were set aside in central Idaho and western Montana as the Bitterroot Forest Reserve. In 1905, the Forest Reserves were reformulated into national forests and managed by the newly created U.S. Forest Service within the Department of Agriculture. Shortly thereafter, on July 1, 1908, both the Clearwater and Nez Perce National Forests were created from portions of the Bitterroot, Coeur d' Alene, and Weiser National Forests. In 1934, additional acreage was added to both Forests when the Selway National Forest was dissolved. Nearly eight decades later, the two Forests were administratively combined on February 6, 2013 and are today known as the Nez Perce-Clearwater.

Since 1908 the history of the Nez Perce-Clearwater largely chronicles the administrative growth of both the Clearwater and Nez Perce National Forests. The first several decades of Clearwater and Nez

Perce National Forest's administration saw each Forest following similar trends as other national forests in the interior Northwest. Mapping of the Clearwater and Nez Perce National Forests occurred along with the establishment of initial communication lines, fire lookout locations, and administrative sites. Fire control was perhaps the top priority for early forest rangers. The initial lack of a functional communication network, difficult access to remote areas, limited infrastructure, and a shortage of labor led to unchecked devastating fires in the early 20th century. Destructive fire seasons such as those of 1910, 1919, 1929 and 1934 (Space 1981) left a landscape legacy still extent today. Too, the extraction of millions of board feet of white pine lumber on the Clearwater National Forest notably altered the vegetative landscape. For example, between approximately 1906 and 1930, many miles of temporary logging railroads were constructed across the Nez Perce-Clearwater to extract this resource. The extent of this harvested volume was so great that the largest white pine lumber mill in the world at the time was constructed in Potlach, Idaho, to process the resource, along with one of the most technologically advanced mills of the day built at Elk River (Petersen 1987). Grazing, too, affected forest conditions and use of the Nez Perce-Clearwater. For example, from 1911 through 1942 at least 2,691,139 ewes, lambs, and goats grazed across the Nez Perce-Clearwater (Steadman 2005, U.S. Department of Agriculture 1943). The advent and arrival of the Civilian Conservation Corps in the 1930s also had a profound effect on the cultural landscape of the Nez Perce-Clearwater. Administrative facilities, bridges, roads, and trails were subsequently constructed which increased active management and access to many portions of the Nez Perce-Clearwater. Following World War II, resource extraction increased to support a booming post-war economy. The legacy of this intensive activity is apparent today in not only the condition and management classification of the Nez Perce-Clearwater's landscapes, but also the multitude of policies that regulate forest management activity.

The human story of the Nez Perce-Clearwater is thus a rich narrative reflecting a converging cross-section of cultures, technologies, values, and environments. Table 309 lists the broad historic themes which have transpired across the Nez Perce-Clearwater and the associated cultural resource site types typical of each.

Table 309. Historic themes and general cultural resource site types of the Nez Perce-Clearwater.

Historic Theme	Site and Feature Type(s)
American Indian Use[1]	Artifact scatters, lithic procurement sites, rock-art, rock shelters, camps, villages, fishing sites, rock cairns, areas of traditional importance, peeled tree groves, trails, etc.
Backcountry Aviation	Airstrips and crash sites
Chinese Sojourners	Habitation features, artifact scatters, and mining features
Civilian Conservation Corps	Ranger stations, camps, public campgrounds, bridges, roads, trails, and fire lookouts
Conflict - Western Frontier	Camp sites along the Lolo Trail
Exploration and Fur Trade	Camp sites along the Lolo Trail
Fire Detection	Fire lookout stations
Forest Service Administrative History	Administrative sites and telecommunication lines
Homesteading and Ranching	Buildings, structures, orchards, and artifact scatters
Hydroelectric Development	Small dams
Incarceration	Internee camps and prison camps
Lands	Boundary and survey markers
Logging and Lumbering	Railroad grades, flumes, splash dams, camps, middens, and artifact scatters

Historic Theme	Site and Feature Type(s)
Mining	Townsites, placer mines, load mines, ditches, mills, building, structures, dams, cemeteries, etc.
Missionary Period	Camp sites along the Southern Nez Perce Trail
Outdoor Recreation	Ranches, developed and dispersed camps, motorways, and artifact scatters
Range Management	Cabins, stock driveways, corrals, and watering stations
Settlement - Local	Schools and middens
Transportation	Roads, trails, bridges, and waystations
Trapping	Martin sets, cabins, and line shacks

[1]With assistance from the Nez Perce Tribe this theme might be disassembled into multiple categories as portrayed for non-native use of the Nez Perce-Clearwater.

The cultural resources included in Table 309 are non-renewable properties. Unlike natural and biotic resources, they cannot be replanted, reintroduced, restocked or otherwise grown. Once a given cultural resource, or its integrity, has been destroyed it is generally gone forever.

Existing Condition - Lolo Trail National Historic Landmark

The Lolo Trail National Historic Landmark was determined eligible as a National Historic Landmark by the Department of Interior on October 9, 1960, as an outgrowth of congressional direction found in the 1935 Historic Sites Act. Later, in 1963, it was formally registered as a National Historic Landmark with an official certification ceremony held at the Powell Ranger Station on August 11, 1965. It was subsequently listed on the National Register on October 15, 1966, upon the National Register's creation that year following the passage of the National Historic Preservation Act.

Nationally, the 2,500 properties designated as National Historic Landmarks tell stories that are of importance to the history of the entire nation, not just local communities, or states. They are places where our nation's most significant historic events occurred. The designation of a property as a National Historic Landmark indicates the property "possesses exceptional value or quality in illustrating and interpreting the heritage of the United States," and "represents an outstanding aspect of American history and culture." Accordingly, these properties must possess a high, not simply good, level of historic integrity to retain their status as a National Historic Landmark.

The portion of the greater Lolo Trail National Historic Landmark located in Idaho is approximately 60,000 acres in size and 62 statute miles in length extending from the Nez Perce-Clearwater boundary in the west near Musselshell Meadows to the Nez Perce-Clearwater boundary to the east at Lolo Pass. It encompasses 1 percent of the Nez Perce-Clearwater and varies approximately between a quarter to one and three-quarter miles wide. The Landmark also extends well onto the Lolo National Forest. Thus, the Landmark is essentially a lineal corridor, but also has several lateral extensions giving it a somewhat braided appearance.

Approximately 8 percent of National Historic Landmarks are located on federal land. Therefore, the Lolo Trail National Historic Landmark is a relatively rare entity on the federal landscape. Indeed, the Lolo Trail National Historic Landmark is the largest National Historic Landmark in the Northern Region of the U.S. Forest Service and encompasses the longest intact segments of both the Nez Perce National Historic Trail and the Lewis and Clark National Historic Trail in the United States. The Lolo Trail National Historic Landmark is thus the single most important stronghold for both the Lewis and Clark and Nez Perce National Historic Trail in the United States.

Nationally, in 2000 and 2001, of the more than 2,500 National Historic Landmarks, approximately 90 percent were considered preserved “without damage or imminent threats” by the National Park Service. The remaining 10 percent fell into one of three undesirable condition classifications. Unfortunately, the Lolo Trail National Historic Landmark falls into this latter 10 percent and is specifically listed in the “watch” category. A National Historic Landmark listed in the “watch” category is defined as a property “that faces impending actions or circumstances that likely will cause a loss of integrity.” The rationale for the watch listing was the result of past timber harvesting operations within the Landmark. Numerous plan components have been crafted to ensure the integrity of the Landmark persists. Additionally, the Landmark has been designated as a distinct geographic area.

Environmental Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications, or longer-term environmental consequences, of managing the Nez Perce-Clearwater under this programmatic framework.

Effects to No Action Alternative

The current forest plans generally only propose the active protection of historic properties from agency activities, not proactive measures meant to enhance or improve historic property conditions. Therefore, the indirect effects of the current forest plans would be the slow loss of integrity of non-renewable historic properties due to natural deterioration and the consequences of time.

Effects Common to Action Alternatives

The four action alternatives generally have six main themes that fluctuate between alternatives and address the significant issues identified during scoping. These themes consist of timber harvest; prescribed fire; aquatic restoration, specifically the recovery of listed fish species; recommended wilderness; wild and scenic river suitability; and motorized travel.

For the purposes of this effect’s analysis, these six themes are considered to affect, both indirectly and cumulatively, the general integrity of historic properties in the following manner:

- **Timber Harvest and Prescribed Fire**. Assuming historic properties are protected by extent federal laws during these activities, timber harvest and prescribed fire can benefit historic properties by removing fuel around historic properties making them more defensible during future wildfires. Additionally, these activities will occur around hundreds of previously recorded cultural resources over the life of the plan that, to date, have never been formally evaluated for their eligibility to the National Register. These activities will thus provide the mechanism to visit and formally evaluate these sites such that non-eligible sites can be removed from future management consideration. This will thoughtfully reduce the number of historic properties the Nez Perce-Clearwater manages, considers, and mitigates for during future planning efforts; better help allocate scarce resources to those properties worthy of investment; and reduce risk exposure to fire fighters by not protecting non-eligible properties during wildfires.
- **Riparian Restoration.** This activity generally occurs within the narrow confines of riparian systems. These streamside localities typically have a high number of historic properties given their flat, well-watered landforms attracted historic human activity. Unlike other agency activities that can be designed to avoid historic properties, aquatic restoration activities

necessarily are focused within these specific, narrow corridors and their adjacent terraces. Avoiding historic properties during aquatic restoration projects is often not possible.

- **Recommended Wilderness**. A reasonably foreseeable outgrowth of recommended wilderness is wilderness designation. Wilderness designation has a neutral, trending-positive effect on cultural resources. Fuel reduction is generally not possible around historic properties in wilderness, but wilderness designation may cause the timely evaluation of previously recorded sites for their eligibility to the National Register because of efforts to remove cultural resources that do not contribute to wilderness character. This evaluation process will help allocate scarce resources to those historic properties worthy of investment and reduce risk exposure to fire fighters by not protecting non-eligible properties during wildfires. Designated wilderness also does not have the suite of trammeling activities found in front-country environs. This management context thus provides an environment that, at times, is more conducive to the long-term preservation of historic properties.
- **Wild and Scenic River Suitability**. A reasonably foreseeable outgrowth of wild and scenic river suitability is wild and scenic river designation. Designation of wild and scenic stream courses has a neutral effect on cultural resources. Fuel reduction meant to benefit historic properties can be more difficult around historic properties having an outstanding remarkable value in wild portions of wild and scenic stream corridors. However, designated streams possessing an outstanding remarkable value related to historic and cultural values offer additional protection to historic properties beyond that offered by the National Historic Preservation Act.
- **Motorized Travel**. Motorized traffic introduces certain effects to historic properties. These effects might include, but are not limited to the following:
    - ♦ Initial damage to archaeological properties resulting from the construction of routes through these properties and subsequent motorized use of those routes, which may cause further soil compaction, soil displacement, rutting, erosion, deflation, and artifact breakage.
    - ♦ An increase in access and use to a particular locality having historic properties resulting in potentially higher occurrences of artifact collecting, vandalism, and dispersed recreational impacts to historic properties.

Table 310. Raw ranking of alternatives by relative amount of proposed activity.

Activity	Activity Benefit to Historic Property Integrity	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Timber Harvest	a	1	5	6	3	2	4
Prescribed Fire	b	6	3	5	4	1	2
Recommended Wilderness	c	2	6	1	4	5	3
Wild and Scenic River Suitability	d	2	4	2	5	6	3
Riparian Restoration	e	3	3	3	3	3	3
Motorized	f	4	3	1	5	6	2

Ranking: 1=least beneficial to 6 being most beneficial to cultural resources. a=most beneficial to f=least beneficial to cultural resources. Ranking in this table does not reflect additive weighting, as does Table 312.

Cumulative Effects

The cumulative consequences of the indirect effects noted above is that hundreds of historic properties would continue to be protected from project specific activities, but few instances of actual interpretation, maintenance and repair, or compatible use would occur that would sustain or enhance resource integrity. The net result would be the slow loss of historic properties on the Nez Perce-Clearwater as the 1987 plans generally only attempt to "cause no further harm" to the resource.

Effects to Resource from Other Resources

Climate Change

A warmer climate will alter the scale and amplify the effects of wildfires on historic properties by increasing the likelihood of sites being burned or impacted by fire suppression efforts, as well as increasing instances of post fire-flooding.

Prolonged seasonal droughts can also lead to soil deflation and erosion as desiccation diminishes vegetative ground cover. This increases the likelihood of artifact exposure, trampling, and illegal collection activity.

Hydrologic impacts such as higher winter stream-flows resulting from warmer temperatures or precipitation falling in the form of rain may cause flooding, scouring, and debris flows. Canyon mouths and stream bottoms would especially be affected by this activity and are archaeologically sensitive landforms that have attracted human use for millennia (Halofsky, Peterson, et al. 2018b).

Cultural landscapes may also be affected by climate change as alteration of vegetation and related species can affect the National Register integrity categories of feeling and setting. Ethnobotanical plant species important to tribal communities may also be affected in terms of seasonal timing, abundance, and distribution.

Cultural Resource Management

Historic property management is specifically meant to benefit cultural resources. There are occasions, however, when low-level adverse effects to historic properties may occur to achieve a long-term benefit to the resource, such as archaeological disturbance experienced when stabilizing a site.

Fire Management

Assuming historic properties are protected by extent federal laws during these activities, fire can benefit historic properties by removing fuel around historic properties making them more defensible. Specifically, prescribed fire activities occur around hundreds of previously recorded cultural resources over the life of the Land Management Plan that to date have never been formally evaluated for their eligibility to the National Register of Historic Places. These activities will thus provide the mechanism to visit and formally evaluate these sites such that non-eligible sites can be removed from future management consideration. This will thoughtfully reduce the number of historic properties the Nez Perce-Clearwater manages, consider, and mitigate for during future planning efforts, better help allocate scarce resources to those properties worthy of investment, and reduce risk exposure to fire fighters by not protecting non-eligible properties during wildfires.

Infrastructure

Roads are often built along drainages, ridgetops, and through saddles. The continued maintenance and repair of these roads can negatively affect archaeological properties located on these, and other, archaeologically sensitive landforms.

Well maintained historic facilities benefit historic properties. Decommissioning or conveying historic buildings has an adverse effect on historic properties. Plan component FW-GDL-CR-01 is meant to help facilitate the consideration of heritage values when future use determinations concerning historic buildings are proposed.

Lands and Lands Special Uses

Mountain top communication sites can conflict with Tribal use of those same localities for traditional use and religious activities.

Livestock Grazing

Livestock management features, such as fences and water developments, can affect historic properties. Fences built across or down ridgetops serve to concentrate livestock atop landforms having a high potential for archaeological site location. Water developments centered on springs and seeps are located at locations on the landscape that attracted historic human use. Archaeological sites located at these locations can be damaged through trampling, soil mixing, and deflation.

Minerals

Prospecting, exploratory, developmental, and production related activities associated with managing locatable minerals has a notable potential to effect historic properties. Placer mining activities are often more impactive to historic properties than lode mining operations.

Recommended Wilderness

Wilderness has a neutral, trending-positive effect on cultural resources. Fuel reduction is generally not possible around historic properties in wilderness, but wilderness designation may cause the timely evaluation of previously recorded sites for their eligibility to the National Register because of efforts to remove cultural resources that do not contribute to wilderness character. This evaluation process will help allocate scarce resources to those historic properties worthy of investment and reduce risk exposure to fire fighters by not protecting non-eligible properties during wildfires. Designated wilderness also does not have the suite of trammeling activities found in front-country environs. This management context thus provides an environment that, at times, is more conducive to the long-term preservation of historic properties.

Soils

Desired conditions for soil resources are complimentary to historic property management excepting soil restoration activities which can disturb archaeological sites.

Suitable Wild and Scenic Rivers

Suitability of wild and scenic stream courses generally has a positive effect on cultural resources. Fuel reduction around historic properties having an outstanding remarkable value in suitable wild and scenic stream corridors is possible. Additionally, designated streams possessing an outstanding remarkable value related to historic and cultural values offer additional protection to historic properties beyond that offered by the National Historic Preservation Act.

Sustainable Recreation - Including Developed and Dispersed Recreation

Developed and dispersed recreation sites often occur in common with locations on the landscape that also attracted historic human use. The existence of archaeological sites at these locations poses a potential effect to historic properties if unmitigated recreation use continues at these sites. These recreation sites do, however, offer opportunities for interpretation and public education concerning Nez Perce-Clearwater history and other issues associated with historic property management. Plan component FW-GDL-CR-02 is meant to resolve ongoing effects located at both developed and dispersed recreation sites.

Roads and Motorized Trails Management

Motorized traffic introduces certain effects to historic properties. These effects might include, but are not limited to the following:

- Initial damage to archaeological properties resulting from the construction of routes through these properties and subsequent motorized use of those routes, which may cause further soil compaction, soil displacement, rutting, erosion, deflation, and artifact breakage.
- An increase in access and use to a particular locality having historic properties resulting in potentially higher occurrences of artifact collecting, vandalism, and dispersed recreational impacts to historic properties.

Timber

Assuming historic properties are protected by extent federal laws during timber harvest operations, this activity can benefit historic properties by removing fuel around the properties making them more defensible during wildfires. Additionally, these activities will occur around hundreds of previously recorded cultural resources over the life of the plan that to date have never been formally evaluated for their eligibility to the National Register of Historic Places. These activities will thus provide the mechanism to visit and formally evaluate these sites such that non-eligible sites can be removed from future management consideration. This will thoughtfully reduce the number of historic properties the Nez Perce-Clearwater manage, consider, and mitigate for during future planning efforts; better help allocate scarce resources to those properties worthy of investment; and reduce risk exposure to fire fighters by not protecting non-eligible properties during wildfires.

Riparian Restoration

This activity generally occurs within the narrow confines of riparian systems. These streamside localities typically have a high number of historic properties given their flat, well-watered landforms attracted historic human activity. Unlike other agency activities that can be designed to avoid historic properties, aquatic restoration activities necessarily are focused within these specific, narrow corridors and their adjacent terraces. Avoiding historic properties during aquatic restoration projects is often not possible.

Summary of Consequences

The raw rankings shown in Table 310 are predicated on the quantitative amount of each activity by alternative. The rankings in the tables need a qualitative-additive weighting, however, to properly frame the degree to which each of the six activities can benefit historic property integrity. That additive weighting is shown in Table 311 and Table 312.

Table 311. Additive weighting of relative effects to cultural resources from other activities.

Ranking	Activity
3 (most favorable)	Timber Harvest, assuming historic properties are protected during project implementation
2	Prescribed Fire, assuming historic properties are protected during project implementation
1	Recommended Wilderness
0	Wild and Scenic River Suitability
-1	Riparian restoration
-2 (least favorable)	Motorized

Table 312. Numerical weighting added to the raw ranking of alternatives in Table 310.

Activity	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Timber Harvest[1]	4	8	9	6	5	7
Prescribed Fire[1]	8	5	7	6	3	4
Recommended Wilderness	3	7	2	5	6	4
Wild and Scenic River Suitability	2	4	2	5	6	3
Riparian Restoration	2	2	2	2	2	2
Motorized	2	1	-1	3	4	0
Totals	21	27	21	27	26	20

Ranking: 1=least beneficial to 6 being most beneficial to cultural resources. Ranking in this table does not reflect additive weighting, as does Table 312.

[1]Assuming historic properties are protected during project implementation

Based on this analysis, Alternatives W and Y will benefit the integrity of historic properties the most, while the Preferred Alternative will have the most potential impacts to cultural resource integrity.

Conclusion

Because historic property management issues were not identified as being specific drivers of alternatives for the Land Management Plan, there are no overt differences between alternatives related to short term uses and long-term productivity of cultural resources that can be weighed in effective terms.

Also, historic properties are non-renewable resources. Unlike natural and biotic resources, they cannot be replanted, reintroduced, restocked, or otherwise grown. Once a given historic property, or its integrity, has been destroyed, it is generally gone forever. A potential exception to this statement relates to historic buildings. Removing or modifying vegetation that contributes to an historic building's integrity through the elements of setting and feeling, as defined above, may have a short-term impact to the integrity of the property. However, given the historic building likely serves as the primary feature or visual anchor on site, impacts to the vegetation may not entirely destroy the significance of the site. In time, vegetation can be purposely reestablished or restored to that appropriate for the period of significance. Thus, the long-term benefits of vegetation manipulation accomplished for the purposes of wildfire protection, or the restoration of the historic setting and feeling, can potentially outweigh the short-term impacts to the site's visual integrity. This management concept does not, however, apply to the Lolo Trail National Historic Landmark. Because the Landmark's primary means of conveying its significance is through setting and feeling, alterations to those elements leaves insufficient integrity remaining to convey its significance.

Additionally, minor impacts to the integrity of an archaeological site may be acceptable if the purpose of that effect is to facilitate on-site historic preservation activities meant to address larger issues affecting the site's integrity.

3.4.2 Sustainable Recreation

Recreation participation is how most Americans have come to know their National Forests and Grasslands. For many Americans then, sustainable recreation is an important portal for understanding the value, meaning, history, and relevance of National Forests and Grasslands (U.S. Department of Agriculture 2010a). The 2012 Planning Rule defines sustainable recreation as the set of recreation settings and opportunities on the National Forest System that is ecologically, economically, and socially sustainable for present and future generations. The focus of forest recreation management is to provide a range of environmentally sustainable opportunities to participate in a variety of recreational activities in forest settings to meet the needs and desires of visitors. Recreation settings are the social, managerial, and physical attributes of a place that, when combined, provide a distinct set of recreation opportunities.

The Forest Service often categorizes recreational activities into two descriptions – developed recreation and dispersed recreation. Both types of recreation are categorized further by the recreation opportunity spectrum. The recreation opportunity spectrum includes a non-motorized and motorized access opportunities discussion, in addition to developed and dispersed opportunities. In some cases, these recreation opportunities are enhanced through the services offered by those in possession of a recreation special use permit for outfitting and guiding services or a recreation event.

Developed recreation occurs in settings that have been created or constructed for specific recreational purposes on the national forest, such as overnight campgrounds, picnic sites, downhill ski areas, rental cabins, boat docks, visitor centers, interpretive trails with display panels, organizational camps, and special use permitted recreation residence tracts. Fees may or may not be charged. These locations are usually given site names, inventoried, and categorized in Nez Perce-Clearwater databases with basic capacity information and design features.

Dispersed recreation occurs across the forest where there is little or no infrastructure or facilities except roads and trails. Activities include hiking, bird watching, driving for pleasure, rock and ice climbing, boating, hunting, fishing, horseback riding, berry picking, backcountry skiing, snowmobiling, camping, and motorized and mechanized trail use. Dispersed camping occurs in the general forest area that has little, or no Forest Service facilities provided, often where there is repeated dispersed use. Recreation special use permits are issued to private businesses, individuals, institutions, other government entities, and nonprofit groups to provide for occupancy and use of the national forests beyond what is normally available to the public.

Changes Between Draft and Final Environmental Impact Statements

Analysis as documented in the Draft Environmental Impact Statement characterized the Forests as having existing recreation opportunity spectrum class designations “based on modeling of travel routes and terrain, as well as the existing forest plan direction.” The Draft Environmental Impact Statement went on to say “This existing condition distribution of classes is not the same as the desired recreation opportunity spectrum distribution from the 1987 plans. The existing condition classifications were based on the 1987 plans, as well as closure orders, the Clearwater travel plan, and other management decisions made since 1987 that have impacted the recreation opportunities across the Nez Perce-Clearwater.”

Subsequent to the release of the Draft Environmental Impact Statement, it was recognized that the 1987 Nez Perce and Clearwater Forest Plans did not make decisions regarding designation of Recreation Opportunity Spectrum (ROS) classes. Rather, the Nez Perce Forest Plan provided direction to “Manage for a full array of recreation opportunities, from primitive to roaded natural, as described by the Recreation Opportunity Spectrum (ROS).” Indicating that ROS direction and protocols were to be used in the planning, analysis, and implementation of project level decisions. Under the No Action Alternative, the development of recreation opportunity spectrum direction would remain part of project level decisions applicable only to those decision areas, remaining inconsistent with 2012 Planning Rule direction to incorporate the recreation opportunity spectrum into the Land Management Plan.

The Clearwater Forest Plan identified five areas as recommended wilderness. The term “semiprimitive recreation” is used to in the descriptions of the recommended wilderness areas. The Plan also allocated five roadless areas to management without roads under three types of management emphasis. One management emphasis description is Management Area A3 – Semiprimitive recreation. A definition of Semiprimitive Recreation Setting is provided in the glossary consistent with the classification definition in the ROS User Guide. Additionally, Appendix F – Travel Planning uses ROS terms such as primitive, semi-primitive, motorized and nonmotorized recreation. However, as with the Nez Perce Plan, ROS was not used as a management tool to determine motorized and nonmotorized suitability across the Forest and there is no designation of ROS classifications in the Forest Plan.

Developing an ROS classification as per the ROS User Guide that did not exist prior to this Land Management Plan revision process is problematic because that ROS classification is not a true representation of the existing condition under the 1987 Forest Plans and subsequent travel management decisions and closure orders. This developed representation is described as the No Action alternative and is used as the baseline in the comparison of alternatives involving suitability of areas for summer and winter motorized use. However, there is a significant difference in the areas and acreage suitable for motorized between the true existing condition and the developed ROS classifications. This discrepancy portrayed an inaccurate change between the No Action alternative and the action alternatives.

To correct this misapplication of ROS classes, the ROS maps for the No Action alternative have been removed and replaced by maps that accurately portray the areas open and closed to summer and winter motorized recreation under the 1987 Plans. The corrected acreages were then used for comparative purposes of the effects of ROS classifications in the action alternatives. Those numbers are presented in the Final Environmental Impact Statement.

Relevant Laws, Regulations, and Policy

Laws

Organic Administration Act of June 4, 1897 (30 Stat. 11, as amended): This act authorizes the establishment of national forests.

Term Permit Act of March 4, 1915 (Pub. L. 63-293, Ch. 144, 38 Stat. 1101, as amended; 16U.S.C. 497): This act provides direction to the National Forest System lands to authorize occupancy for a wide variety of uses through permits not exceeding 30 years.

Multiple-Use Sustained-Yield Act of June 12, 1960 (Pub. L.86-517, 74 Stat. 215): This act provides direction to National Forest System lands to provide access and recreation opportunities. The act states "the policy of Congress is that national forests are established and administered for outdoor recreation..."

National Forest Roads and Trails Act of October 13, 1964 (Pub. L. 88-657, 78 Stat. 1089, as amended): This act declares that an adequate system of roads and trails should be constructed and maintained to meet the increasing demand for recreation and other uses. The act authorizes road and trail systems for the national forests. It authorizes granting of easements across National Forest System lands, construction and financing of maximum-economy roads (Forest Service Manual 7705), and imposition of requirements on road users for maintaining and reconstructing roads, including cooperative deposits for that work.

Land and Water Conservation Fund Act of 1965 (Pub. L. 88-578, 78 Stat. 897 as amended; 16 U.S.C. 460l-4604 (note); 460l-4604 through 6a, 460l-4607 through 460l-4610, 460l-4610a-d, 460l-4611): "The purposes of this act are to assist in preserving, developing, and assuring accessibility to all citizens of the United States of America...[to] such quality and quantity of outdoor recreation resources...[and] providing funds" to states for acquisition, planning, and development of recreation facilities and federal agencies for acquisition and development of certain lands and other areas .

Architectural Barriers Act of August 12, 1968 (Pub. L. 90-480, 82 Stat. 718 51 U.S.C. 4151- 4154, 4154a, 4155-4157): This act establishes additional requirements to ensure that buildings, facilities, rail passenger cars, and vehicles are accessible to individuals with disabilities. It covers architecture and design, transportation, and communication elements of recreational site planning and development.

National Trails System Act of October 2, 1968 (Pub. L. 90-543, 82 Stat. 919, as amended): This act was signed into law by President Lyndon B. Johnson on October 2, 1968. The purpose of the act was "to promote the preservation of public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the nation." This act authorized three types of trails: 1) national scenic trails, 2) national recreation trails, and 3) connecting-and-side trails. In 1978, national historic trails were also added to the national trail system. National scenic trails and national historic trails may only be designated by Congress. National recreation trails may be designated by the Secretary of Interior or the Secretary of Agriculture. Through designation, these trails are recognized as part of the American National Trail System.

Trails for America in the 21st Century (Executive Order 13195): This order was signed by President Clinton in 2001 to achieve the common goal of better establishing and operating the American national system of trails. It addresses development and management of national scenic and historic trails by protecting trail corridors.

The Nez Perce (Nimíipuu or Nee-Me-Poo) National Historic Trail Public Law No (99-44510/06/1986): By Congress, this public law added the Nez Perce Trail to the national trails system as a national historic trail.

Rehabilitation Act of September 26, 1973 (Pub. L. 93-112, Title V, 87 Stat. 390, as amended; 29U.S.C. 791, 793-794, 794a, 794b): This act requires that programs and activities conducted by federal agencies and by entities that receive funding from, or operate under a permit from, federal agencies provide an equal opportunity for individuals with disabilities to participate in an integrated setting as independently as possible. The only exception to the requirement is when the program would be fundamentally altered if changes were made solely for the purpose of accessibility.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (Pub. L. 93-378, 88 Stat. 476, as amended): Per Section 10, this act declares that “the installation of a proper system of transportation to service the National Forest System...shall be carried forward in time to meet anticipated needs on an economical and environmentally sound basis.”

Federal Land Policy and Management Act of October 21, 1976 (Pub. L. 94-579, 90 Stat. 2742, as amended): Per Section 102, this act declares that “the public lands be managed in a manner that…will provide for outdoor recreation and human occupancy and use.”

Secure Rural Schools and Community Self-Determination Act of October 30, 2000 (Pub. L. 106-393, 114 Stat. 1607; 16 U.S.C.500 note): This act provides provisions to make additional investments in, and create additional employment opportunities through, projects that improve the maintenance of existing infrastructure; implement stewardship objectives that enhance forest ecosystems; and restore and improve land health and water quality.

Federal Lands Recreation Enhancement Act of December 8, 2004 (Pub. L. 108-447, as amended): This act gives the Secretaries of Agriculture and Interior the authority to establish, modify, charge, and collect recreation fees on federal recreational lands where a certain level of amenities has been developed.

Federal Cave Resources Protection Act of 1988 (Pub. L. 101-691): This act aims to “secure, protect, and preserve significant caves on Federal lands for the perpetual use, enjoyment, and benefit of all people; and to foster increased cooperation and exchange of information between governmental authorities and those who use caves located on Federal lands for scientific, education, or recreational purposes.” Specific effects of the act include prohibiting the disclosure of location of significant caves, the removal of cave resources, and vandalizing or disturbing cave resources.

Executive Orders

Executive Order 12862, Setting Customer Service Standards: This order requires information about the quantity and quality of recreation visits for national forest plans.

Executive Order 11644, as amended: This order establishes policy and procedure “that will ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands.”

Executive Order 13443, Facilitation of Hunting Heritage and Wildlife Conservation: This order directs federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

2012 Planning Rule (36 CFR 219): This rule states that in developing a proposed plan revision, plan components must include sustainable recreation, including recreation settings, opportunities, access, and scenic character. Recreational opportunities could include non-motorized, motorized, developed, and dispersed recreation on land, water, and air.

Methodology

Spatial Scale

The geographic scope of the analysis is the National Forest System lands administered by the Nez Perce-Clearwater. All lands of all ownership within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects.

Temporal Scale

The temporal scope is the anticipated life of the plan.

Past, Present, and Future Activities used in the Analysis

Recreation has occurred on the Nez Perce-Clearwater in some form since before the designation of the forests and has been influenced throughout this period by the multiple-uses occurring across the forests. Likewise, it is expected that multiple uses will continue to influence recreation in the future. Some of the activities that have influenced, continue to influence, and are expected to influence in the future are:

- Road building, maintenance, and decommissioning
- Trail construction, maintenance, and decommissioning
- Timber Harvest
- Mining
- Grazing
- Fire Management
- Aquatic Restoration
- Fisheries management
- Wildlife management
- Cultural Resources management
- Scenery management

The first six of these activities have often been the basis for creation of recreation access opportunities and recreation settings. They not only influence the ability of recreationists to access the forest but have also altered the characteristics of the forest that provide a variety of recreational activities. The remaining four of these activities are often the attractors for which visitors come to the forest.

Methods and Assumptions

The context for evaluating sustainable recreation on the Nez Perce-Clearwater is the Nez Perce-Clearwater's recreation setting and opportunities, developed through the Recreation Facilities Analysis process (U.S. Department of Agriculture 2014m). In doing so, sustainability is focused on those things the Nez Perce-Clearwater is uniquely poised to provide and framed within the broader landscape of Idaho, Eastern Washington, Eastern Oregon, and Western Montana.

The desired recreation opportunity spectrum for both summer and winter was mapped across the Nez Perce-Clearwater by each alternative to indicate the suitability of recreation related activities. The methodology for mapping the recreation opportunity spectrum for each alternative follows the National Recreation Opportunity Spectrum (ROS) Inventory Mapping Protocol (U.S. Department of Agriculture 2019b). Each alternative was then analyzed for the total number of acres and percentage of the desired recreation opportunity spectrum settings on the Nez Perce-Clearwater. Motorized and non-motorized access were not independently mapped, as they are components of the desired recreation opportunity spectrum and are therefore included in that mapping.

Developed recreation sites were mapped using existing Nez Perce-Clearwater databases as points. The Northern Region undertook an inventory of dispersed sites and added this data to the Nez Perce-Clearwater databases in 2010. This data was also mapped to indicate concentrations of dispersed use in some portions of the Nez Perce-Clearwater. While this data helps indicate where dispersed use occurs, it is assumed that not all dispersed sites were mapped and that new ones are continuing to develop.

Since adoption of the forest plans, recreation activities across the Nez Perce-Clearwater have changed. This analysis assumes that changes to recreational use patterns would occur naturally as a result of factors associated with recreation trends, advances in technology, aging population, aging infrastructure, increase or decrease in local populations, and climatic changes.

The Land Management Plan establishes programmatic level direction. It does not make site-specific travel planning designations, maintenance level determinations, operational choices, or project-level decisions. The Land Management Plan sets broad level context for sustainable recreation and trails management across the vast Nez Perce-Clearwater landscape. If higher-level land management allocations result in inconsistencies with travel planning direction, subsequent travel plan amendments or modification may be necessary. In addition to the laws and executive orders listed above, the Forest Service Manual provides nation-wide and regional direction on recreation management topics. Those policies are not repeated in Land Management Plans.

Information sources

The Nez Perce-Clearwater used the best available data relevant to inform the analysis for the Land Management Plan components for recreation settings, recreation opportunities, recreation special uses, and recreation access. Data for this analysis and the associated Land Management Plan components was pulled from a variety of monitoring and assessment databases. The latest three National Visitor Use Monitoring (NVUM) assessments provide information regarding recreation use and trends across the Nez Perce-Clearwater. Much of the recreation data used in this analysis comes from the Forest Service infrastructure database (INFRA). This forest-level database is a collection of web-based data entry forms, reporting tools, and mapping tools. The database provides a geographic information system that enables the Forest Service to manage and report accurate information about constructed features and land units inventory, as well as visualize, analyze, interpret, and understand data to reveal relationships and patterns. The special-use data system (SUDS) provides information about special-use authorizations, such as outfitter and guide permits and recreation events. The Idaho Statewide Comprehensive Outdoor Recreation Plan (SCORP) also informs the Forest Service about statewide tourism and recreation activities and plans.

Measurement Indicators

For comparison purposes, two indicators were used to determine the effects to sustainable recreation.

First, areas of Recreation Opportunity Spectrum (ROS) classes were allocated across the landscape by alternative in consideration of Management Area land allocations. There are six ROS classes arranged along a continuum that provides a framework for defining recreation opportunity environments. The acreage and percent of desired summer and winter classes were used to indicate the settings a recreating visitor might expect in any given area. This, in turn, would indicate the locations and acres favorable for preferred recreational experiences.

A refinement of these classes was used as a second indicator to assess the differences in recreation access and recreation experience opportunity. This was measured by determining the acres suitable for summer wheeled motor vehicle use, and the acres suitable for motorized over-snow vehicle use. The acres suitable for summer and winter motorized use vary across alternatives, again in consideration of Management Area allocations. Qualitative evaluation of the effects of Land Management Plan direction to how well it supports and benefits people for motorized access further indicates differences across alternatives.

Therefore, the two indicators for determining impacts to sustainable recreation were measured by the following four metrics:

- Settings by acres of desired summer recreation opportunity spectrum classes
- Settings by acres of desired winter recreation opportunity spectrum classes
- Recreation experience opportunity by acres suitable or not suitable for motorized over-snow vehicle use
- Recreation experience opportunity by acres suitable or not suitable for motorized summer vehicle use

Affected Environment

Sustainable recreation management encompasses many aspects of recreational use on the Nez Perce-Clearwater. The recreation settings available on the Nez Perce-Clearwater serve as the basis for providing opportunities for visitors to recreate. Access, whether motorized or non-motorized, and facilities, whether developed or dispersed, allow visitors to achieve and enjoy their desired recreational opportunities. Finally, recreation special uses help facilitate these opportunities by offering assistance to achieve these experiences when visitors might otherwise be unable to realize them. Collectively, these attributes create a sustainable recreation management strategy. All of them are affected by trends in visitor use and activity choices people make based on their objectives and desired experiences.

Visitor Use

National Forest visitor use monitoring report data indicates that from fiscal year 2013 to fiscal year 2017 the volume of recreation use on the national forests was estimated to be about 149 million recreation visits. The nationwide survey further indicates the value of visitors to the economic sustainability of the nation, especially in rural areas. Ten billion dollars is estimated to be spent annually by recreation visitors in areas near national forests and grasslands. Furthermore, approximately 10.3 billion dollars is reflected in the gross domestic product and recreation visitation sustains about 143,000 full-time and part-time jobs (U.S. Department of Agriculture 2017g).

Three national visitor-use monitoring reports and surveys have been completed for the Nez Perce-Clearwater. The latest round of visitation estimates was completed in 2016 for the combined Nez Perce-Clearwater (U.S. Department of Agriculture 2017g). The previous two rounds, in 2006 and 2011, were completed for each of the forests independently since they were not administratively combined at the time those surveys were conducted (U.S. Department of Agriculture 2018c, e, d, f). Estimated annual visitation is around 550,000 visits for the Nez Perce-Clearwater. Table 313 shows the data from the three survey years broken out by the different types of visits users engaged in while visiting the Nez Perce-Clearwater.

Table 313. Estimated site visits for the plan area in 2006, 2011, and 2016

Visit Type	2006	2011	2016
Day Use Developed Site Visits	195,000	155,000	205,000
Overnight Use Developed Site Visits	81,000	69,000	74,000
General Forest Area Visits	385,000	235,000	409,000
Designated Wilderness Visits	30,000	21,000	76,000
Total Estimated Site Visits1	689,000	481,000	763,000
Total Estimated National Forest Visits[1]	440,000	294,000	550,000

Note that a site visit is different than a forest visit since a single visitor may visit multiple site types within a single forest visit.

NVUM surveys are conducted every five years, so numbers apply only to the respective year, not to a five-year interval.

Data Source: National Visitor Use Monitoring Reports for 2006 and 2011 for the Nez Perce and Clearwater National Forests separately and for 2016 a combined Nez Perce-Clearwater Report.

General forest area visits dominate the visit type with almost three-quarters of visitors indicating that their visit included use of an undeveloped or general forest area. Just over one-third of visitors did visit a developed day-use site, while only about one-tenth of visitors indicated using a developed overnight facility. The Nez Perce-Clearwater visitation distribution is slightly different than the National Forest System as whole data. Across the country about two-thirds of visitors indicate a general forest visit, about half visit a day-use developed site visit, and about one-tenth visit a developed overnight visit (U.S. Department of Agriculture 2017g). Therefore, compared to the National Forest System as a whole, the Nez Perce-Clearwater may have slightly higher dispersed use, slightly lower developed day-use, and about the same developed overnight use.

In 2016 National Visitor Use Monitoring data indicated more than half, 57 percent, of the visitors to the Nez Perce-Clearwater were male. This is very similar to the nationwide forest visitation gender breakdown of about 60 percent male (U.S. Department of Agriculture 2017g, 2016c).

About 32 percent of visitors travelled less than 50 miles, which is considered to be a local visitor. This may indicate that the Nez Perce-Clearwater draws visitors from a more regional than local scale. The nationwide survey results indicate that about 50 percent of visitors would be considered local visitors. With that said, almost 60 percent of Nez Perce Clearwater visitors are day visitors, whose visit does not include an overnight stay. This further indicates a more regional than national or international visitation distribution. Income data indicates a concentration of households making between 25,000 and 75,000 dollars a year. Finally, the average amount of money spent per party on a trip to the Nez Perce-Clearwater is estimated to be 583 dollars (U.S. Department of Agriculture 2016c).

Just over half of Nez Perce-Clearwater visitors are ages 20 to 59. Those under age 20 represent about 16 percent of visitors and the remaining about 27 percent of visitors are 60 or older. Again, these age distributions are similar to those for forest visitation nationwide. About 68 percent of forest visitors are 20 to 59 years old, about 15 percent are under age 20, and about 17 percent are 60 or older. However, comparing by decade indicates that the Nez Perce-Clearwater forest visitors' average ages are slightly older than the nationwide forest visitor. The highest single decade of ages for Nez Perce-Clearwater visitors is 60 to 69, while nationwide the highest decade is 50 to 59. This would indicate that the Nez Perce-Clearwater may have a higher representation of retired visitors than nationally (U.S. Department of Agriculture 2017g, 2016c).

Viewing natural features and hiking or walking are the two activities visitors indicated they participated in at the highest rates. 45 percent of visitors indicated participating in hiking or walking and 44 percent in viewing of natural features at some time during their visit. These participation rates closely match the nationwide visitor use survey report as well. The Nez Perce-Clearwater survey indicates slightly higher participation in hunting and fishing, but the difference is less than ten percent for hunting and less than five percent for fishing. The data aligns relatively well with outdoor recreation trend research (Cordell 2012) that asserts that some of the more traditional outdoor activities, such as hunting and fishing, are declining and being replaced by other nature-based recreation, such as wildlife viewing, bird watching, and photography. There are three other activities in the top ten activities that Nez Perce-Clearwater visitors participate in that differ more than five percent from the nationwide survey. Driving for pleasure is participated in by 15 percent more visitors to the Nez Perce-Clearwater; developed camping by 9 percent more; and visiting historic sites by 5 percent more. All of the other top ten activities are within less than five percent of the nationwide survey (U.S. Department of Agriculture 2017g, 2016c). Table 314 displays the full list of activities and participation rates for the Nez Perce-Clearwater in 2016.

Table 314. Activity Participation on the Nez Perce National Forest as surveyed in 2016

Activity	Percent Participation1	Percent Main Activity2	Average Hours Doing Main Activity
Hiking or Walking	44.5	9.8	5.8
Viewing Natural Features	43.4	16.9	4.6
Relaxing	37.9	7.0	27.3
Driving for Pleasure	35.6	7.3	3.2
Viewing Wildlife	29.8	1.7	4.7
Developed Camping	17.6	4.2	32.5
Hunting	13.4	11.6	18.6
Fishing	12.5	5.3	11.0
Nature Center Activities	11.6	2.1	2.4
Visiting Historic Sites	10.0	0.6	4.1
Picnicking	9.0	0.7	17.0
Cross-country Skiing	7.3	6.8	2.0
Motorized Trail Activity	7.2	1.6	8.1
Primitive Camping	7.0	1.1	55.1
Nature Study	6.3	0.2	3.6
Gathering Forest Products	6.2	1.1	3.8
OHV Use	5.2	1.0	19.0
Motorized Water Activities	3.9	2.5	13.6

Activity	Percent Participation1	Percent Main Activity2	Average Hours Doing Main Activity
Other Non-motorized	3.6	0.8	2.3
Non-motorized Water	3.4	2.0	14.2
Bicycling	2.9	0.4	9.1
Backpacking	2.7	0.8	33.3
Snowmobiling	2.6	2.6	4.8
Resort Use	2.2	0.1	25.6
Some Other Activity	1.8	1.0	3.8
No Activity Reported	1.4	15.7	N/A
Other Motorized Activity	0.5	0.2	0.0
Horseback Riding	0.5	0.1	10.5
Downhill Skiing	0.0	0.0	0.0

[1] Survey respondents could select multiple activities, so this column may total more than 100%.

[2] Survey respondents were asked to select just one of their activities as their main reason for the forest visit. Some respondents selected more than one, so this column may total more than 100%.

Data Source: (U.S. Department of Agriculture 2016c)

Other sources of information about outdoor recreation participation nationwide indicate a relatively steady level of participation over the past ten years at about half of the United States population (White et al. 2016, The Outdoor Foundation 2018). In the mountain region, which consists of Idaho, Montana, Wyoming, Nevada, Utah, Colorado, Arizona and New Mexico, about eight percent of the population participates in outdoor recreation (The Outdoor Foundation 2018). Similarly, Idaho Tourism indicates that outdoor recreation including hiking, backpacking, camping, fishing, and visiting parks and historic sites are top activities tourists come to Idaho to experience (Idaho Department of Parks and Recreation 2018).

Activities projected to grow the fastest nationally in number of participants include developed skiing, undeveloped skiing, challenge activities, equestrian activities, viewing or photographing nature, and motorized water activities. Recreation activities expected to show low growth include visiting primitive areas, motorized off-road activities, motorized snow activities, hunting, fishing, and floating (White et al. 2016). In Idaho, utility task vehicle, or UTV use, is the fastest growing trending outdoor activity according to the Idaho State Comprehensive Outdoor Recreation Plan (Idaho Department of Parks and Recreation 2018).

Idaho is ranked third in the nation for number of resident participants in outdoor recreation, behind Alaska and Montana. Regionally, Washington, Utah, and Wyoming also sit in the top ten states for outdoor recreation participation (Outdoor Industry Association 2017b, a). This supports the notion that outdoor recreation in Idaho, and likely on the Nez Perce-Clearwater, is locally and regionally based.

According to 2020 U.S. Census Bureau data, Idaho had the second highest population growth in the country over the past decade. However, where this growth is occurring has changed over the years. In the past, growth was concentrated in urban areas, and rural areas had shrinking populations. Half of Idaho’s counties saw a decline in population between 2010 and 2015, with a concentration of these declines in less populated counties across the state. More recently, growth is occurring in and around smaller communities as well as in the larger urban areas; many of these smaller communities that are experiencing growth are proximate to the Nez Perce-Clearwater.

This growth is expected to lead to a demand for more outdoor recreation in nearby public lands (Idaho Department of Parks and Recreation 2018). 2016 National Visitor Use Monitoring Data for the Nez Perce-Clearwater indicates that a greater percentage of visitors are already visiting from more regional locations rather than local communities (U.S. Department of Agriculture 2016c). This is supported by the Idaho Tourism report indicating that recreational vehicle campers are the most likely overnight trip visitors to Idaho and that the majority of overnight trips originate in Idaho, Washington, California, Utah, and Oregon (Idaho Department of Parks and Recreation 2018). It is likely that this will be further increased by the rising populations in the region, such as from Missoula, Montana; Spokane, Washington; and Coeur d'Alene, Idaho as well as population increases local to the Nez Perce-Clearwater.

The Idaho Statewide Comprehensive Outdoor Recreation Plan (Idaho Department of Parks and Recreation 2018) indicates the age distribution of Nez Perce-Clearwater visitors may also change as a reflection of the changes in the population of Idaho's age distribution. Those over 65 accounted for the largest percent growth in an age group between 2010 and 2015. This age group now represents about 15 percent of the population in Idaho. Furthermore, the age group of 40 to 60 accounts for about 30 percent of the Idaho population. In the future, as this age group retires, there may be an increase in forest recreation visitation and demand for this sector. This may not only influence the amount of forest recreation use but also the activity type. Lastly, the State of Idaho, like the nation, is experiencing Hispanic population growth. The Hispanic population increased by 13 percent in Idaho between 2010 and 2015. A study examining Hispanic participation in outdoor recreation indicates that outdoor opportunities and settings that facilitate family and community gatherings may be more appealing than those that do not facilitate these experiences (Adams et al. 2006). Again, this shift in the population of Idaho and the region may influence changes in future Nez Perce-Clearwater recreation visitation demands.

Recreation Settings and Opportunities

In addition to the goal of providing access to the forest and within the forest, the Forest Service also strives to provide opportunities for recreationists to obtain satisfying recreational experiences by offering choices in types of settings and activities. Recreation activities on the Nez Perce-Clearwater include, but are not limited to, hiking, camping, hunting, fishing, off-highway vehicle driving or riding, picnicking, swimming, boating, cross-country skiing, snowmobiling, backpacking, horseback riding, mountain biking, paddle boarding, wildlife watching, visiting historic sites or scenic driving, and participating in interpretive programs or tours.

The Forest Service uses a framework called the recreation opportunity spectrum (Table 315), which describes different settings across the landscape and the attributes associated with those settings. The recreation opportunity spectrum defines a recreation opportunity setting as the combination of physical, biological, social, and managerial conditions that give value to a place (Clark and Stankey 1979).

Table 315. Recreation opportunity spectrum classes and definitions[1]

Recreation Opportunity Spectrum	Definition
Primitive (P)	This setting supports large, remote, wild, and predominantly unmodified landscapes. There is no motorized activity and little probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few, if any, facilities, or developments. Most of the primitive settings coincide with designated wilderness boundaries and recommended wilderness areas.

Recreation Opportunity Spectrum	Definition
Semi-Primitive Non-motorized (SPNM)	The semi-primitive non-motorized settings include areas of the Nez Perce-Clearwater managed for non-motorized use. Mechanized transport such as mountain bikes are often present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area. These settings are not as vast or remote as the primitive settings, but they also offer opportunities for exploration, challenge, and self-reliance.
Semi-Primitive Motorized (SPM)	This setting is managed for backcountry motorized use on designated routes. Routes are designed for off-highway vehicles and other high-clearance vehicles. This setting offers visitors motorized opportunities for exploration, challenge, and self-reliance. Mountain bikes and other mechanized transport are also sometimes present. Rustic facilities are present for the primary purpose of protecting the natural resources of the area or providing portals to adjacent primitive or semi-primitive non-motorized areas.
Roaded Natural (RN)	This setting is managed as natural appearing with nodes and corridors of development that support higher concentrations of use, user comfort, and social interaction. The road system is generally well defined in this setting and can typically accommodate passenger car travel. System roads also provide access to other recreation opportunity spectrum settings of semi-primitive motorized, semi-primitive non-motorized, and primitive areas.
Rurall)	This setting represents the most developed recreation sites and modified natural settings on the Nez Perce-Clearwater. Facilities are designed primarily for user comfort and convenience.

Note: Urban is not described since it is not present on the Nez Perce-Clearwater.

Data Source: Adapted from text in Nez Perce-Clearwater National Forests Forest Plan Assessment Section 9.0 Recreation.

The recreation opportunity spectrum has six distinct classes in a continuum that describe settings ranging from highly modified and developed to primitive and undeveloped (Clark and Stankey 1979, U.S. Department of Agriculture 1982a). Five of the recreation opportunity spectrum classes apply to the Nez Perce-Clearwater: primitive, semi-primitive non-motorized, semi-primitive motorized, roaded natural, and rural. There are no urban recreation opportunity spectrum classes on the Nez Perce-Clearwater.

Table 316. Existing summer and winter motorized recreation access by acres and percent of plan area

Motorized Access	Summer Acres	Summer %	Winter Acres	Winter %
Motorized	2,403,316	61%	2,481,670	63%
Nonmotorized	1,535,850	39%	1,457,496	37%

Access

Visitors select their access based on their preferred setting, experience, and mode of transportation. Roads, motorized trails, non-motorized trails, rivers, and airstrips are present on the Nez Perce-Clearwater for visitors to walk, bike, boat, ride, drive, or fly to their destination. Strategically placed transportation corridors and entry points facilitate safe reliable access to diverse recreation settings and key destinations across the Nez Perce-Clearwater.

In some cases, the travel routes themselves are the destination. These include historic roads such as the Lolo Motorway, Elk City Wagon Road, and the Magruder Corridor Road, which provides a popular primitive route between Elk City, Idaho, and Darby, Montana. This unique road enables visitors to experience the settings of the adjacent Selway-Bitterroot and Frank Church River of No Return wilderness areas and the roadless areas of East and West Meadow Creek while driving. This road is recommended for high clearance vehicles only. Historic trail routes such as the Southern Nez

Perce Trail are also popular trail destinations. Special designations for travel corridors include: National Historic Trails such as the Nez Perce (Nee-Me-Poo) and the Lewis and Clark National Historic Trails; National Recreation Trails; Wild and Scenic Rivers; and Scenic Byways. Historic routes and rivers offer visitors the opportunity to trace the footsteps and voyages of past cultures, inhabitants, and explorers. Much of the transportation network affords visitors the opportunity to view diverse wildlife and spectacular scenery.

Forest access links local communities with forest settings and facilitates nature-based recreation opportunities for residents. Three adjacent Forests provide road and trailhead access to the Nez Perce-Clearwater: the Lolo National Forest on the northeast provides opportunities to access the Great Burn Recommended Wilderness area; the Bitterroot National Forest on the east provides access to the Selway-Bitterroot wilderness via numerous trailheads, including Paradise which provides river access to the wild section of the Selway River; and the Idaho Panhandle National Forest's St. Joe National Forest on the north provides access to the Mallard-Larkins primitive area and the upper North Fork area.

There are about 5,300 miles of system trails on the Nez Perce-Clearwater documented in the national infrastructure database, which is the official database for the Forest Service. There are about 1,300 miles of trails located inside designated wilderness areas.

Table 317 shows the total miles of trail by different types of designed use. Trails designed for one use may have multiple allowable uses on them. For example, a trail designed for bicycle use may have allowable uses for pack and saddle horses and hiking.

Table 317. Miles of trail by designed use managed by ranger district

District	Hike	Pack[1]	Bike	Winter Non-Motorized[2]	Winter Motorized	Motorcycle	Motorized Vehicle < 50 inch[3]	Motorized Vehicle > 50 inch[4]	Total Miles
Salmon	1	454	0	6	88	62	111	0	722
Red River	5	590	0	2	316	20	83	0	1,016
Moose Creek	1	739	0	0	24	19	4	0	787
Palouse	1	51	15	20	0	16	172	0	275
North Fork	3	611	0	14	272	0	426	61	1,387
Lochsa	4	766	0	8	114	4	222	2	1,120
Total	15	3,211	15	50	814	121	1,018	63	5,307

Note: Designed use is the use for which the trail was designed, although other uses maybe allowed; for example, a trail designed for pack use may also be used by hikers.

[1]Pack type trails are designed for pack and saddle users.

[2]Non-motorized winter use includes both Nordic skiing and snowshoeing trails.

[3]Motorized vehicles less than 50 inches wide. The Forest Service classifies e-bikes as motor vehicles.

[4]Motorized vehicles greater than 50 inches wide.

There are four groomed snowmobile trail systems on the Nez Perce-Clearwater, including the Fish Creek Recreation Area; Lolo Pass and the Powell area; Elk City and the Dixie area; and the Elk River Snowmobile Trail system. Five groomed Nordic ski trail systems provide primitive and semi-primitive non-motorized opportunities at Fish Creek Recreation Area, Musselshell Meadows, Lolo Pass, Elk River Nordic Ski Trails, and Palouse Divide Nordic Ski Area.

Developed and Dispersed Recreation

The Nez Perce-Clearwater's developed recreation program provides a wide range of opportunities appropriate to their recreation settings. Developed recreation opportunities provide much of the infrastructure necessary for the enjoyment of a wide variety of recreation activities in the analysis area. Developed recreation opportunities are located at sites and have infrastructure or features designed to protect the resources, reduce conflicts, and provide for safety. Depending upon the location and the facilities available, these developed sites may or may not have fees associated with them. Sustainable recreation sites are generally managed on a continuum based on a development scale ranging from 1 to 5.

Table 318 provides a list of sites whose scale is 1 or 2, dispersed recreation sites, while those of 3, 4, or 5 are developed recreation sites. On the Nez Perce-Clearwater, just under half of designated recreation sites are 1 or 2 on the development scale, indicating that they are dispersed sites with few amenities.

Table 318. Recreation site development scale standards

Scale	ROS[1] Consistency	Type	Typical Facility Features	Emphasis
0	All	Dispersed	User created; no USFS investment or amenities	Monitoring
1	All	Dispersed	User created; informal vehicle circulation and parking; minimal USFS investment and amenities may include signage	Resource protection
2	All	Dispersed	User created; defined vehicle circulation and parking; minimal USFS investment and amenities may include signage, tables and fire rings; occasional a vault toilet	Resource protection
3	Roaded Natural, Rural and Urban only	Developed	Designed site; defined and delineated vehicle circulation and parking; significant USFS investment and amenities may include signage, tables, fire rings, toilets, waste collection, potable water; roads are surfaced and maintenance level 3 or 4	Visitor comfort and resource protection
4	Roaded Natural, Rural and Urban only	Developed	Designed site; defined and delineated vehicle circulation and parking; significant USFS investment and amenities may include signage, tables, fire rings, toilets, waste collection, potable water, interpretive materials, grills, flush toilets; roads, parking and paths are surfaced and maybe paved as well as maintenance level 4 or 5	Visitor comfort and resource protection
5	Rural and Urban only	Developed	Designed site; defined and delineated vehicle circulation and parking; significant USFS investment and amenities may include signage, tables, fire rings, toilets, waste collection, potable water, interpretive displays, grills, flush toilets; may include utility hook-ups, showers and laundry facilities; roads, parking and paths are delineated and often paved as well as maintenance level 4 or 5	Visitor comfort and resource protection

[1]ROS: recreation opportunity spectrum

Data Source: Adapted from Recreation Site Development Scale Direction (FSH 2309.13.10-Recreation Site Development Scale Direction).

The Nez Perce-Clearwater has approximately 212 recreation facilities serving a variety of different recreational opportunities. Most of the recreation facilities on the Nez Perce-Clearwater were developed in the 1960s when highway development expanded access to more of the forest and especially to many of the waterways, where facilities are concentrated across the forest. While most of the facilities are in the lower 2 to 3 development scale categories and well aligned with the US

Forest Service national niche of being rustic, there are some Class 4 and 5 facilities with amenities such as flush toilets and electrical hookups. Developed sites across the forest are generally well maintained, although there is some deferred maintenance especially along the South Fork of the Clearwater and Selway River Corridors where basic improvements are needed. Hazard tree and other vegetation issues due to mature or overly mature growth are common in almost all developed facilities across the Nez Perce-Clearwater.

Table 319 discusses the facilities, as well as associated fees and reservations. Most sites are not fee or reservation sites, with the exceptions being campgrounds. About half of the campgrounds on the Nez Perce-Clearwater are fee campgrounds but less than ten accept reservations. There is no concessionaire operated or maintained facilities on the Nez Perce-Clearwater.

Table 319. Number of recreation facilities, facilities with fees, and on the reservation system, by site type

Type	Facilities	Facilities with Fees	Reservation System
Campground (developed)	55	29	6
Camping Area (dispersed)	53	0	0
Group Campground	3	0	1
Visitor Centers	3	0	0
Picnic Day Use Site	12	0	1
Pavilion	3	0	2
Cabin or Lookout	16	11	12
Boat Launch	3	0	0
River Access or Boating Site[1]	5	3[1]	0
Trailheads	40	0	0
Interpretive Sites	12	0	0
Fishing Sites	3	0	0
Snow Park or Snow Play	4	0	0
Total	212	43	22

1Fee at boating site is for floating permit on main Salmon River.
Data Source: INFRA

Dispersed recreation consists of those activities that take place *outside* of developed recreation areas. Dispersed sites generally do not have fees associated with them and have little or no amenities such as toilets, tables, or garbage collection. They may, however, be designated, such as those that are 0-2 on the development scale. Many minor recreation sites are identified as dispersed sites. These dispersed sites are generally improved for resource protection rather than user convenience. Many of these sites have been improved but much of the maintenance identified has been deferred.

Most recreation use on the Nez Perce-Clearwater occurs in primitive dispersed sites rather than developed facilities. Dispersed recreation sites are typically concentrated in the Nez Perce-Clearwater's roaded natural recreation opportunity spectrum settings. Most of these primitive sites are established over time by reoccurring recreational use and tend to be in areas with desirable characteristics, particularly those with easy access to forest system roads, relatively flat topography, and proximity to water. Dispersed users are often seeking a more secluded camping experience without the rules and regulations typically associated with developed sites and tend to be self-sufficient users. National Visitor Use Monitoring Data from 2016 shows that 29 percent of overnight visitors camped in an undeveloped site and 42 percent stayed at developed campgrounds on the Nez Perce-Clearwater (U.S. Department of Agriculture 2016c).

In 2009, the U.S. Forest Service Northern Region began developing a standardized protocol for inventorying and monitoring resource conditions of dispersed recreation sites. The Nez Perce-Clearwater supports a large, dispersed recreation program and, at this time, the majority of dispersed recreation sites across the Nez Perce-Clearwater have been inventoried and entered into the infrastructure database, also known as INFRA. However, dispersed recreation sites emerge as users choose to visit new locations when others are occupied or otherwise undesirable and at any given time it is likely that not all existing dispersed sites are captured in the database. Areas that show particularly high concentrations of dispersed sites include those along waterways such as the Clearwater River, the Palouse River, the Lochsa River, and Kelly Creek. The bulk of dispersed sites inventoried fall into three categories of use – x overnight use, day-use, and trailhead use. About 80 of the overnight use sites and 20 of the day-use and trailhead sites include access to a toilet and sometimes a fire ring to reduce resource impacts. These areas are highly sought after not only because of presence of these basic amenities but also because there is no cost for occupancy or use of these amenities and fewer agency regulations. Many dispersed sites hold a significant value for families and friends that traditionally return year after year for activities such as hunting, fishing, horse packing, and off-highway vehicle riding based out of these dispersed sites. Table 320 displays the inventoried dispersed recreation sites by site type across each of the ranger districts on the Nez Perce-Clearwater.

Table 320. Number of dispersed recreation sites by site type on Nez Perce-Clearwater ranger districts

District	Overnight[1]	River[2]	Trailhead	Snow[3]	Day[4]	Total
Salmon	225	0	26	0	16	267
Red River	228	1	35	1	11	276
Moose Creek	69	2	6	1	6	84
Palouse	139	0	12	0	8	159
North Fork	249	1	16	0	23	289
Lochsa	331	10	14	1	28	384
Total	1241	14	109	3	92	1459

Note: Dispersed sites are development class 0-2 and were queried this way in the INFRA database.
[1]Overnight includes campgrounds, camping areas, group campgrounds, cabins, and lookouts
[2]River includes boating sites, fishing sites and swimming sites
[3]Snow includes snow parks and snow play areas
[4]Day includes day use areas, interpretive sites and observation sites
Data Source: INFRA.

This work has included embedding boulders to restrict direct access to riparian areas, reducing the useable area within dispersed sites, hardening sites with gravel to clearly identify parking locations for vehicles, and installing fencing. While rare, there have been occasions where dispersed sites were decommissioned and removed from use when riparian impacts were unable to be mitigated.

There are numerous dispersed recreation activities that do not include overnight use. Some of these include backcountry skiing, backcountry snowmobiling and snow-biking, fishing, hunting, and forest product gathering. Trail-based activities include hiking, trail running, horseback riding and pack stock use, motorcycle, all-terrain vehicles, and utility-terrain vehicle riding, and bicycling and e-biking. Water-based activities include kayaking, rafting, tube floating, swimming, and lounging on the Forests' rivers, streams, lakes, and hot springs. These recreational uses span the recreation opportunity spectrum, as some are motorized or adjacent to roads while others are not. A few of these have more specific dispersed activity locations, such as backcountry skiing in the Lolo Pass area and snowmobiling on the Elk River Snowmobile Trail System, or the three most popular undeveloped hot springs – Jerry Johnson, Weir and Stanley.

Recreation Special Uses

Recreation special use permits are issued to private businesses, individuals, institutions, and nonprofit groups to provide for occupancy and use of the national forest beyond what is normally available to the public. Permitted recreation uses provide specific recreational opportunities to the public and deliver economic benefits to rural economics. Examples of commercial enterprises requiring permits include outfitting and guiding services, resorts, recreation events, and organizational camps. Noncommercial recreation uses are those where the use or activity does not include an entry or participation fee and the purpose is not primarily the sale of a good or service. Examples of noncommercial use include family reunions, weddings, or other similar group gatherings. The Forest Service issues these permits under the authority of a variety of specific laws.

About 60 recreational use permits are issued in any given year across the Nez Perce-Clearwater. Table 321 displays recreation special uses by type and district for those issued in 2019. The actual number varies year to year based on public demand.

Table 321. Recreation special uses by type and district

District	Isolated Cabin	Non-Commercial Group	Outfitter and Guide	Private Camp	Recreation Event	Resort
Salmon	0	0	11	0	0	0
Red River	1	0	8	0	0	1
Moose Creek	0	0	11	0	0	0
Palouse	0	1	2	0	0	0
North Fork	0	0	9	0	1	0
Lochsa	0	0	12	2	1	1
Total	1	1	53	2	2	2

Date Source: Special Uses Database queried September 2019.

Outfitter and guide permittees operating on the Nez Perce-Clearwater make up the largest number of commercial recreational use. The three districts with large areas of designated wilderness and designated Wild and Scenic Rivers have the largest number of outfitter and guides, although there is a relatively equal distribution of outfitting and guiding permits across all districts. Hunting outfitting and river related guiding are the dominate types of outfitters and guides.

There are two commercial, privately owned resorts operating on the Nez Perce-Clearwater. One is located on the Lochsa District along the Lochsa River and the second on the Red River District associated with a hot spring. These commercial resorts are permitted under 20-year special use permits. Per the terms on their permits, any changes to the land or the exterior of their buildings must be submitted to the Forest Service for analysis of potential resource impacts.

Climate Change

The effects of climate change projected to occur in the future include changes in temperature, precipitation, and disturbance patterns that drive and stress ecosystems and the benefits they provide, including quality recreation opportunities. Global climate models project that the Earth's current warming trend will continue throughout the 21st century in the Northern Rockies and is projected to increase 4 to 5 degrees by 2050 (Halofsky, Peterson, et al. 2018a, b). Temperature is expected to increase for all seasons.

A warmer climate will generally improve opportunities for warm-weather recreation, such as hiking, camping, and sightseeing, because it will create a longer time during which these activities are possible. Higher temperatures may have both positive and negative effects on wildlife-based activities (hunting, fishing, birding) and gathering of forest products (for example, berries, mushrooms), depending on how target habitats and species are affected. Recreationists may prefer more water-based activities to seek refuge from hotter and longer summer weather. The changes in timing and size of snowmelt may reduce boating and fishing opportunities that could create overcrowding, overuse, user conflict, and resource damage.

These changes are certain to affect the amount and location of snowpack, and timing of snow melt. A warmer climate is expected to reduce snowpack, thereby reducing opportunities for snow-based winter activities, such as cross-country skiing and snowmobiling. These changes will reduce the area, timing and duration for winter recreation activities. This, in turn, may cause over-crowding and user conflict as winter recreationists vie for these reduced opportunities. Shrinking snowpack may also create conflict and adversely affect wildlife species that use these same areas while recreationists want to be there.

Environmental Consequences

In all alternatives, including the No Action Alternative, climatic factors, natural disturbances, recreation trends, use patterns, and emerging technologies would continue to influence the specific type, amount, and location of recreation opportunities across the Nez Perce-Clearwater. Recreational use is expected to increase in the analysis area over time. Dead and dying trees, wildfire, and other natural occurrences may impact the location and availability of some areas for recreation use. The health and safety of the recreating public would continue to influence recreation management.

Travel plans, when completed, would continue to provide site-specific direction where motorized recreational uses could or could not take place. Current travel planning on the Clearwater signed 2017 will continue to provide direction to this portion of the Nez Perce-Clearwater. Nez Perce travel planning will be completed after the Land Management Plan and will provide site-specific direction regarding motorized recreational use on this portion of the Nez Perce-Clearwater. Demand for motorized vehicle access and trails is predicted to increase as technology advances allowing motor vehicles to use terrain that is currently prohibitive. Likewise, an aging population of visitors may also increase demand for motorized access to facilitate this population's visitation to and enjoyment of the Nez Perce-Clearwater. In particular, demand for developed and maintained areas may increase.

Land Management Plan direction for developed and dispersed recreation does not vary across alternatives in the revised plan. Developed recreation components state that recreation opportunity spectrum design criteria would be followed, as well as new and rehabilitated facilities would follow accessibility guidelines and the Built Environment Image Guide. The following management activities are not suitable uses of developed recreation sites: timber production, livestock grazing, and extraction of locatable minerals or saleable mineral materials.

Dispersed recreation management issues are also included with the components for different classifications of the recreation opportunity spectrum. There is a desire to provide a wide variety of settings for public use.

In all alternatives, natural disturbances, recreation use patterns, and emerging technologies would continue to influence the need for recreation special use permits across the Nez Perce-Clearwater. Vegetative conditions can seriously impact the location and infrastructure of recreation special uses. Additionally, the condition of aging infrastructure can have effects to permit holders in both the short- and long-term. Emerging technologies, as well as shifts and changes in recreational interests, can influence the kinds and location of special uses on the landscape.

Effects from the No Action Alternative

The No Action Alternative continues to benefit uses and interests that were benefited by the 1987 forest plans and changes to those plans resulting from the Clearwater travel plan decision and Nez Perce closure orders. Those uses that were curtailed or limited under the 1987 plans, the Clearwater travel plan, or Nez Perce closure orders would remain curtailed or limited.

Recreation Settings, Opportunities, and Access

The settings and opportunities would continue to be managed as defined by the current 1987 plans for each forest independently with changes due to implementation of the Clearwater travel plan and other closure orders. Table 316 in the existing condition discussion, found earlier in the document, shows the acres and percent of motorized and nonmotorized recreational access on the Nez Perce-Clearwater.

Visitor use is expected to continue to increase, especially general use and day use. Motorized activity use such as utility task vehicle, or UTV use, is expected to increase as that demand increases in Idaho and neighboring states. Access for this and other emerging uses, such as mountain bikes, electric bicycles, and over-the-snow motorcycle-snowmobile hybrid devices, also known as snow bikes, would not be supported to a large degree as the current management plans were not written with these uses in mind. These uses continue to find areas on the Nez Perce-Clearwater that support their activity, but no areas were planned or designed for those uses. This may stress existing trails and areas where these would be allowed but not designed for such uses. Trail design mitigates impacts for uses which the trail is designed for but does not necessarily mitigate for other uses.

Developed and Dispersed Recreation

Recreation trends and use patterns would continue to influence the demand for development scale, amount, and distribution of developed and dispersed recreation across the Nez Perce-Clearwater. Recreational use is expected to increase in the analysis area over time. Demand for developed and maintained areas may increase because of changing demographics of Nez Perce-Clearwater visitors. The emphasis on integrating a universal design for accessible recreation facilities and maintaining facilities to full standards for sustainability components will result in more developed recreation facilities having greater accessibility.

Developed campground capacity maxes out during summer weekend peak time periods. The existing 55 developed campgrounds would likely continue to be at or near capacity during the busiest weekends. Use of dispersed recreation overnight sites may increase as these developed sites reach or exceed capacity. The existing 212 developed sites on the Nez Perce-Clearwater would be retained and there would not be limits on future development other than those resulting from budget limitations or as specified in the 1987 plans. Dispersed recreation opportunities would continue to be available across parts of the Nez Perce-Clearwater. The health and safety of the recreating public would continue to influence recreation management at developed sites.

As user numbers likely grow, dispersed recreation use is likely to also increase, especially adjacent to waterways that attract use. Non-overnight dispersed recreation activities are likely to continue to increase in demand as well. Increases in dispersed recreation may, in turn, lead to a need for more developed opportunities especially when development protects natural resources and makes the recreational use and natural resources more sustainable. Protection of natural resources would continue to influence recreation management at dispersed sites.

Recreation Special Uses

Plan components in the current Nez Perce National Forest and Clearwater National Forest Plans provide limited direction specific to recreation special uses. The effects from the No Action Alternative would continue these components to encourage use of special use permits to assist in management of recreation opportunities and to limit issuance of permits in designated wilderness to maintain the wilderness character.

Effects from the Action Alternatives

Recreation Settings, Opportunities, and Access

The desired recreation opportunity spectrum varies by alternative to address the diversity of opinions received from the public, as well as to fully analyze resource impacts from changes in the amount of available motorized versus non-motorized acres. These changes are based on management area allocations by alternative. The recreation opportunity spectrum can be used to show the general effect of alternatives to recreation settings, opportunities, and access across the Nez Perce-Clearwater.

Table 322 displays the allocation of the summer recreation opportunity spectrum and Table 323 shows the winter recreation opportunity spectrum for each alternative (refer to Appendix A). Across all alternatives, in winter compared to summer, there is a larger percentage of semi-primitive motorized and a reduction in the percentage of roaded natural and rural. This is the result of most Forest Service roads not being plowed. In winter, there is also a decrease in the percentage of semi-primitive non-motorized because there are some areas that are not open to summer motorized use but that are open to motorized over-snow vehicle use. These areas also contribute to the increased percentage of winter semi-primitive motorized setting.

Table 322. Percent summer recreation opportunity spectrum (ROS) classes by alternative (Alt)

Summer ROS Class[1, 2]	Alt W	Alt X	Alt Y	Alt Z	Preferred
Primitive	29.6	29.6	30.1	30.1	28.9
Semi-primitive non-motorized	23.5	12.8	26.0	27.3	16.2
Semi-primitive motorized	23.2	32.0	19.1	18.2	24.6
Roaded natural	19.7	21.6	20.8	20.5	27.2
Rural	3.9	3.9	3.9	3.9	3.1

Date Source: Nez Perce-Clearwater GIS data.

[1]Under the No Action Alternative, 39 percent was classified as nonmotorized as per 1987 Plan and closures.

[2]Under the No Action Alternative, 61 percent was classified as motorized as per the 1987 Plan and closures.

Table 323. Percent winter recreation opportunity spectrum (ROS) classes by alternative (Alt)

Winter ROS Class[1, 2]	Alt W	Alt X	Alt Y	Alt Z	Preferred
Primitive	28.9	28.9	28.9	28.9	28.9
Semi-primitive non-motorized	22.8	1.0	8.9	1.0	11.0
Semi-primitive motorized	42.7	63.6	55.9	63.6	54.1
Roaded natural	5.6	6.4	6.3	6.4	6.0
Rural	0.0	0.0	0.0	0.0	0.1

Date Source: Nez Perce-Clearwater GIS data.

[1]Under the No Action Alternative, 37 percent was classified as nonmotorized as per 1987 Plan and closures.

[2]Under the No Action Alternative, 63 percent was classified as motorized as per the 1987 Plan and closures.

Table 324 and Table 325 lump the summer and winter recreation opportunity spectrum classes by the non-motorized or motorized suitability by alternative. An area may be suitable for motorized use based on its recreation opportunity spectrum class but that does not mean motorized use is allowable everywhere in that setting. Motorized use by wheeled and over-snow vehicles is restricted by motor vehicle use maps for the Nez Perce-Clearwater. Travel management decisions are separate, project-level decisions that determine the specific areas and routes for motorized recreation consistent with the desired recreation opportunity spectrum as mapped.

Table 324. Percent suitable summer motorized and non-motorized use, by alternative (Alt)

Suitable Use	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Non-motorized	39.0[1]	53.1	42.5	56.1	57.3	45.1
Motorized	61.0[2]	46.9	57.5	43.9	42.7	54.9

Date Source: Nez Perce-Clearwater GIS data.

[1]Percent nonmotorized as per 1987 Plan and closures.

[2]Percent motorized as per the 1987 Plan and closures.

Table 325. Percent suitable winter motorized and non-motorized use on the Nez Perce-Clearwater by alternative

Suitable Use	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Non-motorized	37.0[1]	51.7	29.9	37.8	29.9	39.9
Motorized	63.0[2]	48.3	70.1	62.2	70.1	60.1

Date Source: Nez Perce-Clearwater GIS data.

[1]Percent nonmotorized as per 1987 Plan and closures.

[2]Percent motorized as per the 1987 Plan and closures.

In summer, the motorized recreation opportunity spectrum classes—semi-primitive motorized, roaded natural, and rural—are third highest in the Preferred Alternative. This is due in part to less recommended wilderness and suitable wild and scenic rivers in this alternative, and those Idaho Roadless Areas with a backcountry restoration theme that are not recommended wilderness being allocated to roaded natural or semi-primitive motorized recreation opportunity spectrum classes. Alternatives W, Y, and Z are very similar in the amount of the forest suitable for motorized use, averaging about 45 percent. These three alternatives also provide the least amount of suitable motorized acres due to higher and similar acres of suitable wild and scenic rivers within these alternatives. Alternative Y provides potential opportunities for motorized loop routes within backcountry restoration Idaho roadless areas that are not allocated as recommended wilderness, while keeping much of those areas non-motorized. As a result, this alternative has a slightly higher percent of suitable motorized acres than Alternative Z. Alternative W, which has the highest acres of recommended wilderness, has the third highest percent of suitable motorized acres after Alternative X, which has no recommended wilderness acres, and the Preferred Alternative which has the second smallest amount of recommended wilderness. This is, in part, due to the suitability of motorized use in those Idaho Roadless areas that are not allocated as recommended wilderness in Alternative W.

In winter, the motorized recreation opportunity spectrum classes—semi-primitive motorized, roaded natural, and rural—are highest in Alternative X and Z. In Alternative Z, during the winter, some of these portions of Management Area 2 would allow motorized use, which is why Alternative X with no recommended wilderness is equal to Alternative Z with almost 500,000 acres of recommended wilderness. These recommended wilderness acres would be classified as suitable for motorized use. The Preferred Alternative has the second least acres suitable for winter motorized use and is a reduction of approximately 4 percent from the No Action alternative.

Alternative W is the only alternative that does not have a substantial difference between summer and winter motorized classes. There is slightly more motorized class in winter than in summer due to those Idaho Roadless Rule areas that are in the backcountry and restoration theme and are not overlapping with any other land allocation being suitable for summer motorized use. The No Action Alternative and Alternative W have more non-motorized winter recreation opportunity spectrum class acres than motorized. This is related to many overlapping land allocation acres in Alternative W with recommended wilderness. In all other action alternatives, approximately half of summer and about two-thirds or more of winter recreation opportunity spectrum class acres fall within a motorized class; basically, most of Management Area 3 and Management Area 2 are suitable for motorized use excluding recommended wilderness areas.

Alternative Y and the Preferred Alternative do not have as many acres of recommended wilderness but the acres that are within this category are not suitable for winter motorized use. As a result, these alternatives have less winter motorized acres suitable than Alternatives X and Z.

Trails

Trail management on the Nez Perce-Clearwater would not vary by alternative other than the suitability of trails to be available for motorized use. The sustainable recreation program on the Nez Perce-Clearwater determines priorities for trail maintenance. No areas would be precluded from new trail construction or reconstruction because of the Land Management Plan. Plan components provide for increasing connectivity of communities to one another and for increased efficiency of moving people along trails from one location to another.

Future trail use, maintenance, and development is primarily a function of increased use, changing demographics, and changing technologies. Changes would need to be consistent with the trails desired conditions, but overall management of the trail system would largely be determined at the project level based on the aforementioned factors and would not vary significantly by alternative.

Conflict between user groups on trails will likely continue and may increase as demand for trails becomes greater. If fewer trails are maintained into the future or groups of users are restricted from some trails, the conflict on remaining trails may increase. User groups continue to coordinate and educate their members to reduce and avoid conflict.

Motorized Over-Snow Vehicle Use

Currently, motorized over-snow vehicle use is suitable on 63 percent of the Nez Perce-Clearwater. The actual area used is substantially less than 63 percent of the Forest. Terrain, vegetation, snow conditions and duration influence where motorized over-snow vehicles can physically go. Vegetation conditions are dynamic over time and change in response to disturbance and succession. Whereas fire may open dense forest areas for over-snow use, succession is closing areas to over-snow use in areas suitable for over-snow use. Non-motorized and non-mechanized transport winter use, such as Nordic skiing, backcountry skiing, and snow shoeing, are allowable on 100 percent of the Nez Perce-Clearwater. Mechanized transport, such as fat-tire bikes that ride over snow, are not allowed in designated wilderness and other specified areas on the Nez Perce-Clearwater that have closure orders prohibiting mechanized transport. Use of fat-tire bikes in the winter in recommended wilderness areas is tied to the suitability of mechanized transport for each alternative. In Alternative Z, the use of fat-tire bikes in the winter would be permitted but not in Alternatives W and Y or the Preferred Alternative. Alternative X has no recommended wilderness.

The differences in suitable acres for winter over-snow vehicle use is due to the selection of the recommended wilderness acres and allocation of winter recreation opportunity spectrum classes. In Alternatives W and Y and the Preferred Alternative, recommended wilderness areas would not be suitable for winter over-snow use. Alternative Z would find over-snow use suitable. The areas being recommended for wilderness vary by alternative, as described in Chapter 2. The boundaries of Alternative Y were specifically developed in response to public input and interest from over-snow motorized user groups to eliminate from recommendation two portions of the Hoodoo Roadless Area, also known as the Great Burn. Likewise, the boundaries in the Preferred Alternative were also established to provide for winter over-snow use outside of recommended wilderness. These exclusions were made to specifically allow for over-snow motorized use in areas where it is currently and historically occurred. This use was curtailed in 2017 through the Clearwater Travel Plan. Alternative Y would permit this use to continue while recommending most of the Hoodoo as wilderness.

Over-snow users have asked the Nez Perce-Clearwater to provide opportunities for a variety of uses. Some users prefer a greater amount of development and accept a lesser amount of risk. These users are most often going to prefer recreating in rural or roaded natural areas. Other users appreciate the convenience of development but also want to get farther into the backcountry and are willing to accept more risk. These users may prefer using the semi-primitive motorized settings as well as the more developed categories. A subset of users who prefer an unconfined experience are willing to accept a much higher level of risk and, generally, have a higher skill level to travel to remote areas. While the recreation opportunity spectrum system as designed does not allow for a primitive motorized experience, these users are looking for just that. The Nez Perce-Clearwater is one of a few remaining areas in the western United States that has the terrain to provide this opportunity. These areas are generally found in the Hoodoo Roadless Area, Bighorn-Weitas Roadless Area, and the West and East Meadow Creek Roadless areas. Alternatives that do not include these areas as recommended wilderness and allow over-snow use in these areas benefit the winter motorized users. Alternatives X and Z best provides for this primitive over-snow motorized use, followed by Alternative Y. Alternative W provides the least area suitable for over-snow motorized vehicle use. The Preferred Alternative has the second least area and represents about a 3 percent decrease from the No Action Alternative. However, this alternative provides specific areas identified as desirable and usable to winter motorized users while addressing other resource and social concerns.

Bicycling

Bicycling, referred to herein as mountain biking, is a use that was in its infancy at the time of development of the current 1987 Forest Plans, also referred to as the No Action Alternative. Mountain bikes generally can travel any trail outside of Wilderness areas on the Nez Perce-Clearwater, and often use a combination of all maintenance level roads and trails to connect desirable areas to ride. In more developed settings, mountain bikers often look for roads that access single-track trails in which they can ride mostly downhill. As the experience level and fitness level of the rider increases, any trail in any direction is a potential trail to ride. Some extreme users may even take self-sufficient multi-day trips. Walking the bicycle for several miles in rough terrain is acceptable in the most primitive areas for the most advanced users.

Mountain biking is prohibited in designated wilderness and in most alternatives of recommended wilderness. Mountain biking is generally suitable in all other areas; however, a closure order may be issued to limit access to mountain bikes, or any other use, following a site-specific NEPA review and decision. Alternative X has zero acres of recommended wilderness. Alternative Z allows for mechanized transport, including bicycles, within the recommended wilderness areas. These two alternatives provide for the greatest amount of access to mountain bikers. Alternatives W and Y and the Preferred Alternative would limit access to mountain bikes in areas recommended as wilderness. The Preferred Alternative has fewer acres of recommended wilderness compared to Alternative W and Y and, therefore, provides more access than Alternatives W and Y for mountain bikes.

Developed and Dispersed Recreation

The effects from the action alternatives are expected to be like those of the No Action Alternative, with a few exceptions based on recreation opportunity spectrum differences by alternative. Demand for dispersed sites may increase or decrease parallel to the amount of motorized access by alternative. As recreation use in general increases, there is likely to be additional demand for dispersed sites. With additional motorized routes, such as in Alternatives W, X, and Y and the Preferred Alternative, much of this demand may be in current non-motorized areas. In Alternatives Y and Z, where less of the Nez Perce-Clearwater is suitable for motorized use, an increased number of dispersed sites would likely be concentrated along currently open roads and trails, as this use would be less accessible elsewhere in the non-motorized areas.

Recreation Special Uses

Plan components across action alternatives do not vary regarding recreation special uses. There are a few plan components regarding recreation special uses. Coordinating with state and partner organizations and boards could better align Nez Perce-Clearwater recreation special use permits with larger state and regional objectives and goals for tourism and outdoor recreational use. This coordination and relationship development could also assist in improving forest land stewardship and resource protection while increasing recreational opportunities for a larger audience. The later may not have individual knowledge, skills, or abilities to pursue recreational opportunities without the assistance of services provided by recreational special use permittees.

Effects from Other Resources

Vegetation Management

Timber harvest has the potential to affect recreation experiences and opportunities in several ways. Short-term effects may include increased noise and dust levels; the sight of landscapes altered by differing types of harvesting; the presence of slash piles and roads reconstructed or constructed for timber sales; additional traffic from logging trucks on roads used by other drivers, off highway vehicles or bicyclists; and the removal of snow for winter log hauling from roads frequented by winter recreational users. Users may be temporarily displaced to other locations because of log truck traffic, helicopter operations, or the noise from chainsaws, for example.

Overall use of the road system for vegetation management activities is directly tied to timber harvest output, acres of forest being managed each year, and, to a lesser degree, the amount of prescribed fire being planned. Alternatives with higher levels of these management activities can expect increased traffic from both commercial and administrative use. New road construction is likely to be limited and temporary road construction is likely to be used as a more common method for short-term access needs. Road development for vegetation management purposes has the potential to increase dispersed use along these now more accessible travel-ways. In the interior of the Nez Perce-Clearwater where access previously has been limited, this has the potential to attract more visitors and increase recreational use there. As use increases, visitors would experience less solitude and remoteness. Primitive and semi-primitive non-motorized settings could change to semi-primitive motorized and roaded natural settings. Recreational benefits from vegetation management improved or new roads can include enhanced opportunities to gather firewood and other forest products for hunting access and dispersed camps or to recreate. While many new roads constructed for vegetation management are temporary or decommissioned post activity, some can be left open to create additional recreation opportunities if those opportunities align with the recreation opportunity spectrum designations for the area. Constraints in the Idaho Roadless Rule on road construction and timber harvest greatly limits the amount of these activities expected to occur. Therefore, these activities are not expected to increase visitors or facilitate recreational use in these areas.

Alternative X has the highest amount of planned vegetation management activities in terms of planned harvest acres and timber output closely followed by Alternative W. Alternative Z and the No Action Alternative have the lowest amount of planned vegetation management. The Preferred Alternative is third highest. It is, therefore, expected that recreational impacts from vegetation management would be higher in Alternatives W and X than in Alternatives Y and Z and the No Action Alternative. With an increase of harvest activities under the Preferred Alternative, forest visitors can expect to incur increased traffic, noise, visual impacts, and possible increased use of recreation facilities and trails by forest workers.

Timber production is not suitable in developed recreation sites. Timber harvest units may overlap with existing dispersed sites, as well as potential new dispersed sites. Dispersed users may choose to move out of areas during harvest activities and may or may not return post-activity. Hazard tree removal in developed recreation sites to provide for visitor safety may occur even where timber production is not suitable. Dispersed recreation areas typically do not have systematic hazard tree removal.

Aquatic, Riparian and Fish Management

Aquatic plan components may limit new developed and dispersed recreation sites in riparian management zones. New recreation sites and facilities would be located 100 feet from a stream or waterway. However, developed recreation facilities may still be constructed outside of the 100-foot distance or within the 100-foot buffer if they are a water-related site such as a boat ramp. Construction of new developed recreation sites, including considerations for outhouse location and water systems, would need to meet more stringent requirements to ensure these developments are disconnected from the waterways.

Additionally, plan components encourage the mitigation, relocation, or removal of recreation facilities that are currently within riparian management zones if they are degrading aquatic or riparian resources. Dispersed recreation sites within the riparian management zone would be moved, mitigated, or relocated outside of riparian management zones at a rate of two sites per five years. Nearly all developed and dispersed recreation sites within riparian management zones on the Nez Perce-Clearwater are located where people enjoy and choose to be, which is commonly a location associated with water. Removing sites from the riparian management zone and placing them outside of this zone reduces their appeal to many recreationists. Over time, this will put more and more pressure on the remaining recreation sites or user created sites near waterbodies and may increase the ecological effects on these sites.

Objectives to maintain and reconstruct trails will benefit recreational users. Decommissioning of roads may impact recreational use if those roads were used for recreational purposes. Many roads that are decommissioned are overgrown and do not receive regular use for recreation purposes and the impact is expected to be negligible. Alternatives W and X have the most reconstruction and maintenance of roads and would benefit recreationalists the most but also have the highest number of roads that would be decommissioned. Alternatives Y and Z and the Preferred Alternative would reconstruct and maintain fewer miles of roads. Trail reconstruction and maintenance is constant across alternatives and the impacts would not vary.

Hazard trees felled for safety of users retained onsite for aquatics benefits are not likely to have an impact on recreationists.

Wildlife Management

Land Management Plan wildlife management direction affects motorized recreation opportunities. Restrictions that limit types of access and impose seasonal closures during sensitive periods, such as calving, and when animals emerge from dens, can temporarily displace recreationists to other areas. The Nez Perce-Clearwater’s motor vehicle use map limits motor vehicle use to designated routes or areas, yearlong or seasonally, often in response to wildlife and fish considerations.

Recreational benefits from wildlife management could include increased hunter and wildlife viewer satisfaction, as well as angler satisfaction. The effect on recreation from wildlife management is similar for all action alternatives. Road management decisions for wildlife may move recreation use to different areas but is not expected to greatly change use levels across the Forest. Areas identified as suitable or not suitable for motorized recreation will provide different hunting and fishing opportunities to meet a variety of hunting and angling experiences. Wildlife management activities commensurate with these suitabilities can enhance user experiences as well as wildlife habitat conditions.

Plan components require provisions to be included for domestic goat packing. This includes goat packing by outfitters and guides and by recreational and subsistence hunters, as well as for general recreation purposes. Goat packing is an activity that occurs on the Nez Perce-Clearwater. Any provisions that limit the ability of goats to be used for packing activities would negatively impact those recreation uses.

A wildlife multiple use plan component requires closures on roads to be more effective when implementing projects to reduce unauthorized use. Authorized use would not be affected by this plan component. However, if many miles of roads were placed into a closed status for wildlife purposes, recreationists would have fewer areas open to motorized use, which could lead to crowding and other undesirable ecological impacts on the remaining open routes in an area or encroachment into nonmotorized areas.

The wildlife plan components with the potential to impact recreation uses the greatest are the elk wildlife plan components. A plan component restricts authorization of new motorized routes in Management Area 2 if they cannot maintain areas without motorized use that are at least 5,000 acres in size. This plan component may directly limit the ability to meet the recreation opportunity spectrum desired condition of Alternatives W, X, and Y and the Preferred Alternative, and may preclude the ability to authorize new motorized roads or trails, especially those that create loop opportunities in some Idaho Roadless Areas. However, given the large size of many of the roadless areas, it would be possible for new motorized routes to bisect the roadless areas and still meet the guideline.

These plan components would affect where and how much motorized access is available within Management Area 2. However, any trails opened to motorized use in Management Area 2 would represent an increase over current conditions, as the vast majority of Management Area 2 is currently void of such trails. Additionally, these elk plan components are put in place to directly benefit the elk resource by improving habitat with the indirect effect of improving elk populations over time. As elk populations increase, hunter success and opportunity for wildlife viewers would also increase.

Fire Management

Fire Management plan components envision vegetation conditions that would support lessened fire intensity adjacent to communities and infrastructure and reduce negative impacts to values at risk. This would include fuels treatments in areas around locations used under special use permits, recreation rentals, and campgrounds. Fuels management effects on recreation are like effects described under vegetation management. An increase in fire extent, creating a long-lasting change to the setting, could cause a shift in recreational use. The degree of these effects is difficult to determine and is based on the size and intensity of a wildfire event. Prescribed fire has some level of predictability of time, location, and intensity, which may decrease the short-term impacts on visitors. These effects are proportional to the amount of fire management activities being implemented in each alternative. The planned fuels management through prescribed burning varies between alternatives from approximately 6,450 acres per year in Alternative Z to 8,332 in Alternative X. The Preferred Alternative anticipates approximately 6,800 acres per year. Fire suppression actions are also likely to continue and could result in the use of gated roads, as described above. In some cases, roads that are impassible to motor vehicle use due to revegetation or other restrictive condition might be opened to facilitate suppression actions. These roads would probably be used for the duration of the suppression efforts and post-fire work and then returned to their previous status.

Minerals Management

Proposals for exploration and development are driven by external parties and market forces and are regulated by existing mining law. Access through long-term and temporary road development are often associated with mineral exploration and development, but a site-specific analysis is required prior to any approval for exploration or development activities.

If any mine reclamation activities occur, they would likely use existing roads. These might be roads that are not currently designated for motor vehicle use. The roads would probably be used for the duration of the reclamation work and then returned to their previous status.

Recreation could be affected by mineral exploration and extraction in all alternatives. Short-term effects might include noise and visual impacts from exploration, open-pit, or underground mining operations. Over the long-term effects might include increase in the amount and regularity of traffic on primary roads, transition from a more naturally appearing landscape to a more developed landscape that may include new permanent underground or open-pit mines and physical structures; and new roads and road corridors constructed for mining or drilling operations that might change the recreation setting. Depending on the size and other factors of the operation, mining activities effectively reduce or remove recreational opportunities in and proximate to the activities. They can affect hunting, fishing, camping and other nonmotorized and motorized activities to varying degrees.

The potential for oil and gas development on the Nez Perce-Clearwater is low. Mineral facilities could affect visitors, depending on the location of development and the setting affected.

Cultural and Heritage Resources

Management of heritage and cultural resources on the Nez Perce-Clearwater generally benefit recreation activities. The continued existence of cultural resources improves the recreation experience. Routes that are maintained to protect their Natural Register integrity would generally keep routes open to the public but would not lead to increased development. This would keep the recreation experience as it is now and the maintenance level of these routes would not likely increase, even with increased use over time. Adaptive-reuse policies of historic buildings could lead to additional recreational use of these buildings. Routes that impact cultural resources may be rerouted, reconstructed, or decommissioned over time. This could reduce the areas available for both motorized and non-motorized use to some extent. However, existing infrastructure generally has been located to avoid impacts and, thus, are less likely to be causing impacts.

Tribal Trust Responsibilities

The Nez Perce-Clearwater provides a range of high-quality, sustainable recreation opportunities, including four-season use, dispersed and developed facilities and sites, day use and overnight use, motorized and non-motorized use, and guided and independent opportunities. A variety of recreation settings are provided through management area allocations and recreation opportunity spectrum classes that offer a range of summer and winter recreation access and opportunities. Allocation of ROS classes provides access and opportunities for hunting, fishing, gathering, solitude, spiritual quest, and pursuing traditional cultural practices via a variety of motorized and non-motorized roads and trails in a variety of settings from undisturbed, natural conditions to areas where management activities are apparent, human encounters with other forest visitors can be expected, and various amenities are provided in developed and dispersed sites. The spectrum of ROS classes provides for traditional access methods such as hiking and horseback in some locations as well as more modern forms of motorized and mechanized methods in other locations. While ROS is discussed in terms of recreation access and settings, these same principles apply to cultural practices as well and supports the opportunity to engage in the rights granted under the Nez Perce Treaty of 1855.

Livestock Grazing Management

Sights, sounds, and smells associated with livestock grazing may or may not be part of a persons preferred recreation experience. Livestock grazing has occurred on the Nez Perce-Clearwater for as long as or longer than Euro-American recreation use of the land. Most traditional recreational activities are accustomed to livestock grazing in the west and are not impacted to a degree that would reduce recreation or detract from the recreationists experience to any large degree. Livestock grazing remains constant across all action alternatives and is like the grazing levels in the No Action Alternative. Impacts would not vary by alternative.

In grazing management, suitable areas are capable areas minus areas chosen to be unacceptable to graze to minimize conflicts with areas such as campgrounds, other developed recreation sites, research natural areas, fenced rights-of-way, or other areas closed by decision. Therefore, when recreation special uses are within a developed setting, livestock grazing would not cause an effect. However, if the special use permit was granted for areas open to grazing, then participants may encounter cattle, fencing, and water developments.

Air Quality, Rare Plant, and Invasive Species Management

There are no anticipated significant effects from the management direction pertaining to air quality, rare plants, and invasive species. Increased recreational activity may provide increased need and opportunity to inform and educate the public to aid in the prevention of the spread of invasive species.

Designated Areas and Roadless Areas

Designated areas do adjust recreation opportunities depending on the designation. Designated areas are designated by Congress outside of the forest planning process. Designated areas do not vary by alternative. Reduced or curtailed motorized access is often a result of designation.

The Idaho Roadless Rule does not impact recreation activities directly. However, new road construction is generally not permitted within roadless areas, which precludes any road-based recreation in Idaho Roadless Areas. Motorized trails are not precluded from being established, opened, or maintained within Idaho Roadless Areas. Increasing motorized trails in roadless areas would create different recreation settings, opportunities, and expectations of forest visitors. Increased motorized use could affect wildlife movement and behavior thereby affecting the hunting experience.

Recommended Wilderness

Management of recommended wilderness generally promotes recreational use. However, protection of the attributes making these locations recommended wilderness areas may impact recreational experiences over time. For example, special use permits for outfitting or guiding associated with motorized travel might not be permitted as a result of this Land Management Plan. Recreation special uses within recommended wildernesses would need to be aligned with the natural setting and recreational purposes of these areas. Likewise, construction of new developed recreation facilities within recommended wilderness would not be authorized and in many cases replacement of existing facilities may not occur either. Depending on the final decision, areas currently open to motorized or mechanized use may be closed if those areas become recommended wilderness. While this would decrease motorized and mechanized opportunities, it would increase opportunity for solitude and primitive recreation.

Suitable Wild and Scenic Rivers

Management of eligible and suitable wild and scenic rivers potentially promotes recreational use. However, protection of outstandingly remarkable values may impact recreational experiences over time. For example, should it be determined in the future that boating negatively affects harlequin duck nesting and populations, actions to limit boating during sensitive periods would be a possible result of this Land Management Plan. If a developed or dispersed recreation facility along a suitable wild and scenic river is causing fisheries populations to be impacted, those impacts would need to be mitigated to protect the fisheries outstandingly remarkable values which might require removal of the facility.

The dominance of dispersed sites adjacent to waterways may also be influenced by the miles of eligible and suitable wild and scenic rivers in each alternative. In Alternative Z, where the highest number of rivers are found suitable, dispersed site management may increase to ensure retention of the outstandingly remarkable values for which the river was found suitable. Development of facilities along those stretches of river is also likely to be reduced since buildings and structures may not be suitable for these river stretches.

Positive impacts of the protection of outstandingly remarkable values may also occur. Trails and boatable waters are outstandingly remarkable values within the recreation category. In eligible and suitable rivers with these outstandingly remarkable values, these uses would be required to be protected and, thus, would be benefited over time.

New roads would not be constructed in eligible and suitable wild rivers. Roads may be constructed in scenic classified rivers if they only cross the suitable river. Motorized use is generally not acceptable in wild river segments. New trails in wild segments would generally be non-motorized. Recreation facilities would be permitted to be constructed in recreational suitable rivers. Wild rivers would preclude development of large facilities as outlined in plan components, while smaller facilities would be appropriate in scenic classifications.

The rivers found eligible or suitable as wild and scenic rivers varies by alternative. Alternative X finds zero river segments suitable and manages according to the Idaho Department of Water Resources Rivers Plan, which would not impact recreation.

Research Natural Areas

Motorized recreation is not permitted in research natural areas. Proposed research natural areas would be established under all action alternatives. This would reduce the overall number of miles of trails open to motorized use. However, most research natural area were selected, in part, because they do not have conflicts with other resources, including recreational activity.

Cumulative Effects

The analysis area for cumulative effects includes the Nez Perce-Clearwater and adjacent public lands, including the Idaho Panhandle, Bitterroot, Lolo, and Payette National Forests; Bureau of Land Management lands; State of Idaho lands; and public lands within municipal cities and towns within a half days drive, or about 250 miles, of the Nez Perce-Clearwater. These public lands provide a wide range of recreation opportunities in addition to those provided by the Nez Perce-Clearwater. Differences in agency’s missions provide a broad variety of recreation experiences.

Adjacent national forests receive recreation visitors like the Nez Perce-Clearwater. To address the impacts associated with increased visitors, all public land agencies have employed additional recreation management actions or have installed additional facilities to prevent damage to natural and cultural resources. It is expected that recreational uses on national forest lands will continue to increase as more people nationwide continue to look for places to recreate. As more people venture onto public lands, differing societal desires and ideas of the recreation opportunities public lands should provide will continue to influence public land management policy. Coordination with other agencies and organizations to provide recreation opportunities would continue to be necessary to meet public demands.

Within the expected life of the Land Management Plan, the human population growth near, around and interested in the Nez Perce-Clearwater is expected to increase. As the population increases, the demand for a variety of recreation settings, experiences, and opportunities in open, natural space will likely grow. Land-management agencies will continue to provide a variety of recreation opportunities but are not likely to be able to meet all the demand for every activity desired. All alternatives accommodate a mix of recreation opportunities and settings for recreationists. Alternative Z would provide the most non-motorized settings for summer, slightly more than Alternative Y, followed by Alternative W. Alternative W would provide the most non-motorized settings in winter followed by the Preferred Alternative. Alternative X and the Preferred Alternative provide the most motorized opportunity in the summer and Alternatives X and Z provide the most motorized opportunity in the winter.

The expected increased use of utility task vehicles, utility-terrain vehicles, and other off highway vehicles across the cumulative effects area may result in increased conflict among motorized and non-motorized user groups. As use increases, compliance with regulations could become a greater challenge as recreational participants increase in number and compete for space and resources. Idaho Roadless Rule Areas, Management Area 2 under the Land Management Plan, could potentially be the most affected areas as demand for motorized use increases. Potentially affecting areas that currently offer semi-primitive nonmotorized recreation settings that provide solitude, quite recreation, and minimal encounters with, or signs of, other users.

Motorized recreation opportunities that are road dependent have decreased over the decades due to road decommissioning and closures that have occurred primarily to benefit anadromous fisheries. The amount of non-motorized recreation opportunities has increased with these changes and the amount of motorized or road-related recreation opportunities has decreased across the Nez Perce-Clearwater. The preferred alternative reduces the area suitable for motorized over-snow vehicle use approximately three percent.

Areas currently available for motorized over-snow vehicle use has decreased primarily because of the Clearwater Travel Plan. Previous areas available to motorized over-snow vehicle use, especially in the Hoodoo (Great Burn) area, are no longer available resulting in a greater concentration of motorized over-snow vehicle use on the remaining areas open to this activity, as well as displacing motorized over-snow vehicle users beyond the Nez Perce-Clearwater. Much of the over-snow motorized use comes from Montana, especially from the counties of Missoula, Ravalli, and Superior. As these populations continue to increase, there will be more and more pressure for these activities on public lands. Other national forests in and available from the recreation region of comparison have closures that limit areas available for winter motorized use. Collectively, this leads to increased demand on those areas open that could lead to overcrowding, changes in the recreation setting, and encroachment into nonmotorized areas. The preferred alternative reduces the area suitable for motorized over-snow vehicle use approximately 3 percent. However, strong consideration was given to areas that provide desirable conditions and are popular with over-snow while delineating suitable and not suitable areas. Therefore, while the total suitable area is reduced, the majority of the suitable motorized over-snow vehicle use area provides appropriate physiological conditions and are currently popular with these recreationists.

Conclusion

Sustainable nature-based recreation is a key component of the resources and values provided by the Nez Perce-Clearwater. However, things are changing. The number of recreationists coming to the Forest is increasing, the types of recreational activities and the technology to pursue them is ever changing, visitor expectations change, and ecological conditions are changing. In light of all of this, understanding and managing the effects from other resource management on recreation settings and opportunities, and the effects on other resources and their management from management of sustainable recreation is a complex management responsibility. Application of Land Management Plan components serves to meet the plethora of resource goals and objectives in the Plan. Thereby moving the Forest toward desired conditions for the full array of resources and values, ensuring that recreation opportunities are ecologically, economically, and socially sustainable for present and future generations.

The allocation of recreation opportunity spectrum classes is primary in this effort. The recreation opportunity spectrum classifications vary by alternative (Table 326) per the intent of the 2012 Planning Rule. All the revised plan alternatives would establish guidance and desired recreation opportunity spectrum classes for both summer and winter recreation settings and set expectations for the recreation settings on the Nez Perce-Clearwater. Desired recreation opportunity spectrum classes would aid in managing both existing and emerging recreation uses. Establishing clear expectations and identifying a spectrum of settings for recreation users is important to the long-term sustainable management of recreation use on the Nez Perce-Clearwater. Travel plans, when implemented, would continue to provide the site-specific direction where motorized uses can and cannot occur.

Table 326. Acres of sustainable recreation and access by indicator and alternative (Alt)

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Motorized Access Suitability	2,403,316	1,846,585	2,270,448	1,729,937	1,660,349	2,161,917
Non-Motorized Access Suitability	1,535,850	2,092,581	1,668,718	2,209,229	2,278,817	1,777,249
Winter Over-Snow Motorized Access Suitability	2,481,670	1,903,114	2,760,060	2,450,733	2,760,053	2,369,176

Data Source: Nez Perce-Clearwater GIS data.

3.4.3 Scenery

Scenery provides an important sense-of-place backdrop, setting, and character-defining element that can be valued and enjoyed by both forest visitors and people in adjacent communities. While many of the benefits of the Nez Perce-Clearwater scenery are intangible, there are very real and quantifiable economic benefits that contribute to local economies and communities. For example, outfitter and guide services associated with the many rivers across the Nez Perce-Clearwater are dependent on the aesthetics of these unique waterways.

The spectacular scenery found on the Nez Perce-Clearwater varies from deep river canyons to high mountain peaks. These scenic backdrops bring local, regional, national, and even a few international visitors to the area to enjoy the Nez Perce-Clearwater. National visitor use monitoring data (U.S. Department of Agriculture 2018g) indicates that the top five most common activities on the Nez Perce-Clearwater are hiking and walking, viewing natural features, relaxing, driving for pleasure, and viewing wildlife. All of these include scenery as an integral part of their appeal; an appeal that would likely be diminished if the scenery were to be dramatically altered.

Relevant Laws, Regulations, and Policy

Federal Laws

National Environmental Policy Act of 1969 (Pub. L. 91-190, 42 U.S.C. 4321-4347, January 1, 1970): This act directs the federal government to "… (2) assure for all Americans…healthful, productive, and aesthetically and culturally pleasing surroundings; … [and] (4) preserve important historic, cultural, and natural aspects" of our environment. It further directs agencies to "ensure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment." The act directs agencies to develop methods and procedures "which will insure that [scenery and other] unqualified environmental amenities and values may be given appropriate consideration in decision making along with economic and technical considerations."

Wild and Scenic Rivers Act of 1968 (Pub. L. 94-588, 16 U.S.C. 1600, October 22, 1976): This act declares that certain selected rivers, with their immediate environments, that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.

National Forest Management Act of 1976 (Pub. L. 94-588, 16 U.S.C. 1600, October 22, 1976): This act states that aesthetics will be considered for all multiuse planning. "Sec. 6 (3) F … (ii) the interdisciplinary review as determined by the Secretary has been completed and the potential environmental, biological, esthetic, engineering, and economic impacts on each advertised sale area have been assessed, as well as the consistency of the sale with the multiple use of the general area; (iii) cut blocks, patches, or strips are shaped and blended to the extent practicable with the natural terrain; … [and] (v) such cuts are carried out in a manner consistent with the protection of soil, watershed, fish, wildlife, recreation, and esthetic resources, and the regeneration of the timber resource."

Regulation

Title 36 of the Code of Federal Regulations (CFR), Part 219 - Planning, Subpart A—National Forest System Land Management Planning (36 CFR part 219, subpart A): This regulation establishes the planning requirements for developing, amending, and revising land management plans for units of the National Forest System as required by the National Forest and Rangeland Renewable Resources Planning Act of 1974. Section 219.8 (b)(2) directs that the Plan must include Plan components to guide the Nez Perce-Clearwater National Forest's contribution to social and economic sustainability, considering sustainable recreation; including recreation settings, opportunities, and access; and scenic character. Section 219.10(a)(1) further requires that the Plan must provide for ecosystem services and multiple uses, including outdoor recreation, range, timber watershed, wildlife, and fish. When developing plan components for integrated resource management, that the responsible official must consider: "Aesthetic values, air quality, cultural and heritage resources, ecosystem services, fish and wildlife species, forage, geologic features, grazing and rangelands, habitat and habitat connectivity, recreation settings and opportunities, riparian areas, scenery, soil, surface and subsurface water quality, timber, trails, vegetation, viewsheds, wilderness, and other relevant resources and uses."

Taken together, these requirements direct the Forest Service to take into account the contribution of National Forest scenic resources to the social and economic sustainability of the National Forest System.

Forest Service Manual 2380: This manual outlines Forest Service policy and direction for the management of scenic resources. Section 2380.3 describes Forest Service policy with regard to scenic resources. The four components of the policy are listed below:

- Inventory, evaluate, manage, and, where necessary, restore scenery as a fully integrated part of the ecosystems of National Forest System lands and of the land and resource management and planning process.
- Employ a systematic, interdisciplinary approach to scenery management to ensure the integrated use of the natural and social sciences and environmental design.
- Ensure scenery is treated equally with other resources.
- Apply scenery management principles routinely in all National Forest System activities.

Forest Service Manual Section 2380.31: This manual requires the use of the basic concepts, elements, principles, and variables defined in the (U.S. Department of Agriculture 1995b)

Direction

Agriculture Handbook 701 – Landscape Aesthetics: A Handbook for Scenery Management (U.S. Department of Agriculture 1995b), referred to as the Scenery Management System: The goal of the scenery management system is to create and maintain landscapes having high scenic diversity, harmony, and unity. The scenery management system provides a systematic approach for inventorying, analyzing, and determining the relative value and importance of National Forest scenery. The system guides establishment of scenic character, originally referred to as landscape character, and scenic integrity goals and objectives for landscape and project planning, implementation, and monitoring. It recognizes that the landscape and scenery are dynamic and the application of scenic integrity objectives does not relate to a static scenic character description but to a description that considers dynamic and changing landscape processes. It recognizes the value of a natural-appearing National Forest landscape, and the relationship of human-introduced visual elements in that landscape.

Forest Service Handbooks: provide guidance for the management of scenic resources. While the associated Volume 1 has been replaced by the Scenery Management System, the resource specific portions associated with U.S. Department of Agriculture, Forest Service, National Forest Landscape Management, Volume 2 (U.S. Department of Agriculture 1974c) are still valuable and applicable in many cases:

- Chapter 2 – Utilities Agriculture Handbook 478
- Chapter 4 – Roads Agriculture Handbook 483
- Chapter 5 – Timber Agriculture Handbook 559
- Chapter 6 – Fire Agriculture Handbook 608 (U.S. Department of Agriculture 1985)
- Chapter 8 – Recreation Agriculture Handbook 666

State and Local Plans: There are no specific state or local plans that pertain to scenery management but the Idaho Statewide Comprehensive Outdoor Recreation Plan (Idaho Department of Parks and Recreation 2018) does recognize the importance of scenery for the recreating public. With more than 33.5 million acres, nearly 65 percent of land in Idaho is federally owned. Therefore, the federal government is an essential provider of outdoor recreation in Idaho and offers opportunities and experiences that are not provided by local or state governments. These lands include some of Idaho's most iconic rivers, mountains, and landscapes. Across Idaho, federal agencies manage forests, deserts, reservoirs, waterways, and wildlife habitats that are critical to the state's outdoor recreation opportunities (Idaho Department of Parks and Recreation 2018).

Methodology

Spatial Scale

The spatial boundary for the indirect and cumulative effects analysis area encompasses lands within the Nez Perce-Clearwater National Forests administrative boundary, as well as areas outside of the Nez Perce-Clearwater boundary that contain critical travelways and use areas from which the Nez Perce-Clearwater is viewed. This extension encompasses ten miles beyond the administrative boundary. Areas outside of the Nez Perce-Clearwater boundary would include selected sections of federal and state highways, communities, and use areas that are considered critical viewing areas for the Nez Perce-Clearwater. Areas were chosen that meet the criteria listed in the Scenery Management System Handbook (U.S. Department of Agriculture 1995b). Maps of the concern level viewing platforms are included in the project record.

Temporal Scale

The duration of effects on scenic quality varies depending on aspect, elevation, soil conditions, and the dominant species of vegetation found in the area where management activities occur. In most cases, management activities within the planning area up to 30 years to return to a point where past harvest activities are no longer dominant. This temporal scale closely matches the anticipated life of the plan.

Past, Present, and Future Activities used in the Analysis

As part of the assessment, past harvest activities were reviewed. Past harvest primarily occurred on approximately one third of the Nez Perce-Clearwater, an area referred to as the managed front. Limited harvest occurred on what is now identified as Idaho Roadless Rule areas. This information was used to inform the existing condition mapping. Activities outside of the Nez Perce-Clearwater boundary include management activities on other federal, state, and private land ownership adjacent to the Nez Perce-Clearwater. These areas are expected to continue to be managed primarily for timber and agricultural resources. This will have the greatest effect in areas where there is intermingled ownership. Critical viewsheds, such as U.S. Highway 12 and U.S. Highway 95, are within areas where intermingled ownership is most prevalent.

Methods and Assumptions

This analysis will focus on three main components of managing the scenery resource. First, determining the existing scenic integrity and scenic character across the Nez Perce-Clearwater. Second, determining the desired condition of scenery in the future, measured by desired scenic character descriptions. Third, determining the potential effects of the proposed alternatives on the desired scenic character. This analysis reviews the alternatives in the context of the desired condition of scenic character and scenic integrity objectives.

Agriculture Handbook 701, the Scenery Management System (U.S. Department of Agriculture 1995b), describes the process and methodology for inventorying, assessing, and describing the scenery resource. This process outlines the steps to establish both the scenery resource measure and the scenery resource indicator; scenic character was set as a scenery resource measure and scenic integrity objectives were created as a scenery resource indicator. Scenic character descriptions for both the existing condition as well as the desired condition were developed for identified zones across the Nez Perce-Clearwater and are outlined in the Land Management Plan's Appendix 7 and spatially displayed within the maps found in Appendix A. Agriculture Handbook 701, the Scenery Management System (U.S. Department of Agriculture 1995b) also describes the process to determine and map scenic integrity objectives. Appendix J outlines the steps taken during the scenery management system inventory process and the scenic integrity objectives are displayed spatially within the maps found in Appendix A.

The scenic integrity objectives proposed for each alternative assume that vegetation would continue to evolve and be affected by various factors, such as fire, insects, drought, and disease. An assumption is also made that the wildland urban interface areas would continue to expand and become more developed. This may increase both the need to address fuel build-up around properties of other ownership, as well as pressure to protect aesthetics associated with landowners' sense of place.

The following figures illustrate examples of each of the scenic integrity objectives found in the plan area. Figure 135 shows an example of a very high scenic integrity level where there are only minute, if any, deviations from the scenic character. This image shows the northside of Gedney Mountain from below the summit of the peak. This location is within the Selway Bitterroot designated wilderness.

Figure 135. Example of location with very high scenic integrity.

Figure 136 shows an example of a location with a high scenic integrity level where deviations are not evident and do not dominate the scenic character. This photo is along U.S. Highway 12 near Syringa, Idaho, where a fuels reduction project occurred adjacent to the travelway, which is a high concern level travelway due to designation as a Scenic Byway and adjacency to a designated wild and scenic river.

Figure 136. Example of a location with high scenic integrity.

Figure 137 provides an example of existing moderate scenic integrity level where the landscape appears slightly altered and deviations remain visually subordinate to the scenic character. This image shows a past timber harvest near Little Boulder Campground on the Palouse Ranger District near Helmer, Idaho. Harvest occurred in both the foreground and middle ground viewshed.

Figure 137. Example of a location with moderate scenic integrity.

Figure 138 shows an example of existing low scenic integrity where the landscape appears altered, and deviations begin to dominate the scenic character. This photo was taken at Dixie Summit near Dixie, Idaho. Multiple timber harvest units are visible in the middle ground.

Figure 138. Example of a location with low scenic integrity.

Measurement Indicators

The key indicator for analyzing alternatives for this land management plan are the scenic integrity objectives, as displayed in the maps and tables for each alternative found in Appendix A. Scenic integrity objectives indicate a minimum threshold of intactness of the desired scenic character. Management activity induced modifications are analyzed in terms of changes in line, form, color, texture, opening pattern, harmony, size, and scale from the existing natural scenic character during project-level analysis.

This indicator is described in the Scenery Management System Handbook (U.S. Department of Agriculture 1995b). The methodology for analyzing this indicator is also described in this handbook and can be applied using the tools described in the handbook.

Affected Environment

Existing Condition

Scenic Character

The affected environment for the scenery resource is partly portrayed by a description of the scenic character. The 2012 Planning Rule defines scenic character as:

a combination of the physical, biological, and cultural images that gives an area its scenic identity and contributes to its sense of place. Scenic character provides a frame of reference from which to determine scenic attractiveness and to measure scenic integrity.

The landscape of the Nez Perce-Clearwater begins in the jagged peaks of the Bitterroot Mountains and flows to the deep canyons of the Salmon, Selway, Lochsa, and Clearwater Rivers. Broad coniferous forests cover the mountains that stretch from the rolling hills of the Palouse Plateau to the Camas Prairie. Across the Nez Perce-Clearwater, nature provides an extraordinary scenic backdrop for recreationists whether they are on foot, on a motorized trail vehicle, or in a car. Visitors can travel extensive scenic byways, follow ancient routes across the mountains, or enjoy recreation opportunities in natural surroundings.

Among the many discrete places that people recreate on the Nez Perce-Clearwater, four broad zones are described in this Land Management Plan to group the diverse scenic settings found on the Nez Perce-Clearwater. They include the: Palouse, North Fork, Middle Fork, and South Fork. A detailed description of scenic character by these zones is found in the Land Management Plan's Appendix 7.

Inherent Scenic Attractiveness

Inherent scenic attractiveness is a classification of visually unique or distinctive scenery. Inherent scenic attractiveness generally does not change over time, even when events, such as stand replacing fires, may change the scenic character in the short-term or roads, mines, or timber harvests lower the scenic integrity. Landscapes with distinctive characteristics of landforms, river features, and vegetation are generally considered more attractive than those with commonly found vegetative patterns, river features, and landforms. The uniqueness; variety, including seasonal variety; and vividness of these landscape features, especially related to their line, form, color, and textures, are measures for determining the scenic attractiveness. Cultural features, such as historic structures, including those associated with management activities like mining, can also be considered part of the scenic attractiveness. Distinctive landscapes include areas of unusual visual attributes of vividness and patterns and unique or outstanding variety of rock, water, topography, and vegetation forms. Common landscapes include areas that provide positive yet typical vividness and patterns of rock, water, topography, and vegetation that are found throughout the Nez Perce-Clearwater. Indistinctive landscapes are areas with little to no visual variety and uniqueness or vividness in rock, water, topographic, or vegetative forms. A summary of acres and percent of area which falls under each scenic attractiveness class is provided in Table 327. Inherent scenic attractiveness is mapped and can be found in Appendix A.

Table 327. Acres and percent of plan area which falls under each scenic attractiveness class

Classification	Acres	Percent
A-Distinctive	194,347	5%
B-Common	3,739,454	95%
C-Indistinctive	352	<1%

Data Source: Nez Perce-Clearwater GIS and Scenery Management System Handbook model inputs.

Existing Visual Quality Objectives and Scenic Integrity

Existing scenic integrity refers to the current condition of the scenery as it has been influenced or changed by human modifications or constructed features, such as roads, mines, or timber harvest, that are generally considered incongruent with the scenic character of the landscape. Existing scenic integrity indicates the degree of intactness and wholeness of the scenic character, or conversely, it measures the degree of visible disruption.

The current condition of the scenic character varies across the Nez Perce-Clearwater. Past harvest completed across the Nez Perce-Clearwater was informed by the Visual Quality Objective standards expressed in the 1987 Clearwater and Nez Perce National Forest Land Management Plans. Each of these plans outlined the travelways of concern and determined appropriate visual quality objectives given that concern. Large portions of the Nez Perce-Clearwater contain naturally evolving landscapes where the scenery reveals the biophysical features and processes that occur in this geographic area with very limited human intervention. These areas include all the designated wilderness areas, research natural areas, and several large expansive roadless areas that were designated and recommended as wilderness. Broad natural landscapes, such as the viewshed of the Lolo Trail National Historic Landmark and Pilot Knob, have been managed to maintain the Visual

Quality Objectives laid out in the 1987 Forest Plans and appear, for the most part, to have a natural appearing character at this time. There are areas of private land intermingled on both the eastern and western termini of the Lolo Trail that do have very apparent man-made activities but most of the central portion of the trail appears natural.

Within the roaded portion of the Nez Perce-Clearwater, there is evidence of human habitation and management. Some of these areas have openings that appear natural, while others have openings that are obviously created by humans. These openings, while obvious, do not generally dominate the natural character of the landscape. They appear in background views or are minor components of the foreground and middleground views from critical travelways or recreation areas.

Some isolated areas have human impacts that dominate the landscape to the point that they do not meet the Visual Quality Objectives listed in the 1987 Forest Plans. These areas should be improved through landscape restoration efforts. These areas are very limited and generally contain activities, such as rock quarries, that will be rehabilitated when they are no longer needed.

The most recent comprehensive assessment of the existing scenic integrity for the Nez Perce-Clearwater was done at a coarse scale for the entire Forest Service Northern Region in 2010. It was an entirely geographic information system generated product with no ground verification and used available data from key observation travel routes and points that have not been verified on the ground. The resulting product rated the existing scenic integrity of the scenery on National Forest System lands into one of five levels: very high, high, moderate, low, and unacceptably low. A review by the Nez Perce-Clearwater landscape architect and other members of the Nez Perce-Clearwater team of specialists familiar with the landscape indicates that the results of this product may not represent the actual existing condition. Many of the obvious disruptions that resulted in low or unacceptably low scenic integrity have now, ten years later, improved through vegetation regrowth over time.

Environmental Consequences

Effects Common to All Alternatives

The distribution of the scenic integrity objectives in the revised plan alternatives reflects a range in the priorities across the Nez Perce-Clearwater. The priorities range from viewsheds where managing and maintaining the scenic integrity is most important to areas where achieving other goals or meeting other resource needs may be a higher priority.

The scenic integrity objectives and the desired scenic character descriptions proposed in the revised plan alternatives, would provide management direction for all new activities that modify the landscape, including installation of roads and facilities and vegetation management activities, such as incorporating fuel reduction burns and timber harvests. Installed facilities might include such items as utility lines, mining facilities, administrative facilities, and recreation facilities.

Assigned scenic integrity objectives and desired scenic character related to scenery management would serve to maintain and manage the scenic resource in a sustainable way that reflects the value, importance, viewing context, and dynamic nature of vegetation over time across the Nez Perce-Clearwater. The scenic integrity objectives and desired scenic character would not directly prohibit any on-the-ground project work but would influence the design and location of projects to meet or exceed the minimum levels of scenic integrity.

Effects to No Action Alternative

Indirect Effects

Under the No Action Alternative, the current forest plans would still apply to management activities occurring on the Nez Perce-Clearwater. Both the Nez Perce and Clearwater National Forest Plans were developed using the processes described in the Forest Service Visual Management System Handbook (U.S. Department of Agriculture 1974c, b). In that planning process, all National Forest System lands within the planning area were assigned visual quality objectives based on those inventory methods. In general, both the Nez Perce and Clearwater National Forest Plans were relatively consistent in how the process was applied. The only difference between the plans with respect to the process was that individual travelways and their associated concern levels were not specifically included in the Nez Perce National Forest Plan. Therefore, if the No Action Alternative is selected, the two Forests' approaches to scenery management would continue to be inconsistent, complicating scenery management on the Nez Perce-Clearwater. The use of outdated terminology would also continue, as the forest plans that would apply date back to 1987 and the Scenery Management System was implemented in 1995. Visual quality objectives for critical travelways, use areas, and administrative sites would continue to be considered during the planning process for any proposed management activity. Newer computer techniques would continue to be used that allow more accurate analysis of seen areas and distance zones so that newer methodology would continue. Table 328 contains the current Nez Perce and Clearwater National Forest Plan visual quality objectives with definitions, acres, and a crosswalk to the scenery management system terminology.

Table 328. Current Nez Perce and Clearwater National Forest Plans visual quality objectives with definitions, acres, and the comparable scenery management system terminology

Visual Quality Objectives	Total Acres for Nez Perce and Clearwater National Forest Lands in 1987	Crosswalk to comparable Scenery Management System Scenic Integrity Objectives
Preservation: Only ecological changes are allowed to alter the natural landscape.	1,135,433 acres—30% of the Nez Perce-Clearwater National Forests in 1987. This applies to designated wilderness.	Very High: Scenic character is intact with only minute if any deviations.
Retention: Human activities are not evident to the casual forest visitor.	440,396 acres—12% of the Nez Perce-Clearwater National Forests in 1987. This applies, in general, to areas with high concern for scenery, such as the Lolo Trail, designated wild and scenic rivers, and developed recreation sites.	High: Deviations are not evident and do not dominate the scenic character.
Partial Retention: Human activities may be evident but must remain subordinate to the characteristic landscape.	406,867 acres—11% of the Nez Perce-Clearwater National Forests in 1987.	Moderate: Appears slightly altered. Deviations must remain visually subordinate to the scenic character.
Modification: Human activity may dominate the characteristic landscape but must, at the same time, utilize naturally established form, line, color, and texture. It should appear as a natural occurrence when viewed in the middleground and background.	902,532 acres—24% of the Nez Perce-Clearwater National Forests in 1987.	Low: Appears altered. Deviations begin to dominate the scenic character.

Visual Quality Objectives	Total Acres for Nez Perce and Clearwater National Forest Lands in 1987	Crosswalk to comparable Scenery Management System Scenic Integrity Objectives
Maximum Modification: Human activity may dominate the characteristic landscape but should appear as natural when viewed as background.	838,157 acres—23% of the Nez Perce-Clearwater National Forests in 1987.	Very Low: Appear heavily altered. Deviations may strongly dominate.

Data Source: Nez Perce-Clearwater GIS data and Scenery Management System Handbook direction.

Effects Common to All Action Alternatives

The scenic integrity objective within Management Area 1—Wilderness, Wild and Scenic Rivers, and National Historic Landmark Areas—remains similar across alternatives; however, there is a four percent reduction in acres with a very high scenic integrity objective within this management area due to the placement of portions of the Middle Fork Clearwater Wild and Scenic River and the Lolo Trail National Historic Landmark in the High scenic integrity objective category due to the presence of associated infrastructure. Under the action alternatives, Management Area 1 acres are assigned scenic integrity objectives of Very High. Similarly, the Preferred Alternative acreages within Management Area 1 are assigned scenic integrity objectives of Very High (94 percent) or High (6 percent).

Scenic integrity objectives within Management Area 2—Backcountry—are based on a combination of the scenic classes and motorized versus non-motorized recreation opportunity spectrum classes. Management Area 2 includes recommended wilderness areas, suitable and eligible wild and scenic rivers, Idaho roadless rule areas, research natural areas, and parts of the Gospel Hump Geographic Area. The range of scenic integrity objectives is from Very High to Low. The land allocations within this management area include restrictions and opportunities for management actions based on the desired conditions, which would be overlain by the scenic integrity objectives minimum levels of intact scenic character. In all of these areas excluding Research Natural Areas, timber harvest and fuels reduction burning would be suitable across the Nez Perce-Clearwater. If designed well, these management actions could meet the assigned scenic integrity objectives of all acres within this management area.

The range of scenic integrity objectives is also Very High to Low in the front country found within Management Area 3, with over 99 percent being in the Moderate and Low categories. Unlike Management Area 2, the motorized versus non-motorized recreation opportunity spectrum classes do not vary as much across the alternatives within Management Area 3. As a result, the overlay of the recreation opportunity spectrum classes with the scenic classes results in a more consistent split of acres into Very High, High, Moderate, and Low. The percentage differences between High, Moderate, and Low scenic integrity objectives across the alternatives is less than one percent. In all action alternatives, there is less than 1 percent Very High and High, 56 to 78 percent Moderate, and 21 to 44 percent Low.

In each of the discussions of the specific alternatives, two tables are used to show the acreage and percentage differences of the scenic integrity objectives across all management areas. The second table also depicts each management area. Combined, these two tables indicate that the scenic integrity objective acreage variations occur primarily within Management Area 2. This management area is where differing acres of recommended wilderness, suitable wild and scenic rivers, and motorized suitability within these land allocations appear within the recreation opportunity spectrum classes.

Effects that Vary by Action Alternative

The Preferred Alternative

The Preferred Alternative proposes more acres as recommended wilderness than the No Action Alternative and Alternative X but less than Alternatives W, Y, and Z, with 258,210 acres. These areas, in addition to the 1,135,433 acres of designated wilderness, would account for about 1.4 million acres where management actions would maintain either the designated wilderness character or, for the recommended areas, characteristics that maintain opportunities for inclusion in the National Wilderness Preservation System. For areas outside of these land allocations, forest vegetation management actions are proposed to focus on increasing the rate of change towards desired conditions within 30 years. These actions would include timber harvest and fuels management activities. The Preferred Alternative also proposes ten suitable wild and scenic rivers and two eligible wild and scenic rivers where management activity opportunities and tools would be based on the specific river segment's classification, but the focus would likely be on natural processes.

Indirect Effects

The Preferred Alternative has fewer acres of recommended wilderness than Alternatives W, Y, and Z and, therefore, this alternative has fewer acres with a High scenic integrity objective. Under this alternative, there is a slight reduction in the number of acres with a Very High scenery integrity objective in Management Area 1 compared to all other alternatives. This is due to portions of the Middle Fork of the Clearwater Wild and Scenic River and the Lolo National Historic Trail having infrastructure, such as U.S. Highway 12 and the Lolo motorway, that precludes it from obtaining a very high scenic integrity objective. The other action alternatives categorize these lands in a very high category with the aim of consistency across Management Area 1 lands. The Preferred Alternative, with 1,763,316 acres with a moderate scenic integrity objective, has the second most acres in this scenic integrity objective category, behind Alternative X. The acres with a low scenic integrity objective in this alternative are very similar to the other action alternatives, varying by no more than one percent.

Scenic integrity objectives (SIO) would be assigned across Nez Perce-Clearwater by overlaying the scenic classes of the Nez Perce-Clearwater with the management area information and recreation opportunity spectrum information to relate the scenery resource to other resources across the Nez Perce-Clearwater. Acres and percent of the plan area which falls under each SIO under this alternative is provided in Table 329. Table 330 includes the percent of each management area falling within each SIO. The locations of the scenic integrity objectives across the Nez Perce-Clearwater are displayed on the Preferred Alternative map in Appendix A.

Table 329. Scenic integrity objectives (SIO) by acre and percent of the plan area, under the Preferred Alternative

SIO	Acres	Percent of Plan Area
Very High	1,179,117	30%
High	472,631	12%
Moderate	1,763,316	45%
Low	523,992	13%

Data Source: Nez Perce-Clearwater GIS data.

Table 330. Scenic integrity objectives (SIO) by percent of management area, under the Preferred Alternative

SIO	Management Area 1	Management Area 2	Management Area 3
Very High	94%	1%	<1%
High	6%	20%	<1%
Moderate	<1%	79%	56%
Low	0%	<1%	44%

Data Source: Nez Perce-Clearwater GIS data.

Alternative W

Alternative W proposes the largest number of acres as recommended wilderness, approximately 856,932 acres. These areas, in addition to the 1,135,433 acres of designated wilderness, would account for about 2 million acres where management actions would maintain either the designated wilderness character or, for the recommended areas, characteristics that maintain opportunities for inclusion in the National Wilderness Preservation System. For areas outside of these land allocations, forest vegetation management actions are proposed to focus on increasing the rate of change towards desired conditions within 30 years. These actions would include timber harvest and fuels management activities. This alternative also proposes 12 suitable wild and scenic rivers where management activity opportunities and tools would be based on the specific river segment's classification, but the focus would likely be on natural processes.

Indirect Effects

The number of acres of recommended wilderness increase the acres of High scenic integrity objective within this alternative compared to the Preferred Alternative and Alternative X and reduce the number of acres of Moderate scenic integrity objective acres. The acres of High and Moderate in this alternative, compared to Alternatives Y and Z, are more similar. The three alternatives are within one percentage of each other for both of these scenic integrity objectives. The difference is related to the suitability of motorized use in those Idaho Roadless Rule backcountry theme areas not proposed as recommended wilderness. In Alternative W, those areas are suitable for motorized use. In Alternative Y, some areas are found suitable to accommodate loop opportunities in some of these backcountry theme areas. In Alternative Z, motorized use is not suitable. As a result, Alternative W's and Y's High and Moderate acres are almost identical, with the High acres being about 14 percent and the Moderate acres being about 41 percent. This High percent is slightly less than that in Alternative Z and the Moderate percent is slightly more than in Alternative Z. The percent of Low scenic integrity objective acres is less than 1 percent difference across all alternatives, at about 13 percent.

Scenic integrity objectives would be assigned across Nez Perce-Clearwater. Acres and percent of the plan area which falls under each SIO under this alternative is provided in Table 331. Table 332 includes the percent of each management area falling within each SIO. The locations of the scenic integrity objectives across the Nez Perce-Clearwater are displayed on the Alternative W map in Appendix A.

Table 331. Scenic integrity objectives (SIO) by acre and percent of the plan area, under Alternative W

SIO	Acres	Percent
Very High	1,253,457	32%
High	548,717	14%

SIO	Acres	Percent
Moderate	1,607,192	41%
Low	529,690	13%

Data Source: Nez Perce-Clearwater GIS data.

Table 332. Scenic integrity objectives (SIO) by percent of each management area, under Alternative W

SIO	Management Area 1	Management Area 2	Management Area 3
Very High	100%	1%	<1%
High	0%	45%	<1%
Moderate	0%	53%	69%
Low	0%	<1%	31%

Data Source: Nez Perce-Clearwater GIS data.

Alternative X

Alternative X has no proposed recommended wilderness areas or suitable wild and scenic rivers. The highest number of acres are suitable for motorized access under this alternative. Timber outputs in this alternative are expected to be the highest of all alternatives. The timeline for meeting desired conditions for forest vegetation is 20 years, indicating likely higher timber harvests, as well as the largest number of acres of planned ignition burning of all alternatives.

Indirect Effects

Across the Nez Perce-Clearwater, this short duration of time before the desired vegetation conditions are met may increase the visibility of management actions due to short periods of regrowth between actions but may also make the scenery more stable because ecological conditions will be within the historic range of variability across the Nez Perce-Clearwater sooner.

Given that Alternative X has no acres of recommended wilderness or suitable or eligible wild and scenic rivers, as well as the highest amount of recreation opportunity spectrum motorized suitable class acres, this alternative would have the lowest percentage of High scenic integrity objective acres of the five alternatives. This leads to the highest percentage of Moderate scenic integrity objective acres of all alternatives. 75 percent of the Management Area 2 lands within this alternative are within the Moderate scenic integrity objective, while the other alternatives have between 53 and 79 percent. The amount of Low scenic integrity objective acres in this alternative is about the same across all the alternatives because this scenic integrity objective is predominantly found within Management Area 3 land allocations and motorized suitable recreation opportunity spectrum classes, which vary less across alternatives.

Scenic integrity objectives would be assigned across Nez Perce-Clearwater. Acres and percent of the plan area which falls under each SIO under this alternative is provided in Table 333. Table 334 includes the percent of each management area falling within each SIO. The locations of the scenic integrity objectives across the Nez Perce-Clearwater are displayed on the Alternative X map in Appendix A.

Table 333. Scenic integrity objectives (SIO) by acre and percentage across the Nez Perce-Clearwater in Alternative X

SIO	Acres	Percent
Very High	1,253,456	32%

SIO	Acres	Percent
High	322,701	8%
Moderate	1,833,200	47%
Low	529,699	13%

Data Source: Nez Perce-Clearwater GIS data.

Table 334. Scenic integrity objectives (SIO) by percentage of each management area across the Nez Perce-Clearwater in Alternative X

SIO	Management Area 1	Management Area 2	Management Area 3
Very High	100%	1%	0%
High	<1%	23%	<1%
Moderate	<1%	75%	78%
Low	0%	<1%	21%

Data Source: Nez Perce-Clearwater GIS data.

Alternative Y

Alternative Y has an intermediate level of eligible wild and scenic rivers and recommended wilderness acres. Management of vegetation outside of wilderness and recommended wilderness would be completed over a longer period than Alternatives W and X and the Preferred Alternative and shorter than Alternative Z. This alternative would move the Nez Perce-Clearwater towards the desired forest vegetation conditions in about 50 years. The amount of timber harvest and planned ignition burning acres under this alternative is also less than that of Alternatives W and X and the Preferred Alternative but more than Alternative Z. Historic areas of snowmobile use in the Great Burn Recommended Wilderness Area will be removed from the recommended wilderness land allocation, but the remainder of this area would be recommended wilderness. Fourteen rivers are found to be suitable wild and scenic rivers under this alternative.

Indirect Effects

Under this alternative, language to not renew the communication site within the Pilot Knob Geographic Area could affect the existing scenic composition of this portion of the Nez Perce-Clearwater by reducing the appearance of contrasting man-made environmental structures at this site.

The moderate number of acres of recommended wilderness and suitable wild and scenic rivers increases the acres of High scenic integrity objective within this alternative compared to Alternative X and the Preferred Alternative and reduce the number of acres of Moderate scenic integrity objective acres. The acres of High and Moderate in this alternative compared to Alternatives W and Z and the Preferred Alternative are more similar. The three alternatives are within three percentage of each other for High and four Moderate scenic integrity objectives. The difference is related to the suitability of motorized use in those Idaho Roadless Rule backcountry theme areas not proposed as recommended wilderness. Under this alternative, some portions of those areas are suitable for motorized use to create loops within the backcountry theme areas, but the remaining portions of the Idaho Roadless Rule areas are not suitable for motorized use. Therefore, there are slightly more High scenic integrity objective acres in this alternative compared to Alternative W, less than one percent, and two percent less than the Preferred Alternative. There is less High scenic integrity objective acreage in this alternative compared to Alternative Z, which finds motorized use not suitable in these Idaho Roadless Rule areas. As a result, Alternative W and Y are very close in High and Moderate acres, with the High being about 14 percent and the Moderate being about 41 percent for both alternatives. This percent of High is slightly less than that in Alternative Z and the Moderate percent is slightly more than in Alternative Z. The percent of Low scenic integrity objective acres is less than 1 percent difference across all alternatives, at about 13 percent.

Scenic integrity objectives would be assigned across Nez Perce-Clearwater. Acres and percent of the plan area which falls under each SIO under this alternative is provided in Table 335. Table 336 includes the percent of each management area falling within each SIO. The locations of the scenic integrity objectives across the Nez Perce-Clearwater are displayed on the Alternative Y map in Appendix A.

Table 335. Scenic integrity objectives (SIO) by acre and percent of the plan area, under Alternative Y

SIO	Acres	Percent
Very High	1,253,461	32%
High	559,817	14%
Moderate	1,596,333	41%
Low	529,446	13%

Data Source: Nez Perce-Clearwater GIS data.

Table 336. Scenic integrity objectives (SIO) by percent of management area, under Alternative Y

SIO	Management Area 1	Management Area 2	Management Area 3
Very High	100%	1%	0%
High	<1%	40%	<1%
Moderate	<1%	59%	77%
Low	0%	<1%	23%

Data Source: Nez Perce-Clearwater GIS data.

Alternative Z

Alternative Z would rely more on natural processes across the plan area to meet vegetative desired conditions. Recommended wilderness designation would be proposed across areas, comprising 475,000 acres. Thirty-six rivers are found to be suitable wild and scenic rivers under this alternative. Management of vegetation outside of wilderness and recommended wilderness would be completed over the longest period of all action alternatives and the timber harvest and planned ignition burning acres would be the smallest. This alternative would move the Nez Perce-Clearwater towards the desired forest vegetation conditions in about 100 years.

Indirect Effects

Under this alternative, additional snag and leave tree requirements could affect the scenic integrity at a project specific scale by increasing the presence of snags and leave trees, which may impact the foreground views from some concern-level travelways and points. Site specific design mitigations to address this desired condition may have to be considered at the project level.

Across the Nez Perce-Clearwater, this longer duration of time before the desired vegetation conditions are met may reduce the visibility of management actions due to longer periods of regrowth between actions but may also make the scenery less stable because ecological conditions will not be within the historic range of variability across the Nez Perce-Clearwater for a longer duration of time.

This alternative has the highest acres of High scenic integrity objective due to the high amount of recommended wilderness, suitable wild and scenic rivers, and reduced motorized suitable acres. This alternative has the smallest number of acres of Moderate scenic integrity objective. The percent of Low scenic integrity objective acres is less than 1 percent difference across all alternatives, at about 13 percent.

Scenic integrity objectives would be assigned across Nez Perce-Clearwater. Acres and percent of the plan area which falls under each SIO under this alternative is provided in Table 337. Table 338 includes the percent of each management area falling within each SIO. The locations of the scenic integrity objectives across the Nez Perce-Clearwater are displayed on the Alternative Z map in Appendix A.

Table 337. Scenic integrity objectives (SIO) by acre and percent of the plan area, under Alternative Z

SIO	Acres	Percent
Very High	1,253,490	32%
High	601,130	15%
Moderate	1,555,135	40%
Low	529,301	13%

Data Source: Nez Perce-Clearwater GIS data.

Table 338. Scenic integrity objectives (SIO) by percent of management area, under Alternative Z.

SIO	Management Area 1	Management Area 2	Management Area 3
Very High	100%	1%	<1%
High	<1%	43%	<1%
Moderate	<1%	55%	76%
Low	0%	<1%	24%

Data Source: Nez Perce-Clearwater GIS data.

Cumulative Effects

Except when viewers are well inside the Nez Perce-Clearwater boundary viewing only Nez Perce-Clearwater land, viewsheds often include land that is under some other ownership. Viewers may not recognize the boundaries of ownership and a person's eyes certainly do not stop viewing scenery at these boundaries. Therefore, a viewer's experience of the scenery of the Nez Perce-Clearwater often encompasses their experience of both Nez Perce-Clearwater lands and lands of other ownership that lie next to, behind, or in front of the Nez Perce-Clearwater. Where views include interspersed ownership, actions on the other land can positively or negatively affect viewers' attitudes towards the scenery of the Nez Perce-Clearwater. Lands around the Nez Perce-Clearwater may be managed by other federal agencies, including other National Forests, as well as state and private landowners. Each of these ownerships has different direction and management for scenery. As a result, viewers may perceive a difference in the scenic quality of the different lands and may perceive boundaries and other indicators of management action changes across the full landscape viewed.

No Action Alternative

Visual quality objective-based analysis would continue for proposed management activities across the Nez Perce-Clearwater and existing scenic condition would still be monitored. Travelways, use areas, and administrative sites created under the current forest plans would not be included in the existing mapping and would have to be updated on a project-by-project basis.

Alternative W

Alternative W would propose large expanses of recommended wilderness that would mirror large expanses of roadless and recommended wilderness on adjacent Forests. Areas of the Nez Perce-Clearwater that are proposed for more intensive management would be intermingled with state and private timberlands in some areas of the Palouse, North Fork, and Lochsa-Powell Ranger Districts. Intensive management by both Forest Service and other landowners would be found near several communities adjacent to the Nez Perce-Clearwater.

Alternative X

Alternative X would not propose any roadless areas as recommended wilderness. Therefore, more large expanses of the Nez Perce-Clearwater may be open for more intensive vegetative management. Some of these would be intermingled with state and private timberlands in some areas of the Palouse, North Fork, and Lochsa-Powell Ranger Districts. Intensive management by both Forest Service and other landowners would be found near several communities adjacent to the Nez Perce-Clearwater. The currently designated Idaho roadless areas would be retained and their themes would maintain large expanses of un-roaded area.

Alternative Y

Within Alternative Y, recommended wilderness areas will again mirror wilderness areas and recommended wilderness areas on adjacent Forests, creating large expanses of the landscape that reflect primarily natural changes to the landscape. Some of these would be intermingled with state and private timberlands in some areas of the Palouse, North Fork, and Lochsa-Powell Ranger Districts. Intensive management by both Forest Service and other landowners would be found near several communities adjacent to the Nez Perce-Clearwater. The pace of change is expected to be slightly slower than that proposed in Alternatives W and X, so management action driven changes to the landscape near rural communities and intermingled private lands would not be as visible.

Alternative Z

Within Alternative Z, designated areas of wilderness and recommended wilderness will again mirror wilderness areas and recommended wilderness areas on adjacent Forests, creating large expanses of the landscape that reflect primarily natural changes to the landscape. Some of these would be intermingled with state and private timberlands in some areas of the Palouse, North Fork, and Lochsa-Powell Ranger Districts. Intensive management by both Forest Service and other landowners would be found near several communities adjacent to the Nez Perce-Clearwater. The pace of change is expected to be significantly slower than that proposed in the other alternatives. This slower pace could allow for more growth of vegetation between harvests, which would likely reduce the visibility of management action driven changes to the landscape near rural communities and intermingled private lands. In contrast, this slower pace of change could also create a less stable long-term scenic character more susceptible to dramatic changes. These changes could result from events outside the historic range of variability for the ecosystem, such as uncharacteristic fires or widespread insect and disease outbreaks. These occurrences could shift the scenic character from naturally appearing to unnatural appearing and sustain that unnatural appearance for a long duration of time.

Preferred Alternative

Within the Preferred Alternative, designated wilderness and recommended wilderness areas will reflect wilderness areas and recommended wilderness areas on adjacent Forests, creating large expanses of the landscape that primarily display natural changes to the landscape. Some of these would be intermingled with state and private timberlands in some areas of the Palouse, North Fork, and Lochsa-Powell Ranger Districts. Intensive management by both Forest Service and other landowners would be found near several communities adjacent to the Nez Perce-Clearwater. The pace of change is expected to be slower than in Alternatives W and X, so management action driven changes to the landscape near rural communities and intermingled private lands would not be as visible compared to those alternatives.

Effects to Resource from Other Resources

Air Quality

While air quality is not a part of the vegetation and landforms that make up the forest setting, it does contribute to the overall recreation setting across the Nez Perce-Clearwater. Maintenance of good air quality contributes to the recreation experience and allows visitors to enjoy the scenery found in the area. Significant incidences of smoke, especially in river corridors where canyon walls can trap the smoke, can reduce the overall recreation experience for visitors.

Climate Change

Evidence of climate change can be seen across the Nez Perce-Clearwater in the form of increased insect and disease, wildfire occurrences, reduction in quantity of water, and poor growth of vegetation. These factors contribute significantly to the scenic appearance of the forest environment and, therefore, affect the overall scenic quality of the Nez Perce-Clearwater.

Cultural Resources

The Nez Perce-Clearwater has a rich pre-historic and historic story. Events of national importance occurred here and are now memorialized in print media and interpretive facilities. Historic facilities, such as cabins and lookouts, enhance this cultural experience by maintaining tangible evidence of the past. These heritage components enrich the visitor experience and enhance the scenic experiences of forest visitors through maintenance of historic structures. Desired conditions for heritage resources encourage retention of historic structures and protection of significant scenic components of several of the most notable cultural sites and travelways. Plan components for these objectives complement scenic quality guidelines for these areas.

Designated Wild and Scenic River Management

Desired conditions for existing designated wild and scenic rivers complement scenic quality desired conditions to maintain these distinctive river corridors in a way that protects the scenic character of the river landscapes in the long-term.

Suitable Wild and Scenic River Management

Desired conditions for suitable wild and scenic rivers also complement scenic quality desired conditions to maintain these distinctive river corridors in a way that protects the scenic character of the river landscapes in the long-term.

Ecology (other than fire ecology)

Land Management Plan direction related to ecosystems and ecology is designed to provide integrity and sustainability within those ecosystems. The desired condition to restore and maintain landscapes to be resilient natural ecosystem processes usually affects the long-term stability and composition of the scenery resource. Overall, the plan components for ecology are expected to complement the scenic integrity objectives and scenic character goals.

Economic Sustainability

Economic sustainability does not directly affect the scenic resource. However, management activities designed to enhance and protect the Nez Perce-Clearwater environment will likely enhance and protect the scenery resource. For them to be successful and implementable, they must also be economically viable.

Fire Management

Fire occurrences across the landscape are a major part of the dynamic nature of the Nez Perce-Clearwater. Historic fires and the suppression of fires have shaped the landscape's appearance, contributing to the current condition of the Nez Perce-Clearwater scenery. Maintenance of natural processes within areas such as designated wilderness and recommended wilderness complements the desired scenic conditions for the landscapes in those management areas. More active fuels reduction activities and prescribed burning is proposed to occur within general forest areas to also maintain a more natural balance of forest vegetation.

Desired conditions for fire management across the Nez Perce-Clearwater would be to maintain the forest vegetation in a condition that emulates natural conditions. This will require active fire and fuels operations over time to manage forest vegetation and limit uncharacteristic fire events. These activities, when applied appropriately, would meet or exceed the Nez Perce-Clearwater scenic integrity objectives.

Aquatic Ecosystems and Fisheries

While management of the fisheries resource itself would have little effect on the scenic resource, fishing is a major component of recreational use on the Nez Perce-Clearwater. Protection of watershed habitats that sustain the fisheries resource does contribute to the scenic quality and overall forest setting within protected watersheds. This would complement scenic quality in these areas. Structural improvements to protect fisheries can have minor short-term effects on scenic quality but generally do not affect the long-term scenic character. In many cases, actions to protect fisheries, such as reducing sediment into streams, restoring wetlands, and decommissioning roads, will positively affect the scenery resource by improving the scenic integrity from a valued viewing platform.

Forest Products (other than timber)

Much of the vegetation that provides forest products also contributes to the visual variety of the forest setting. Protection of these resources from overuse contributes to the overall scenic quality of an area. The desired condition to maintain viable populations of these species complements the scenic integrity objectives for these areas.

Infrastructure

A significant portion of the Nez Perce-Clearwater infrastructure is composed of historic buildings that have been maintained or restored for both administrative and public use. Historic buildings contribute to the scenic character of the Nez Perce-Clearwater by providing a window to past use of the area expanding the opportunity to experience those historic settings in context.

Invasive Species

Proliferation of invasive species, especially along travel corridors, can affect the overall scenic quality of the landscape. Generally found in the foreground viewshed along road and trail corridors, invasive species often out-compete native species creating an unnatural visual appearance that can be significant. Invasive species management over the long-term will complement the scenic integrity objectives to maintain natural appear landscapes, especially in critical travelway corridors.

Lands and Lands Special Uses

Lands and lands special uses authorizations of occupancy of Nez Perce-Clearwater lands by private entities for uses such as roads, utility corridors, and communication sites can create significant changes to the scenic resources of an area. While utility corridors and communication sites are generally isolated or are found generally in the urban interface, approval of the permitted uses should meet or exceed the scenic integrity objectives of the area.

Livestock Grazing

Desired conditions for livestock grazing within the forest environment are to maintain grazing capacity at a level that can produce sustained forage without damaging the forest ecology. This would complement the scenic integrity objectives for these areas.

Management Area Allocations

Management area allocations have grouped land areas by type and intensity of appropriate forest management. In this way, it has outlined groupings of areas that have similar scenic integrity objectives.

Minerals

While locatable minerals will remain available for all the activities related to mining those products, lands affected by these activities will eventually be reclaimed in an appropriate manner that meets or exceeds the scenic integrity objectives for that area. However, in all alternatives, negative impacts to the scenic integrity may result where valid existing rights are involved and mitigations to meet the assigned scenic integrity objectives are not implemented.

At-Risk Plants

While at-risk plants generally do not contribute to the overall scenic quality of an area, they do contribute to the overall visual variety and ecological interest of an area. There are several areas across the Nez Perce-Clearwater that have significant populations of at-risk plants. Some of these have been designated as research natural areas, with at-risk plants contributing variety to the type of settings available for visitors to enjoy.

Recommended Wilderness

Recommended wilderness varies between alternatives. Recommended wilderness and suitable wild and scenic river acres are the two main contributors to differences in the scenic integrity objectives across alternatives. Management actions to ensure these areas could still be designated wilderness in the future will likely complement the scenic integrity objectives of these areas and benefit the scenery resource. These areas would be managed to maintain natural processes for the most part, with a reduction in the discernible management actions compared to the desired scenic character.

Research Natural Areas

The objective for research natural areas is to monitor natural processes over time to better understand the dynamic forest processes that interact in the long-term for special vegetative communities. Retaining these areas in their natural conditions is critical to this objective and complements scenery goals of maintaining variety within the landscape. A scenic integrity objective of very high, indicating there would be little to no man-made activities occurring within these areas, will support the objective of maintaining the natural functions of these area.

Idaho Roadless Rule Areas

The themes assigned to these areas directly influence the management actions suitable to occur within them and, in turn, the possible affects to the scenery resource. In general, these areas would be dominated by use of fuels management operations to achieve desired vegetation conditions. Use of this management action over other tools would likely create scenic conditions that are well aligned with the scenic integrity objectives of these areas. These areas would continue to function naturally and be dominated by natural processes. The desired conditions outlined for these areas would be in keeping with the scenic integrity objectives assigned to them.

Social Sustainability

Social and economic sustainability of local communities is a critical component of forest planning. Providing forest products, recreation opportunities, and scenic settings for these communities is an important function of the Nez Perce-Clearwater. Goals for forest management to maintain sustainable outputs of forest products, opportunities for a variety of recreation pursuits, and scenic quality in critical viewsheds over the long-term would contribute to social sustainability. Production of these resources over the long-term would be designed to meet or exceed the scenic integrity objectives.

Soils Resource

While soils management does not directly affect the scenic quality of an area, improved soil conditions do encourage and maintain appropriate plant communities that contribute to the scenic character of the Nez Perce-Clearwater. Desired conditions to maintain soils through time to provide the appropriate conditions for optimum vegetative growth will contribute to the overall scenic quality of the Nez Perce-Clearwater.

Suitable Wild and Scenic Rivers

Plan components related to the designation of suitable Wild and Scenic Rivers would, in many cases, include a standard for scenic quality, as many of these rivers have scenery as one of their outstandingly remarkable values. This designation would complement the desired condition for scenery for these distinctive river segments. These areas would be managed to maintain natural processes for the most part, with a reduction in the discernible management actions compared to the desired scenic character.

Sustainable Recreation (including developed and dispersed recreation)

Maintaining scenic quality around developed recreation sites and dispersed sites across Nez Perce-Clearwater is one of the desired conditions for recreation. The scenic character creates the setting for that visitor experience. Maintenance of these resources supports the sense of place that visitors expect when they come to the Nez Perce-Clearwater. Maintaining this desired condition over time does require management of the components of that setting, including vegetation management.

The recreation opportunity spectrum complements scenery management in terms of the visual appearance of recreation sites, such as campgrounds, river access, and trailheads. Desired conditions for scenery management also apply to how the surrounding foreground, middle ground, and background National Forest System lands appear.

While not limiting recreation development, scenic integrity objectives may influence the design and location of recreation facilities, especially when they may be visible from critical viewing platforms. Desired conditions to maintain recreation settings in and around recreation facilities would be in keeping with desired conditions for scenery.

Development of visitor access routes across the Nez Perce-Clearwater, either by road or trail, is critical to support the recreation function. Bringing visitors to recreation opportunities, whether by car, motorized trail vehicle, or by foot, is part of their experience. The desired condition for scenery is to provide the desirable forest settings that support that use. Within the components for recreation, the recreation opportunity spectrum complements the scenery management guidelines.

To support recreation use, the desired condition for road and trail management is to develop an effective, efficient, and sustainable transportation system. These travelways can then be identified as scenic corridors and maintained with the appropriate scenic integrity objectives.

Timber

Plan components in the revised plan alternatives have detailed desired condition descriptions aimed at maintaining resilience and sustainability as a general goal. Maintaining a healthy and resilient landscape over time would enhance the short- and long-term character of the Nez Perce-Clearwater, and is complimentary with desired conditions for scenery, such as maintaining large tree structure and meadows that are open and clear of conifer encroachment. Both elements would increase the visual variety across the Nez Perce-Clearwater. Changes to the vegetation required to meet these desired conditions would need to be designed to meet or exceed the scenic integrity objectives of the area.

Plan components in the revised plan support a desired condition of maintaining ecological integrity and sustainability that resemble the natural range of variation. In the long-term, these goals are complimentary with desired conditions for scenery. Each alternative has a different time frame in which this will occur. Impacts to scenic quality will differ across alternatives, with changes to the vegetated landscape happening more frequently and at a broader scale in Alternatives W and X.

Watershed Management

All Land Management Plan alternatives provide detailed guidance for protection of watersheds, riparian areas, and aquatic habitats, which complement scenic quality desired condition goals. Desired conditions for watershed management would affect scenic integrity in a positive way in the long- and short-term.

Watershed Restoration Program

Restoration of water courses and wetlands, especially in critical viewsheds, would improve scenic quality in the long- and short-term. River related environments are a critical part of the scenic character of the Nez Perce-Clearwater and improvements to the river related environments over the long- and short-term will improve scenic quality.

Tribal Trust Responsibilities

Maintaining tribal treaty rights across the Nez Perce-Clearwater would complement scenery desired conditions aimed at maintaining critical historic and natural areas of the Nez Perce-Clearwater.

Wildlife

Plan objectives to improve wildlife habitat may have some effect on scenic integrity, as some species, such as elk, require openings on the landscape that may need to be maintained either by timber harvest or fuels management. Habitat restoration that requires these actions would need to meet or exceed the scenic integrity objectives.

Summary of Consequences

The No Action Alternative would not resolve the incongruent forest management direction for the scenery resource between the Nez Perce and the Clearwater National Forests. There would still be an inconsistent and unpredictable approach to scenery management and neither of the two existing approaches comply with current Forest Service directives.

All revised plan alternatives would resolve the need for change and would meet the 2012 Land Management Planning Rule requirements to consider the contribution of the Nez Perce-Clearwater scenery to the social and economic sustainability of the Nez Perce-Clearwater. All revised plan alternatives, the desired scenic character descriptions, mapped scenic integrity objectives, and the Land Management Plan components would result in the Nez Perce-Clearwater's scenery being managed in a way that recognizes the public's expectations and desire to enjoy the scenery, especially in critical viewsheds, and would allow for managing for scenic sustainability within the context of dynamic landscapes.

A comparison of the scenic integrity objectives proposed in the revised plan alternatives show how they generally vary from alternative to alternative based upon the amount and locations of recommended wilderness and suitable wild and scenic rivers. Table 339 compares the alternatives and their effects to the scenery resource. The action alternatives have very similar amounts of Very High scenic integrity objective assigned acres ranging from 1,253,456 to 1,253,490. The Preferred Alternative has fewer acres in the Very High scenic integrity objective class at 1,179,117 acres. Alternative Z has the highest amount of High scenic integrity objective assigned acres and Alternative X the least, with the other action alternatives falling in between. This difference corresponds to the greater amount of land recommended as wilderness and suitable wild and scenic river in Alternative Z and none in Alternative X. Alternative X has the highest amount of Moderate scenic integrity objective assigned acres and Alternative Z the least. The same reason above with regards to the opposite is true for High scenic integrity objective acres in these two alternatives. Alternatives W and Y and the Preferred Alternative are very similar in Moderate scenic integrity objective acres and are more like Alternative Z than X. No land in any of the revised plan alternatives was assigned a scenic integrity objective of very low.

Table 339. Summary of scenery integrity objectives (SIO) by acres, percent, and alternative (Alt)

SIO	No Action1	Alt W	Alt X	Alt Y	Alt Z	Preferred
Very High	1,135,433 acres 30%	1,253,457 acres 32%	1,253,456 acres 32%	1,253,461 acres 32%	1,253,490 acres 32%	1,179,117 acres 30%
High	440,396 acres 12%	548,717 acres 14%	322,701 acres 8%	559,817 acres 14%	601,130 acres 15%	472,631 acres 12%
Moderate	406,867 acres 11%	1,607,192acres 41%	1,833,200 acres 47%	1,596,333 acres 41%	1,555,135 acres 40%	1,763,316 acres 45%
Low	902,532 acres 24%	529,690 acres 13%	529,699 acres 13%	529,446 acres 13%	529,301 acres 13%	523,992 acres 13%

SIO	No Action1	Alt W	Alt X	Alt Y	Alt Z	Preferred
Very Low	838,157 acres 23%	0	0	0	0	0

[1]The No Action Alternative is based on the Visual Management System instead of the Scenery Management System. As a result, the scenic integrity objective terms are cross walked from the assigned visual quality objectives to compare the alternatives.

Data Source: Nez Perce-Clearwater GIS data.

3.4.4 Infrastructure

Infrastructure on the Nez Perce-Clearwater includes roads, bridges, facilities, airstrips, and dams. The transportation system for the Nez Perce-Clearwater is defined as the system of National Forest System roads, National Forest System trails, and airfields on National Forest System lands (36 CFR 212.1). This section focuses primarily on the National Forest System roads, which are an extensive network that includes approximately 7,680 miles of forest roads accessing approximately 1,331,040 acres, or 34 percent, of the Nez Perce-Clearwater.

Effects to National Forest System roads would vary amongst the alternatives and are described in detail in this section. Bridges, facilities, airfields, and dams are also described in this section. Effects to these resources would be similar under all of the alternatives.

The Nez Perce-Clearwater expects to maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns. The National Forest System roads would continue to provide access for recreation and resource management as well as to support watershed restoration and resource protection to sustain healthy ecosystems.

While infrastructure was not identified specifically as an issue during scoping, it is critical for management of the activities and resources on the Nez Perce-Clearwater. Comments received during scoping that are directly related to infrastructure, specifically roads, included access in wilderness areas and Idaho Roadless Areas, timber output, aquatic resources, and elk and big game security.

Relevant Laws, Regulations, and Policy

Federal Laws

Term Permit Act of March 4, 1915 (Pub. L. 63-293, Ch. 144, 38 Stat. 1101, as amended; 16 U.S.C. 497): This act provides direction authorizing occupancy of National Forest System lands for a wide variety of uses through permits not exceeding 30 years.

National Forest Roads and Trails Act of October 13, 1964 (Pub. L. 88-657, 78 Stat. 1089, as amended): This act declares that an adequate system of roads and trails should be constructed and maintained to meet the increasing demand for recreation and other uses. This act authorizes road and trail systems for the National Forests. It authorizes granting of easements across National Forest System lands, construction and financing of maximum-economy roads (Forest Service Manual 7705), and imposition of requirements on road users for maintaining and reconstructing roads, including cooperative deposits for that work.

Highway Safety Act of September 9, 1966 (Pub. L. 89-564, 80 Stat. 731, as amended): This act authorizes state and local governments and participating federal agencies to identify and survey accident locations; to design, construct, and maintain roads in accordance with safety standards; to apply sound traffic control principles and standards; and to promote pedestrian safety. The Highway Safety Improvement Program and the Safety Performance Management Measures Final Rules, effective April 14, 2016, address the requirements of the Moving Ahead for Progress in the 21st Century Act and the Fixing America's Surface Transportation Act. Updates to the existing Highway Safety Improvement Program requirements under 23 CFR § 924 are consistent with the Moving Ahead for Progress in the 21st Century Act and the Fixing America's Surface Transportation Act and clarify existing program requirements. The Safety Performance Management Measures Final Rule adds part 490 to title 23 of the CFR to implement the performance management requirements under 23 U.S.C. 150, including specific safety performance measure requirements for the purpose of carrying out the Highway Safety Improvement Program to assess serious injuries and fatalities on all public roads.

Federal Aid Highway Act of 1968, as amended (23 U.S.C. 109(a) and (h), 144, 151, 319, and 351): This act establishes the National Bridge Inspection Standards (23 CFR § 650, Subpart C) and the requirement that each state have a current inventory of bridges on all public roads, including National Forest System roads open to public travel (Forest Service Manual 1535.11).

Surface Transportation Assistance Act of 1978 (Pub. L. 95-599, as amended): This act supersedes the Forest Highway Act of 1958 and authorizes appropriations for Forest highways and public lands highways. It establishes criteria for Forest highways; defines Forest roads, Forest development roads, and Forest development trails, referred to as National Forest System roads and National Forest System trails in Forest Service regulations and directives; and limits the size of projects performed by Forest Service employees on Forest roads. The act establishes the Federal Lands Highway Program.

Secure Rural Schools and Community Self-Determination Act of October 30, 2000 (Pub. L. 106-393, 114 Stat. 1607; 16 U.S.C.500 note): This act provides provisions to make additional investments in, and create additional employment opportunities through, projects that improve the maintenance of existing infrastructure, implement stewardship objectives that enhance Forest ecosystems, and restore and improve land health and water quality.

Moving Ahead for Progress in the 21st-Century Act (MAP-21) of July 6, 2012 (Pub. L. 112-141): This act replaces the Federal Lands Highway Program with the Federal Lands Transportation Program and Federal Lands Access Program. This act authorizes funding for federal lands transportation facilities and federal lands access transportation facilities under a unified program, with policy similar to federal-aid highways and other public transportation facilities. It requires federal land management agencies to identify a comprehensive inventory of public federal lands transportation facilities that, at a minimum, includes the transportation facilities that provide access to high-use federal recreation sites or federal economic generators. As part of the Moving Ahead for Progress in the 21st Century enactment, Section 1111 amended Section 144 of Title 23 United States Code and directed the Federal Highway Administration to "consider a risk-based approach to determining the frequency of bridge inspections." Section 650.311(a)(3) of the National Bridge Inspection Standards (23 CFR 650 subpart C) states "certain bridges may be inspected at greater than twenty-four-month intervals, not to exceed forty-eight months, with written FHWA [Federal Highway Administration] approval." Additionally, in accordance with 23 CFR 650.311(a)(2), certain bridges require inspection at less than 24-month intervals.

Idaho Roadless Rule 36 CFR 294.22: This rule provided state-specific direction for the conservation and management of inventoried roadless areas within the State of Idaho. The rule integrated local management concerns with the national objectives for protecting roadless area values and characteristics. It designated a system of lands titled Idaho Roadless Areas and established five management themes for individual roadless areas: Wild Land Recreation; Primitive;

Special Areas of Historic and Tribal Significance; Backcountry and Restoration; and General Forest, Rangeland, and Grassland.

Executive Orders

Executive Order 13751: Safeguarding the Nation from the Impacts of Invasive Species (December 5, 2016)

Executive Order 13112: Invasive Species (February 3, 1999). Amended by Executive Order 13286 (28 February 2003)

Agency Regulations

36 CFR § 212—Travel Management*:* This final rule requires designation of those roads, trails, and areas that are open to motor vehicle use. Designations are made by class of vehicle and, if appropriate, by time of year. This rule prohibits the use of motor vehicles off the designated system, as well as use of motor vehicles on routes and in areas that is not consistent with the designations. Subpart B provides for a system of National Forest System roads, National Forest System trails, and areas on National Forest System lands that are designated for motor vehicle use. After these roads, trails, and areas are designated, motor vehicle use, including the class of vehicle and time of year, not in accordance with these designations is prohibited by 36 CFR § 261.13. Motor vehicle use off designated roads and trails and outside designated areas is prohibited by 36 CFR § 261.13. Subpart C provides for a system of National Forest System roads, National Forest System trails, and areas on National Forest System lands that are designated for over-snow vehicle use. After these roads, trails, and areas are designated, motorized over-snow vehicle use not in accordance with these designations is prohibited by 36 CFR § 261.14. Motorized over-snow vehicle use off designated roads and trails and outside designated areas is prohibited by 36 CFR § 261.14.

The Road Management Rule 2001*:* This rule "removes the [prior rule's] emphasis on transportation development and adds a requirement for science-based transportation analysis…The intended effect of this final rule is to help ensure that additions to the National Forest System network of roads are those deemed essential for resource management and use; that construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; and, finally, that unneeded roads are decommissioned and restoration of ecological processes are initiated" (Federal Register Vol. 66, No 9, pg. 3206).

Subpart A of the Rule pertains to Administration of the Forest Transportation System: In part, Subpart A requires each unit of the National Forest System to: 1) identify the minimum road system needed for safe and efficient travel and for protection, management, and use of National Forest System lands (36 CFR (CFR) 212.5(b)(1)) and 2) identify roads that are no longer needed to meet forest resource management objectives (36 CFR 212.5 (b)(2)). In determining the minimum road system, the responsible official must incorporate a science-based roads analysis at the appropriate scale.

Policy

- Forest Service Manual 7100 – Engineering Operations
- Forest Service Manual 7300 – Buildings and Other Structures
- Forest Service Manual 7400 – Public Health and Pollution Control
- Forest Service Manual 7500 – Water Storage and Transmission

- Forest Service Manual 7700 – Travel Management
- Energy Policy Act of 2005
- USDA Facilities Energy and Water Conservation and Utilities Management (DR-5500-001)
- International Building Code
- National Best Management Practices for Water Quality Management on National Forest System Lands – Volume 1: National Core BMP Technical Guide, April 2012: This is the first volume of guidance for the Forest Service, U.S. Department of Agriculture, and National Best Management Practices Program. The National Best Management Practices Program was developed to improve agency performance and accountability in managing water quality consistent with the Federal Clean Water Act and state water quality programs. Current Forest Service policy directs compliance with required Federal Clean Water Act permits and state regulations and requires the use of the National Best Management Practices Program to control nonpoint source pollution to meet applicable water quality standards and other Federal Clean Water Act requirements. It includes the National Best Management Practices Program for construction, operation, and maintenance of roads and motorized trails.

State and Local Laws

- Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08)
- Idaho's Wastewater Rules (IDAPA 58.01.16)

State and Local Plans

The Nez Perce-Clearwater has Cooperative Use Agreements for road and bridge maintenance with the PotlatchDeltic Timberland Real Estate Investment Trust and the Idaho Department of Lands under a statewide cost share agreement.

Methodology

Spatial Scale

The network of National Forest System roads may also include county, state, private, and other federal jurisdiction sections. The geographic scope of the road effects analysis is those National Forest System roads administered by the Nez Perce-Clearwater, as these roads are under the jurisdiction of the Forest Service and would be affected by varying degrees under each of the alternatives. For cumulative effects to roads, the geographic scope includes all National Forest System roads, including those administered by other entities.

The geographic scope of effects for bridges, facilities, airstrips, and dams, including cumulative effects, is the footprint of these resources. Although the National Forest System road network, as a whole, is included in the effects analysis, the effects of the alternatives are more evident in Management Area 3. A map of Management Area 3 can be found in Appendix A.

Temporal Scale

The temporal scope of the analysis is the life of the Land Management Plan. For cumulative effects, this analysis considers known past, present, and reasonably foreseeable future activities within the plan area over a 75-year period from 1960 to 2035. This period was selected to include the increase in the number of major infrastructure projects in the 1960s and 1970s and extends to 2035 because this date represents a reasonably foreseeable future for planning activities.

Past, Present, and Future Activities used in the Analysis

Past, present, and future activities included in the analysis include road construction, reconstruction, maintenance, and decommissioning. Information used to conduct the analysis largely comes from the INFRA module of the U.S. Forest Service's Natural Resource Manager Database. This database is a collection of web-based data entry forms, reporting tools, and geographic information system mapping tools that enables the Nez Perce-Clearwater to manage and report accurate information about constructed features and land units. Activities implemented by other entities that administer sections of roads within the National Forest System are not included in this database, with the exception of cost-share roads.

Adjacent road systems are maintained by Idaho Department of Transportation, Deer Creek Highway District, Whitebird Highway District, Idaho County Roads and Bridge Department, Kidder-Harris Highway District, Clearwater County Highway District, Clearwater County Roads and Bridge Department, North Latah County Highway District, Idaho Department of Lands, PotlatchDeltic, and other private entities. Effects from activities implemented by these other entities within the Nez Perce-Clearwater constitute a minor portion of the overall effects as the majority of the National Forest System roads are under the jurisdiction of the Forest Service.

For non-road infrastructure, routine and unplanned maintenance activities have occurred, are occurring, and will continue to occur. The scale of these activities on the Nez Perce-Clearwater is small and would be similar under all of the alternatives; therefore, effects from these activities was not analyzed in further detail.

Adjacent landowners include private lands, the PotlatchDeltic Real Estate Investment Trust, Western Pacific Timber LLC, Idaho Department of Lands, the Bureau Land Management, and other national forests. Adjacent Forest Service lands include the Payette National Forest, the Wallowa-Whitman National Forest, the Idaho Panhandle National Forest, the Lolo National Forest, the Salmon-Challis National Forest, and the Bitterroot National Forest. Changes in infrastructure initiated by these landowners that could have an effect on the Nez Perce-Clearwater infrastructure are mostly related to recreational use and timber harvesting activities.

Most roads on the Nez Perce-Clearwater were constructed during the 1960s through the 1980s. During this building era, more maintenance was also performed. Over time, maintenance levels have decreased due to reductions in funding and personnel, resulting in fewer miles of road being maintained annually and longer durations between maintenance activities for many of the roads. The rate of new road construction has slowed substantially, and new road construction is predominately limited to that needed for timber harvest access and road relocations for resource protection. The rate of road decommissioning has stayed largely consistent rate for the last several years.

Methods and Assumptions

INFRA data was used to determine the miles of Nez Perce-Clearwater National Forest System roads and their maintenance levels.

Geospatial analysis was used to identify the acreage of Nez Perce-Clearwater land within 1,600 feet of an existing road prism and the acreage of lands that are not within 1,600 feet of an existing road prism. This analysis assumes yarding timber harvest would be accomplished by widely available and commonly used equipment and was verified based on the 2014 to 2019 Timber Management activities and on the logging systems being utilized on the Nez Perce-Clearwater.

There is a direct correlation between the volume of commercial timber sale traffic generated from Forest Service management activities and volume of timber sold. Logging trucks hold roughly 5,000 board feet per truck, for a total weight of 80,000 pounds. Increases and decreases of volume sold would be proportionate to the number of logging trucks and other commercial traffic on the roadways.

The quantity of aggregate needed to maintain roads within timber management areas can also be determined by the volume of timber sold. The Forest Service evaluates the wear rates on forest roads every five years, which in turn indicates the volume of aggregate needed on the Nez Perce-Clearwater to replace aggregate that becomes worn out during timber management.

The wear rate calculated in 2018 was estimated to be 1 inch per 10 million board feet, varying by geologic parent material of the gravel, with basaltic and limestone gravels being more resilient than granitic gravels. Gravel pits on the Nez Perce-Clearwater are typically no larger than 5 acres, producing approximately 45,000 cubic yards of material each. Smaller staging areas of 2 to 4 acres are located across the Nez Perce-Clearwater for stockpiles of around 4,000 cubic yards of material at each location. A network analysis would need to be completed to estimate aggregate haul costs.

Increases and decreases in timber and fuels management activities could result in increases or decreases in Nez Perce-Clearwater or contracted personnel for management oversite, which would result in increases and decreases in needs for office, housing, and warehouse space. This would have an effect on how building resources are managed and would be addressed in the Facility Master Plan.

Measurement Indicators

The following measurement indicators were used in the road system effects analysis:

- Acres of Nez Perce-Clearwater lands that are within 1,600 feet from an existing road: This is an indicator of the likelihood of new road construction in an area. The 1,600-foot distance was selected as the evaluation distance, as most currently used yarding timber harvesting equipment has a maximum haul distance of around 1,600 feet. In areas that are beyond 1,600 feet from an existing road prism, new roads may be constructed to harvest timber in those areas.
- Acres of Recommended Wilderness: If new plan areas become designated as wilderness, there could be an impact on access. An access assessment would need to be conducted to determine where access to the wilderness would be provided. Roads within the wilderness could be cherry-stemmed or decommissioned and existing roads could be maintained or reconstructed, but no new road construction would occur in these areas.
- Acres of suitable for inclusion Wild and Scenic Rivers: If new plan areas become designated as Wild and Scenic River corridors, there could be an impact on the level of road maintenance, as these areas typically draw visitors and there would be more road use. It also could impact the availability of gravel for road resurfacing, as quality rock sources are often found adjacent to rivers and are located next to roads; however, aggregate pits typically are not allowed within a quarter mile of a Wild and Scenic River.
- Volume of timber to be sold as a surrogate for thousand board feet hauled: The volumes of timber proposed to be sold under the alternatives are used as a surrogate for the amount of hauling that would occur on the forest system roads. Higher amounts of hauling results in more wear on the aggregate surface and more road maintenance and aggregate would be needed, which could mean more gravel pits would be opened on the Nez Perce-Clearwater. Other effects

from higher haul rates include less public access on some roads during hauling and more required personnel, housing, office space, and vehicles to administer the timber harvest.

- Miles of roads maintained and improved: National Forest appropriations are allocated proportionally to the amount of timber management and recreational use on each Forest. Timber Management contracts include road maintenance responsibilities on haul routes to provide additional operators to perform road maintenance on National Forest System roads. Higher timber volumes result in more road maintenance and positive road modifications such as curve widening, improved sight distance, and replacement of failing or undersized culverts, which would be sized to pass flows from 100-year flood events.
- Under timber stewardship sales, watershed improvements can be accomplished, including installation of aquatic organism passage culverts; bridge improvements; additional gravel surfacing; and replacement of additional drainage structures with upsized culverts, retaining walls, landslide repairs; and forestwide road maintenance, such as road blading.
- Gravel surface replacement is currently accomplished on the Nez Perce-Clearwater using timber harvest receipts and approximately 25 percent of forest road maintenance is performed by timber purchasers. Roughly 23 percent of the road improvements for watershed benefits on the Nez Perce-Clearwater are a result of Timber Management and Stewardship receipts and another 50 percent is funded and supported by various partners, with the largest of those contributors being Bonneville Power Association and the Nez Perce Tribe.

Affected Environment

Existing Condition

National Forest System Roads

This section covers the development of the existing condition of the National Forest System roads that are under the jurisdiction of the Forest Service. They are wholly or partly within or adjacent to National Forest System lands. The Forest Service determines these roads are necessary for the protection, administration, and utilization of the National Forest System and for the use and development of its resources. Roads managed by public road agencies, such as states, counties, and municipalities that help provide access to National Forest System lands, are also informally considered part of the overall regional transportation system but do not fall under the jurisdiction or direction of the National Forest. These roads are not included in this evaluation.

During the 1960s through the 1980s, the National Forest Service road system expanded and resources were developed. Comprehensive area transportation plans began to be developed in the 1980s and continued through the 1990s. These plans provide a conceptual depiction of the road network necessary to access the identified land base for timber harvest. In general, these plans demonstrated that road densities ranging from 3 to 5 miles of road per section are necessary to access 50 to 70 percent of the land base. This density reflected using the full range of available harvest systems, including aerial systems.

A forest-scale roads analysis was completed by the Clearwater National Forest in 2002 and by the Nez Perce National Forest in 2005. The following were principal results of these analyses:

- Road maintenance funding is not adequate to maintain and sign roads to standard.
- Road access may not be adequate for future management needs.

- Management of the National Forest Service road system can impact cultural and traditional uses, such as plant gathering, access to traditional and cultural sites, and American Indian treaty rights.
- Some roads are causing adverse impacts.
- Existing roads may be needed for future management activities not currently planned.

One of the strategies adopted to address the lack of funding included the “ephemeral road system.” In this scenario, access would be developed to treat vegetation in accordance with disturbance regimes and then a portion of that access would be removed following treatment. Road densities of 1 to 3 miles per section, representing the main access routes, would be retained. Tertiary local roads would be removed through road decommissioning and reconstructed when treatments would be required again after regeneration.

On November 9, 2005, the Forest Service published the final rule “Travel Management: Designated Routes and Areas for Motor Vehicle Use” in the Federal Register. The 2005 Travel Management Rule requires National Forests to develop a minimum road system to accommodate resource needs. In 2015, a forest-level roads analysis was completed for the Nez Perce-Clearwater. This analysis established a minimum road system for arterial, collector, and important local class National Forest roads on the Nez Perce-Clearwater. This broad-scale analysis encompassed all existing National Forest System roads on the Nez Perce-Clearwater. The report provided an assessment of the road infrastructure and a set of findings and recommendations for revisions to the Nez Perce-Clearwater transportation system. The report provided information to Nez Perce-Clearwater managers regarding the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands.

The travel analysis report is used by the Nez Perce-Clearwater to prioritize maintenance needs and identify opportunities to decommission roads or put them into intermittent stored service as the Nez Perce-Clearwater works to identify the minimum number of routes needed for an efficient transportation system, as directed in 36 CFR § 212 subpart A.

The travel analysis report identified approximately 14 miles of National Forest System roads as “not likely needed for future use” that may be considered as candidates for conversion to another use, storage for future use, or removal through decommissioning. Other roads that were rated as “high risk” were identified as candidates for storage for future use, reconstruction, relocation of the road, or additional road maintenance. Roads considered “low risk” are the first to be considered for reduced road maintenance or a change to a lower maintenance level.

This same analysis indicated that, in 2015, the Nez Perce-Clearwater required $2,900,000 annually to maintain the open road system, which was well above the road budget at that time and well above current road budgets. Since the budgets are 33 to 50 percent lower than what is needed, other avenues of funding or reduced open road mileage need to be determined.

The travel analysis report and the Land Management Plan do not provide travel management decisions. Site-specific, project-level analysis under the National Environmental Policy Act is required to make travel management decisions, including road closure, storage, or decommissioning.

National Forest System Road Maintenance

National Forest System roads are designated by vehicle classifications and use design and maintenance standards for each road. Roads on the Nez Perce-Clearwater are generally constructed and maintained at a 14-foot width to allow for passage of most cars and trucks. Roads are typically constructed to grades of 10 percent or less to allow travel by most highway vehicles. The Forest

Service classifies maintenance of National Forest System roads by five levels, which are defined in Forest Service Handbook 7709.59, sec.62.32 and characterized in the “Guidelines for Road Maintenance Levels” (U.S. Department of Agriculture 2012a). These levels define the general design standards, uses, and associated type of road maintenance required. Road maintenance levels on the Nez Perce-Clearwater generally follow the definitions in the 2012 Guidelines for Road Maintenance Levels and are described below.

Of the approximately 7,682 miles of National Forest System roads on the Nez Perce-Clearwater, 3,799 miles, or 49 percent, of roads are operationally Maintenance Level 1 roads and are closed to all traffic; 2,003 miles, or 27 percent, are operationally Maintenance Level 2 roads and are suitable for high clearance vehicles; 1,572 miles, or 20 percent, are operationally Maintenance Level 3 roads and are suitable for passenger cars; 194 miles, or 3 percent, are operationally Maintenance Level 4 roads and are typically two lane gravel roads suitable for passenger cars; and 113 miles, or 2 percent, are operationally Maintenance Level 5 roads and are typically paved and suitable for passenger cars traveling at higher speeds.

Routine road maintenance work, such as brushing, blading, and ditch and culvert cleaning, is periodically performed on approximately 3,900 miles of Maintenance Level 2, 3, 4, and 5 roads as funding allows and, in most cases, they are kept in a drivable condition for their designed use. Annually, approximately 1,200 miles of road are maintained by force account, partners, and timber sales. The approximately 3,800 miles in Maintenance Level 1, which includes roads treated for intermittent stored service, do not receive routine maintenance work but may be maintained for resource protection.

Road Maintenance Level 1

Road Maintenance Level 1 includes roads that have been placed in storage for at least one year between intermittent uses. Basic custodial maintenance is performed to prevent damage to adjacent resources and to perpetuate the road for future resource management needs. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Maintenance Level 1 roads are not designated for motor vehicles as a road and are not shown as a road on the motor vehicle use map. They may be managed and designated as a motorized trail and shown on motor vehicle use maps as a motorized trail, and they may be available and suitable for non-motorized uses. Road entrances will be physically blocked or disguised, and culverts may be removed. Route markers should be installed but need not be visible from an open road at the entrance. Roads managed at this maintenance level are described as being in basic custodial care, which may include condition survey and mitigation measures for potential resource damage.

On the Nez Perce-Clearwater, Maintenance Level 1 roads may be taken out of storage for administrative use, at which time they are no longer Maintenance Level 1. These roads remain closed to public use but may be used by the Nez Perce-Clearwater and other authorized individuals during emergencies and to access the forest to conduct forest protection and management activities. The Nez Perce-Clearwater recognizes the travel Routes Data dictionary definition “roads receiving Level 1 Maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during times when open for traffic. However, while being maintained at Level 1, they are closed to vehicular traffic, but may be available and suitable for non-motorized uses” (U.S. Department of Agriculture 2009a).

Road Maintenance Level 2

Road Maintenance Level 2 includes roads that are open for use by high-clearance vehicles. Passenger car traffic, user comfort, and user convenience are not taken into consideration. Warning signs and traffic control devices are not provided with the exception that some signing, such as W-18-1 ‘No Traffic Signs,’ may be posted at intersections. Motorists should have no expectations of being alerted to potential hazards while driving these roads. Traffic normally is minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Maintenance Level 2 roads are maintained for use by high-clearance vehicles and log-haul but are not generally suitable for passenger cars (U.S. Department of Agriculture 2009b). Surface smoothness is not considered a priority and these roads may not be passable during periods of inclement weather. They have low traffic volume and low speed. Typically, they are local roads that connect to collectors and other local roads. They have water bars, drain dips, or cross drains as the preferred drainage treatments and the use of culverts, arches, and bridges is avoided when possible. These roads are subject to the requirements of Engineering Manual-7100-15 and the Manual on Uniform Traffic Control Devices for all signs. On the Nez Perce-Clearwater, these roads may be maintained at a higher level or reconstructed during forest management activities for a specified period of time for administrative and contractual use.

Road Maintenance Level 3

Road Maintenance Level 3 includes roads that are open and maintained for travel by a prudent driver in a standard passenger car during the normal season of use. User comfort and convenience are not considered priorities. Warning signs and traffic control devices are provided to alert motorists of situations that may violate expectations. They are typically single lane with turnouts visible from either direction or usually must be driven at low speeds. They may be local or collector roads and have low-to-moderate traffic volume. These roads typically connect to arterial and collector roads or other Maintenance Level 3 roads. They may include some dispersed recreation sites. Drainage is provided via a combination of drivable dips, culverts, arches, and bridges and these roads may have potholes or washboarding. These roads are subject to the requirements of Engineering Manual-7100-15 and the Manual on Uniform Traffic Control Devices for all signs.

Road Maintenance Level 4

Road Maintenance Level 4 includes roads that provide a moderate degree of user comfort and convenience at moderate travel speeds for prudent drivers in a standard passenger car during the normal season of use. Most roads are double lane and aggregate surfaced; however, some roads may be single lane with turnouts visible from either direction, and some may be paved. Roads in this maintenance level have moderate traffic volume and speeds. They usually are collectors and arterials and may connect to state and county roads and include some developed recreation areas. Drainage is provided primarily via culverts, arches, and bridges. These roads are subject to the requirements of Engineering Manual-7100-15 and the Manual on Uniform Traffic Control Devices for all signs.

Road Maintenance Level 5

Road Maintenance Level 5 includes roads that provide a high degree of user comfort and convenience for prudent drivers in a standard passenger car during the normal season of use. These roads are normally double lane, paved facilities, although some may be aggregate surfaced sections and may be dust abated. These roads have a smooth road surface, are often paved or chip-sealed with lane striping and have defined shoulders. Maintenance Level 5 roads inspire confidence in the traveler that hazards will be few and identified well in advance and the roadway is visually pleasing. They have high traffic volume and speeds and typically connect to state and county roads. These roads are usually an arterial or collector and they may include some developed recreation roads. Drainage is provided via culverts, arches, and bridges. These roads are subject to the requirements of Engineering Manual-7100-15 and the Manual on Uniform Traffic Control Devices for all signs.

Road Decommissioning and New Road Construction

As shown in Table 340 for the Clearwater National Forest and Table 341 for the Nez Perce National Forest, the total number of roads on the Nez Perce-Clearwater has been steadily decreasing since 1999. A total of about 1,625 miles of National Forest System roads and non-National Forest System roads have been decommissioned during this time. Most of this decommissioning took place on the non-system roads that were legacy roads from former timber harvest practices, which are no longer needed for new harvest techniques, and roads in unstable terrain or with failing drainage structures. However, there have been additions to National Forest System roads during this time as well. These additions include the construction of approximately 46 miles of new roads for vegetation, special uses, recreation management, and watershed improvements by moving roads away from sensitive stream habitats. Most of the increases are due to the need for better located roads that provide for a more stable, less impacting road system.

Table 340. Miles of roads decommissioned from 1999 to 2018.

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Miles	127.8	67.3	92.0	42.7	41.9	156.9	29.6	55.0	52.1	114.4
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Miles	127.0	138.3	90.1	154.9	194.4	97.4	60.5	65	30	46

Table 341. Miles of roads constructed from 1999 to 2018.

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Miles	13.62	2.33	.65	0.5	.45	0.38	0	2.08	0	0
Year	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Miles	1.58	1.13	0	4	6.6	9.88	0.13	2.4	0.1	0

Road Traffic, Visitor Use, and Access

Systematic road use data has not been collected on the Nez Perce-Clearwater for over 15-years; therefore, variability in road use was difficult to determine. Traffic count and visitor count data collected during three sampling events is documented in the following reports: the 2012 Engineering Analysis of Motorized Mixed Use, the 2014 Mixed Use Analysis Report, and the 2016 National Visitor Use Monitoring Report (U.S. Department of Agriculture 2018g).

National Visitor Use Monitoring Program data from the 2016 recreational use sampling event indicates there were approximately 763,000 visitors to the Nez Perce-Clearwater. Assuming every three visitors had a vehicle, then roughly 254,000 vehicles traveled on the Nez Perce-Clearwater annually, or between 700 to 1,200 vehicles per day forestwide. The range of 200 to 365 days was used to calculate the number of vehicles per day.

National Visitor Use Monitoring Program data correlates to road count data collected during the mixed-use analysis on main arterial roads taken over several weekends in 2011 and 2014, where the average daily count was 1,030 and 680, respectively. Of those counts, roughly 91 to 94 percent of the traffic was off-highway vehicle, passenger, or light pickup traffic (Mixed Use Analysis reports, 2012 and 2014). No fire suppression activity was recorded on the roads during the motorized mixed-use analysis.

Road and Trail Bridges

There are approximately 176 road bridges and 85 trail bridges under the jurisdiction of the Forest Service within the Land Management Plan area. Of the 176 road bridges, 169 are highway legal load bridges, 6 are weight-restricted, and 1 is closed due to travel management and condition. The

National Bridge Inspection Standards require all highway bridges on public roads to be rated for all legal loads and unrestricted routine permit loads, and they must be posted if there are any weight restrictions. Bridges are not usually posted if they have the capacity to carry the legal loads for posting described in the Manual for Condition Evaluation of Bridges or the Guide Manual for Condition Evaluation and Load and Resistance Factor Rating (LRFR) of Highway Bridges (AASHTO, 2003).

Prior to 2018, Forest Service policy required inspections to be performed every two years on every bridge under Forest Service jurisdiction. On June 8, 2018, the Federal Highway Administration issued risk-based, routine inspection interval implementation guidance that state transportation departments, federal agencies, and tribal governments can use as an alternate approach to Technical Advisory 5140.21 dated September 16, 1988, which was historically used to address the extended routine inspection interval. When state transportation departments, federal agencies, and tribal governments elect to use the 2018 guidance, they must submit their risk assessment criteria and a summary report to the Federal Highway Administration for approval.

Any new, rehabilitated, or structurally modified bridge should receive an initial inspection, be in service for at least 24 months, and receive its next routine inspection before establishing a risk-based, routine inspection interval. The assessment must be reviewed after each routine inspection to set the next inspection interval.

Trail bridges on the Nez Perce-Clearwater are generally inspected every five years by the Forest Service.

Facilities

The management of buildings and other structures is prescribed under Forest Service Manual 7310. Forests are mandated to develop a facilities master plan as a guide to facilities planning. The Nez Perce-Clearwater completed an updated Facility Master Plan in February 2018.

Administrative facilities are typically buildings and their appurtenances necessary to support the employees, equipment, and activities necessary for the management of the National Forests. Administrative facilities are separate from recreation facilities. Administrative facilities include fire stations, lookouts, offices, warehouses, communication towers, and shops as well as living quarters, such as barracks and individual residences. Living quarters are partially supported by rental receipts, while administrative and other facilities are financially supported through annual budget appropriations.

The Supervisor’s Office which serves the Nez Perce-Clearwater Forest is in Kamiah, Idaho. There are six ranger district offices within the Nez Perce-Clearwater: Palouse Ranger District in Potlatch, Idaho; North Fork Ranger District in Orofino, Idaho; Lochsa Ranger District in Kooskia, Idaho; Salmon River Ranger District near White Bird in Slate Creek, Idaho; Red River Ranger District in Elk City, Idaho; and Moose Creek Ranger District near Lowell, Idaho. Other major administrative building sites within the plan area include the Grangeville Air Center, Grangeville Dispatch, and Grangeville Office Annex.

There are approximately 487 Forest Service-owned administrative buildings within the Nez Perce-Clearwater, of which 261 are classified as being in poor condition. The rehabilitation or replacement of existing forest facilities that do not meet current operational standards and the disposal of those facilities that are considered surplus to the forest operational needs is a focus for the Nez Perce-Clearwater. The 2018 Nez Perce-Clearwater Facility Master Plan identifies 224 buildings to be retained for existing use, 6 buildings to be repurposed, 109 buildings to be retained for an alternate use, 148 buildings to be decommissioned, and 1 building to be acquired. There are four leased buildings within the plan area, which are the two former Supervisor's Offices and associated warehouses in Orofino, Idaho and Grangeville, Idaho. There are many historic buildings within the Land Management Plan area, including several sites that are listed on the National Register of Historic Places. See the Cultural Resources Section for further description of these properties.

Additional facilities within the Nez Perce-Clearwater include 12 work centers, 4 guard stations, and 39 lookouts. The Nez Perce-Clearwater also manages 13 drinking water systems and 20 wastewater systems for these work sites.

Airstrips

Public airstrips on the Nez Perce-Clearwater are considered infrastructure and are a segment of the transportation system. There are seven airstrips on the Nez Perce-Clearwater that are available for public use: Cayuse at Cayuse Creek in the North Fork drainage, Dixie at Dixie Guard Station, Fish Lake in the Lake Creek drainage of the Lochsa River, Moose Creek along the Selway River at Moose Creek Guard Station, Orogrande along Crooked River, Shear Airstrip along the Selway River at Shear Guard Station, and Wilson Bar along the Salmon River. The Fish Lake, Moose Creek, and Shear airstrips are located within the Selway-Bitterroot Wilderness and are managed as wilderness airstrips. Wilson Bar is managed as a Wild and Scenic River airstrip.

Dams

There are two dams within the Nez Perce-Clearwater plan area. Both are classified as low hazard dams and are not currently being operated.

- Erickson Dam is located on Erickson Creek, which is a tributary to the South Fork of the Clearwater River. It is an earthen dam with a height of 20 feet and normal storage of 8 acre-feet. It currently has no functioning outlet controls. The closest downstream community from Erickson Dam is Elk City, Idaho, which is approximately 10 miles away.
- Upper Bear Dam is in the Selway-Bitterroot Wilderness on Bear Creek, which is a tributary to the Selway River. It is an earthen dam with a height of 13 feet and normal storage of 82 acre-feet. It currently has no functioning outlet controls and has a condition index of 38. The closest downstream community from Upper Bear Dam is Lowell, Idaho, which is over 70 miles away.

These dams are inspected by the Nez Perce-Clearwater. The Idaho Department of Water Resources also inspects Erickson Dam.

Environmental Consequences

Effects Common to All Alternatives

Under all alternatives, including the No Action Alternative, effects to road bridges, facilities, airstrips, and dams would be similar: Road bridges within the Nez Perce-Clearwater would continue to be inspected and maintained or closed, if needed, due to condition in accordance with resource needs and access management direction. Facilities within the Land Management Plan area would be maintained or decommissioned in accordance with the Nez Perce-Clearwater Facility Master Plan. The seven existing airstrips would be maintained in serviceable condition and available for public use. The two existing dams would continue to be inspected. Removal or breaching of these dams should be considered if the action is deemed appropriate for resource enhancement since the dams are not currently used nor needed.

Road, bridge, and both recurrent and deferred facility maintenance would continue to occur, as funding allows. Physical conditions would continue to be addressed through maintenance activities and be based on public health and safety, resource protection, and mission priorities. Light detection and ranging remote sensing information has been used to verify and correct road data and to detect unclassified non-system roads. These non-system roads and roads with a history of high erosion or instability would continue to be evaluated for addition to the road system or decommissioning.

Annual operating budgets and supplemental funding would likely fluctuate, resulting in varying maintenance accomplishments from year to year. State and local government agencies with road management authority are expected to continue to maintain their existing road network within the Nez Perce-Clearwater. Some changes, such as widening, resurfacing, and bridge replacements, are probable but are dependent on budgets and funding allocations.

Timber harvest would continue to maintain roads within vegetative units. Stewardship sales and partners would continue to provide additional funds for stream habitat improvements for roads and bridges. Commercial traffic, such as timber hauling, can be expected to fluctuate to some degree depending on vegetation management activities. Market conditions and other external factors often influence activity levels. These traffic conditions are usually limited to relatively small geographic areas and short periods of time. Hauling occurs more often during the summer months but is not uncommon during the winter months.

The natural fire regimes would remain in a state of departure from the desired vegetation condition and the potential for uncontrolled wildfire to affect road and trail bridges, buildings, communication sites, and other infrastructure would continue to increase. Protection from fire for these improvements would continue to be needed and may increase as the forest condition continues in departure from the desired vegetation condition.

Access across the Nez Perce-Clearwater is influenced by a variety of factors. Given the mixed land ownership, including state lands and corporate timberlands, in and around the Nez Perce-Clearwater and the ongoing management actions taken on these lands, new access may arise through cooperative and cost-share agreements. Changes in ownership of private lands could result in continued requests for road access across National Forest System lands. Depending on the circumstances, these may be requests for Nez Perce-Clearwater or private road special-use authorizations. New access to National Forest System lands may be created, depending on the terms and conditions written into any new authorizations.

In Management Area 1, which comprises Wilderness, Wild and Scenic Rivers, and National Historic Landmark Areas, it is unlikely new roads would be constructed as such an action would require a change in the national designations of the Wilderness and National Historic Landmark areas. In addition, Wild and Scenic Rivers are by nature thinner and more difficult to locate additional roads. In Management Area 2, which includes lands within Idaho Roadless Areas, recommended wilderness areas, suitable wild and scenic rivers, parts of the Gospel Hump Geographic Area, and proposed and designated Research Natural Areas, there could be some decrease in road miles where access would be reduced, but roads could be relocated in Wild and Scenic River corridors for resource management. In Management Area 3, which includes the rest of the Nez Perce-Clearwater and consists of the areas with the majority of existing roads, trails, and structures, new road construction is anticipated to occur under all alternatives, with the highest levels of new construction under Alternatives W and X. New and relocated roads should be designed to minimize impacts to sensitive areas and optimize landing locations for harvesting equipment.

The following sections describe effects of the alternatives on National Forest System roads, which would vary under each alternative. Table 342 summarizes the anticipated effects between the alternatives for Nez Perce-Clearwater Forest System Roads.

Effects to No Action Alternative

Under the No Action Alternative, effects to roads would result from continued implementation of the 1987 Clearwater and Nez Perce Forest Plans. The geospatial analysis of the Nez Perce-Clearwater road system under the current forest plans indicates that 1,009,700 acres, or 83 percent, of the 1,217,682 acres in Management Area 3 are within 1,600 feet of a roadway and could be harvested from existing roads; therefore, a minor amount of additional roads for timber management may need to be constructed to access that acreage under implementation of the No Action Alternative.

Under the No Action Alternative, 1,139,059 acres would remain as designated Wilderness in Management Area 1 and an additional 197,695 acres of Wilderness are recommended. The Recommended Wilderness areas would continue to be managed as Idaho Roadless Areas with uses that would not preclude them from future Wilderness designation. The recommended Wilderness areas would be managed with no non-conforming uses, which means there would be no new road construction within that acreage and existing roads may be cherry-stemmed or decommissioned.

Under the No Action Alternative, 57,891 acres would remain as designated Wild and Scenic River and an additional 155,477 acres would be recommended for Wild and Scenic River designation. Wild and Scenic River corridors would continue to be managed under their approved river plans.

Under the No Action Alternative, the average annual timber volume that is anticipated to be sold is approximately 50 to 60 million board feet, which corresponds to roughly 12,330 commercial vehicles traveling the Nez Perce-Clearwater roads annually. The timber volume sold, and the subsequent commercial vehicle use, is anticipated to result in a need for replacement of around 18,800 cubic yards of aggregate material annually. This means an additional aggregate pit would need to be developed or an existing pit redeveloped annually.

The average annual timber harvest would cover roughly 1,200 acres of the approximately 1,489,736 acres in Management Area 2 and 2,600 acres of the approximately 1,217,682 acres in Management Area 3. Most of the road maintenance and commercial road use would be concentrated in those timber harvesting areas. Arterial and collector routes would need to be analyzed for improvements to a higher road maintenance management level. Roughly 25 percent of all road maintenance would be completed with funds from those sales.

The No Action Alternative would provide the current level of funding and options for performing road maintenance on the Nez Perce-Clearwater. As the amount of timber sold is directly proportional to the amount of funding National Forests receive, the lower rate of timber sold under the No Action Alternative would result in fewer miles of road being maintained and improved compared to the action alternatives.

Effects that Vary by Action Alternative

Alternative W

The geospatial analysis of the Nez Perce-Clearwater road system, under the current forest plans, indicates that 1,035,819 acres, or 84 percent, of the 1,238,906 acres in Management Area 3 is within 1,600 feet of a roadway and could be harvested from existing roads; therefore, additional roads for timber management may need to be constructed to access that acreage under implementation of Alternative W.

Under Alternative W, 1,139,059 acres would remain as designated Wilderness in Management Area 1 and an additional 856,933 acres would be recommended for Wilderness designation. The recommended Wilderness areas would be managed with no non-conforming uses, which means there would be no new road construction within that acreage and existing roads may be cherry-stemmed or decommissioned.

Under Alternative W, 57,891 acres would remain as designated Wild and Scenic River and an additional 64,587 acres would be recommended for Wild and Scenic River designation. This means road use could increase within that acreage, thereby increasing road maintenance needs, and new aggregate pit locations may be reduced, thereby reducing the amount of aggregate available for road resurfacing in these areas.

Under Alternative W, the average annual timber volume that is anticipated to be sold is approximately 215 to 241 million board feet, which corresponds to roughly 44,000 to 48,000 commercial vehicles traveling the Nez Perce-Clearwater roads annually. This would result in an average increase from about 12,330 to 46,100 commercial vehicles on the Nez Perce-Clearwater roads annually. This would almost quadruple the amount of commercial traffic on the roads. It would also require approximately 78,000 cubic yards of aggregate to be generated, which would be an increase of approximately 59,200 cubic yards annually. This means an additional one to two aggregate pits would need to be developed annually.

The average annual timber harvest would be roughly 800 acres of the approximately 1,468,512 acres in Management Area 2 and 11,800 acres of the approximately 1,238,906 acres in Management Area 3. The majority of the road maintenance and commercial road use would be concentrated in those timber harvesting areas. Arterial and collector routes would need to be analyzed for improvements to a higher road maintenance management level. Roughly 60 percent of all road maintenance would be completed with funds from those sales.

Alternative W would provide a higher level of funding and options for performing road maintenance on the Nez Perce-Clearwater. As the amount of timber sold is directly proportional to the amount of funding National Forests receive, the higher rate of timber sold under Alternative W would result in more miles of road being maintained and improved.

Alternative X

The geospatial analysis of the Nez Perce-Clearwater road system under the current forest plans indicates that 1,038,332 acres, or 83 percent, of the 1,244,330 acres Management Area 3 are within 1,600 feet of a roadway and could be harvested from existing roads; therefore, additional roads for timber management may need to be constructed to access that acreage under implementation of the No Action Alternative.

Under Alternative X, 1,139,059 acres would remain as designated Wilderness in Management Area 1, and no additional acres would be recommended for Wilderness designation. Roads would continue to be managed under the Idaho Roadless Area Rules.

Under Alternative X, 57,891 acres would remain as designated Wild and Scenic River, and no additional acres would be recommended as Wild and Scenic Rivers. Areas adjacent to non-designated rivers would remain available for aggregate supply, unless precluded by other circumstances.

Under Alternative X, the average annual timber volume that is anticipated to be sold is approximately 247 million board feet, which corresponds to roughly 50,200 commercial vehicles traveling the Nez Perce-Clearwater roads annually. This would more than quadruple the amount of commercial traffic on the roads. The timber volume sold, and the subsequent commercial vehicle use is anticipated to result in a need for replacement of around 86,000 cubic yards of aggregate material annually. This means an additional two or more aggregate pits would need to be developed annually.

The average annual timber harvest would be roughly 1,400 acres of the approximately 1,463,088 acres in Management Area 2 and 12,600 acres of the approximately 1,243,330 acres in Management Area 3. Most of the road maintenance and commercial road use would be concentrated in those timber harvesting areas. Arterial and collector routes would need to be analyzed for improvements to a higher road maintenance management level. Roughly 62 percent of all road maintenance would be completed with funds from those sales.

Alternative X would provide the highest level of funding and options for performing road maintenance on the Nez Perce-Clearwater. As the amount of timber sold is directly proportional to the amount of funding National Forests receive, the higher rate of timber sold under Alternative X would result in more miles of road being maintained and improved.

Alternative Y

The geospatial analysis of the Nez Perce-Clearwater road system under the current forest plans indicates that 1,017,009 acres, or 83 percent, of the 1,219,951 acres in Management Area 3 are within 1,600 feet of a roadway and could be harvested from existing roads; therefore, additional roads for timber management may need to be constructed to access that acreage under implementation of the No Action Alternative.

Under Alternative Y, 1,139,059 acres would remain as designated Wilderness in Management Area 1 and an additional 309,332 acres would be recommended for Wilderness designation. The recommended wilderness areas would be managed with no non-conforming uses, which means there would be no new road construction within that acreage and existing roads may be cherry-stemmed or decommissioned.

Under Alternative Y, 57,891 acres would remain as designated Wild and Scenic River and an additional 99,120 acres would be recommended for Wild and Scenic River designation. This means road use could increase within that acreage, thereby increasing road maintenance needs, and aggregate pit locations may be reduced, thereby reducing the amount of aggregate available for road resurfacing.

Under Alternative Y, timber outputs would be around 150 million board feet annually resulting in an average increase of commercial vehicle traffic from 12,00 to 28,000 on the Nez Perce-Clearwater roads annually. This would more than double the amount of commercial traffic on the roads. The timber volume sold, and the subsequent commercial vehicle use is anticipated to result in a need for replacement of around 45,000 cubic yards of aggregate material annually, which would be an increase of approximately 27,000 cubic yards annually. This means one additional aggregate pit would need to be developed annually.

The average annual timber harvest would be roughly 1,400 acres of the approximately 1,487,467 acres in Management Area 2 and 6,100 acres of the approximately 1,219,195 acres in Management Area 3. Most of the road maintenance and commercial road use would be concentrated in those timber harvesting areas. Arterial and collector routes would need to be analyzed for improvements to a higher road maintenance management level. Roughly 46 percent of all road maintenance would be completed with funds from those sales.

Alternative Y would provide moderately increased funding and options for performing road maintenance on the Nez Perce-Clearwater. As the amount of timber sold is directly proportional to the amount of funding National Forests receive, the moderately increased rate of timber sold under Alternative Y would result in more miles or road being maintained and improved.

Alternative Z

The geospatial analysis of the Nez Perce-Clearwater road system under the current forest plans indicates that 1,032,491 acres, or 84 percent, of Management Area 3 is within 1,600 feet of a roadway and could be harvested from existing roads; therefore, some additional roads for timber management may need to be constructed to access that acreage under implementation of the No Action Alternative.

Under Alternative Z, 1,139,059 acres would remain as designated Wilderness in Management Area 1 and an additional 474,659 acres would be recommended for Wilderness designation. The recommended wilderness areas would be managed with non-conforming uses, which means there would be new recreational uses; however, there would be no new road construction within that acreage and existing roads may be cherry-stemmed or decommissioned.

Under Alternative Z, 57,891 acres would remain as designated Wild and Scenic River and an additional 145,976 acres would be recommended for Wild and Scenic River designation. This means road use could increase within that acreage, thereby increasing road maintenance needs, and aggregate pit locations may be reduced, thereby reducing the amount of aggregate available for road resurfacing.

Under Alternative Z, timber outputs would be around 80 million board feet annually resulting in an average increase of commercial vehicle traffic from 12,000 to 14,000 on the Nez Perce-Clearwater roads annually. This would increase the amount of commercial traffic on the roads. It would also require a volume of aggregate generated to be 20,500 to 24,000 cubic yards, which would be an increase of approximately 4,000 cubic yards annually. This means no additional aggregate pits would need to be developed annually.

The average annual timber harvest would be roughly 1,200 acres of the approximately 1,472,540 acres in Management Area 2 and 4000 acres of the approximately 1,234,879 acres in Management Area 3. Most of the road maintenance and commercial road use would be concentrated in those timber harvesting areas. Arterial and collector routes would need to be analyzed for improvements to a higher road maintenance management level. Roughly 25 percent of all road maintenance would be completed with funds from those sales.

Alternative Z would provide a higher but comparable level funding to the No Action Alternative for performing road maintenance on the Nez Perce-Clearwater. As the amount of timber sold is directly proportional to the amount of funding National Forests receive, the lower rate of timber sold under Alternative Z would result in fewer miles or road being maintained and improved.

Preferred Alternative

For the Preferred Alternative, the geospatial analysis of the Nez Perce-Clearwater road system under the current forest plans indicates that 1,009,700 acres, or 81 percent, of the 1,240,340 acres in Management Area 3 are within 1,600 feet of a roadway and could be harvested from existing roads; therefore, a minor amount of additional roads for timber management may need to be constructed to access that acreage under implementation of the Preferred Alternative.

Under the Preferred Alternative, 1,231,638 acres would remain as designated wilderness in Management Area 1 and an additional 258,210 acres of wilderness are recommended in Mallard-Larkins, Hoodoo, and Meadow Creek. The recommended wilderness areas would continue to be managed as Idaho Roadless Areas with uses that would not preclude them from future wilderness designation. Two non-conforming uses would be allowed in the recommended wilderness areas: (1) Maintenance of existing buildings and currently available recreational rentals will remain, and (2) The use of chainsaws by administrative personnel, and through agreement by partners, for the maintenance of trails. A cherry stem will be recommended to maintain access on Elk Mountain Road, Forest Road 285.

The plan includes an objective to remove all other non-conforming uses within five years of the record of decision. The use and maintenance of Black Mountain Lookout will be impacted with the Mallard Larkins recommended wilderness area. This designation could create additional difficulties in staffing, maintenance, and repair of the lookout.

Under the Preferred Alternative, 57,891 acres would remain as designated wild and scenic rivers. An additional 61,849 acres would be recommended for wild and scenic river designation. Therefore, road use could increase within that acreage, thereby increasing road maintenance needs, and new aggregate pit locations may be reduced, thereby reducing the amount of aggregate available for road resurfacing in these areas.

Under the Preferred Alternative, 10 percent more motorized summer recreation opportunity spectrum area and 21 percent more motorized winter recreation opportunity spectrum area will be delineated. There would be a reduction in summer and winter non-motorized areas. This will likely not impact the road, building, or airstrip infrastructure very much, except for at trail heads. Trail heads will likely need to be made larger to accommodate more trailer traffic. It could cause additional mixed use of vehicles sizes that will need to be addressed when and where issues arise.

Under the Preferred Alternative, the average annual timber volume that is anticipated to be sold is approximately 190 to 210 million board feet, which corresponds to roughly 40,000 commercial vehicles traveling on Nez Perce-Clearwater roads annually. This would nearly quadruple the amount of commercial traffic on the roads compared to 2018. The timber volume sold, and the subsequent commercial vehicle use, is anticipated to result in a need for replacement of around 69,000 cubic yards of aggregate material annually. This means an additional one to two aggregate pits would need to be developed or redeveloped annually.

The average annual timber harvest acreage would be roughly 8,825 to 10,000 acres of the approximately 1,463,088 acres in Management Area 2 and 1,243,330 acres in Management Area 3. Most of the road maintenance and commercial road use would be concentrated in those timber harvesting areas. Arterial and collector routes would need to be analyzed for improvements to a higher road maintenance management level. Roughly 60 percent of all road maintenance would be completed with funds from those sales.

Cumulative Effects

Under the No Action Alternative, the incremental cumulative effects on roads would be minimal as the amount of new road construction, decommissioning, and maintenance activities that would occur during the planning timeframe would be very small compared to the overall Nez Perce-Clearwater road system. Roads would continue to be upgraded to the PACFISH and INFISH standards as roadwork is implemented. This means existing culverts would be upsized to pass 100-year flood events.

Under Alternative W, the road system would be used for timber management more extensively, which could result in more temporary area closures for public safety during haul periods; therefore, public access to those areas could be reduced. Public access could further be reduced due to closures for fuels management activities and for wildlife management. Higher timber harvest would also result in more temporary roads, which could have a cumulative effect on aquatic resources.

Like Alternative W, under Alternative X the road system would be used for timber management more extensively, which could result in more temporary area closures for public safety during haul periods; therefore, public access to those areas could be reduced. Public access could further be reduced due to closures for fuels management activities and for wildlife management. Higher timber harvest would also result in more temporary roads, which could have a cumulative effect on aquatic resources.

Under Alternative Y, the road system would be used for timber management somewhat extensively, which could result in temporary area closures for public safety during haul periods; therefore, public access to those areas could be reduced. Public access could further be reduced due to closures for fuels management activities and for wildlife management. Moderately higher timber harvest would also result in more temporary roads, which could have a cumulative effect on aquatic resources.

Under Alternative Z, the incremental cumulative effects on roads would be minimal as the amount of new road construction, decommissioning, and maintenance activities that would occur during the planning timeframe would be very small compared to the overall Nez Perce-Clearwater road system. Designation of additional Wild and Scenic Rivers would further reduce the locations where gravel pits could be located.

Under the Preferred Alternative, the road system would be used somewhat extensively for timber management, which could result in temporary area closures for public safety during haul periods; therefore, public access to those areas could be reduced. Public access could further be reduced due to closures for fuels management activities and for wildlife management. Moderately higher timber harvest would also result in more temporary roads, which could have a cumulative effect on aquatic resources.

Effects to Resource from Other Resources

Air Quality

Air quality impacts on infrastructure are expected to be minimal under all alternatives. If the Nez Perce-Clearwater were to become a non-attainment area within the planning timeframe, mechanized construction equipment would be subject to emissions reduction requirements. This could result in increased costs for infrastructure projects due to the cost of installing emissions reduction devices. If new or modified industrial facilities get proposed within the Land Management Plan area, the facilities would be subject to the Forest Service's air permit review process to ensure that air emissions will not adversely impact air quality related values of federally protected wilderness areas.

Carbon Storage

Management of carbon storage is not expected to impact infrastructure on the Nez Perce-Clearwater under any of the alternatives due to the scale of forest biomass compared to the footprint of existing and anticipated forest infrastructure.

Climate Change

Effects from climate change on infrastructure should be considered during infrastructure planning and maintenance activities under all alternatives. Culverts may need to be sized larger to handle increased flow volumes during spring runoff events and bridge structures may require more scour protection. Consideration should be given to locating facilities at higher elevations above streams and rivers to avoid flooding. Roads may be closed or relocated due to the potential for damage during high flow events. Seasonal closures may need to be adjusted to protect roads from traffic damage during wet conditions.

Cultural and Heritage

Effects from cultural and heritage resources on infrastructure would occur under all alternatives. Infrastructure listed or eligible to be listed on the National Register of Historic Places is subject to the National Historic Preservation Act and modifications to or demolition of these resources requires consultation with the State Historic Preservation Office. Requirements to protect viewsheds may limit where new infrastructure is constructed.

Ecology (other than fire ecology)

The general health of the forest has the potential to affect infrastructure under all alternatives. Trees killed by disease and pests could fall and block culverts and roads. Under Alternatives W and X, the forest vegetative desired condition would be achieved sooner, in 30- and 20-years respectively, than under Alternatives Y and Z, which would be in 50- and 100-years. The Preferred Alternative would achieve the vegetative desired condition in 35 to 40 years.

Economic Sustainability

Economic sustainability is anticipated to have little to no effect on infrastructure under all alternatives. Forest system roads provide access to economical sustainable resources Under Alternatives W and X, which would have higher timber output, economic sustainability would be higher, and more road construction, maintenance, and reconditioning would likely occur.

Fire Management

Fire management could have a protective effect on infrastructure as it would reduce the likelihood of events that could damage infrastructure. Fuels management activities, such as prescribed burning and fire suppression actions, are likely to continue under all alternatives. Administrative use of gated roads that normally prohibit motor vehicle use is likely when these management activities occur. Roads in road Maintenance Level 1 storage may be opened to facilitate suppression actions. These roads would likely be used for the duration of suppression efforts and post-fire work and then returned to their previous status. Suppression efforts should continue to provide structure protection to bridges, buildings, and communication sites.

Fisheries

Watershed improvement activities are likely to continue under all alternatives. The consequences to motor vehicle access to implement watershed improvements are expected to be minimal. Activities that would occur on roads that are generally not designated for motor vehicle use are treatments to reduce sediment production and transport sediment to surface waters or to provide for aquatic organism passage. Actions taken might include culvert removal, out-sloping of road prisms, or the removal of unstable fills. Watershed treatments will continue to be completed on roads that are designated for motor vehicle use and may result in traffic delays or temporary road closure of open roads while construction occurs.

Numerous Land Management Plan components related to infrastructure are designed to minimize the transport of sediment from roads to waterbodies. Generally, these Land Management Plan components would not affect the public use of roads except for the decommissioning of roads, which may restrict motorized travel depending on the site-specific decision. Road conditions on existing roads would have improved conditions through proper best management practices and maintenance and decommissioned roads would have improved hydrologic conditions due to the disconnection of the road from the stream system. See the following plan components for additional details: FW-DC-ARINF-01, FW-STD-ARINF-01, FW-STD-ARINF-02, FW- STD-ARINF-03, FW-STD-ARINF-07, FW-GDL-ARINF-01, FW-GDL-ARINF-02, FW-GDL-ARINF-03, FW-GDL-ARINF-04, FW-GDL-ARINF-06, FW-GDL-ARINF-07, FW-GDL-ARINF-08, FW-GDL-ARINF-09, FW-GDL-ARINF-10, and FW-GDL-ARINF-10.

Forest Products (other than timber)

The collection of forest products is not anticipated to affect infrastructure as existing infrastructure is generally used and these activities are expected to be low impact.

Invasive Species

Effects from invasive species on infrastructure could occur under all alternatives. If aggregate pits become infested with weeds, the pit would have to be closed and the area treated for invasives. The availability of certified weed-free straw for erosion and sediment control could limit construction activities or methods.

Lands and Lands Special Uses

Pursuit of easements and rights-of-way needs to continue to ensure continued access to Nez Perce-Clearwater roads. Lands special uses are not anticipated to influence infrastructure under any of the alternatives, as they do not permit uses of the infrastructure.

Livestock Grazing

Grazing is not anticipated to influence infrastructure at current levels. Increased levels of livestock grazing could have an effect, as roads could be damaged by heavier livestock traffic.

Management Area Allocations

Management Area 3 contains the most development. The alternatives for Management Area 2 could influence some roads. These effects would be site specific and depend upon road and wilderness recommendations regarding cherry-stemming of roadways, access for lookouts, and trail access.

Minerals

Proposals for exploration and development are regulated by existing mining law. Access and long-term or temporary road development are often associated with mineral exploration and development, but a site-specific analysis would be required prior to any approval for exploration or development activities.

If any mine reclamation activities occur, they would likely, but not always, use existing roads. These may be roads that are not currently designated for motor vehicle use. They would likely be used for the duration of the reclamation work and then returned to their previous status. New roads, trails, or other types of access may be approved for a proposed mining operation as long as the proposal is incident to mining and within the scope of the next logical phase of mining development and would be subject to a site-specific analysis.

The availability of suitable gravel for aggregate surfacing could affect the amount of road maintenance the Nez Perce-Clearwater can accomplish under all alternatives as quality rock sources on the Nez Perce-Clearwater are limited.

Rare Plants

The presence of rare plants or suitable habitat for those species could affect the location of new infrastructure under all alternatives. These resources would be identified during project level surveys and modifications to infrastructure design or location may be required to avoid or minimize impacts to rare plants.

Recommended Wilderness

Existing infrastructure within recommended wilderness would need to be assessed prior to wilderness designation and the need for access would have to be evaluated. Access to fire lookouts is anticipated to be maintained for public safety and resource protection. The need for access to other locations would need to be evaluated. Existing roads within the boundary of the proposed wilderness may be reduced to wilderness access points, such as cherry-stemmed or decommissioned.

Research Natural Areas

It is unlikely that there would be changes to infrastructure from research natural areas under any of the alternatives as these areas are typically devoid of infrastructure to protect the integrity of these sites.

Roadless Areas

There are roads within the Idaho Roadless Areas which serve as area boundaries. Since most of the proposed wilderness areas are in current Idaho Roadless areas, road management could change if the area becomes designated wilderness. If designated, a road system analysis would be needed to determine whether those roads stay open or are closed.

Scenery

The management of landscape character and scenic integrity objectives could affect the location of new infrastructure under all alternatives. These resources would be identified during project level surveys and modifications to infrastructure design or location may be required to avoid or minimize impacts to scenery.

Social Sustainability

Social sustainability is a complex issue and is related to firewood and food harvest, timber harvesting jobs, and livestock grazing on the Nez Perce-Clearwater. Timber harvest is addressed in the alternatives analysis and the other components of social sustainability are not anticipated to affect infrastructure as existing infrastructure is generally used, and these activities are expected to be low impact. There is local interest in historic infrastructure on the Nez Perce-Clearwater, which contributes to the social identity of the surrounding communities. Some of these historic buildings and structures may need the support of volunteer groups to be maintained for public enjoyment.

Soils

Soils could affect infrastructure under all alternatives. Landslides are a common occurrence on the Nez Perce-Clearwater, and unstable slopes slough above roads, causing soils and other debris to clog ditches and culverts, which in turn can cause damage to roads.

Suitable Wild and Scenic Rivers

Designation of additional Wild and Scenic Rivers and inclusion of additional eligible Wild and Scenic Rivers on the Nez Perce-Clearwater would likely affect infrastructure. Under Alternatives W, Y, and Z, aggregate pits would not be developed within a quarter mile of designated and eligible Wild and Scenic Rivers. As quality aggregate is often found near rivers, this could reduce the availability of suitable material for road resurfacing.

Sustainable Recreation

Recreation and access management and roads and motorized trails management would affect infrastructure under all alternatives, as it could change the level of road and facility maintenance. Movement towards the sustainable recreation concept could result in more partnerships and reduced financial burden on the Nez Perce-Clearwater.

Timber

Commercial timber harvest activities will generally result in road maintenance and reconstruction and the continued application of best management practices on existing National Forest System roads. New road construction is likely to be limited; temporary road construction would be used more commonly to meet short-term access needs. Administrative use of gated roads that normally prohibit motor vehicle use yearlong is likely when management activities, such as pre-commercial thinning, invasive weed treatments, or other noncommercial silvicultural treatments, are planned.

Under the No Action Alternative and Alternative Z, timber outputs would be lower and there would be less road maintenance since most road maintenance is accomplished through timber sales and road maintenance is funded from the sale activity. Under Alternatives W and X, timber harvest would be higher, which would result in more road maintenance as roads used for timber harvest would be maintained and, in some cases, reconstruction would be available to the public following completion of harvest. Under Alternative Y, there would be a moderate amount of timber harvest, which would result in an intermediate level of road maintenance. The Preferred Alternative should yield a higher level of maintenance than the existing condition and Alternative Z.

Water Resources

The following proposed forestwide standards, objectives, and guidelines would affect infrastructure under all alternatives:

FW-STD-RMZ-02. Staging of vehicles or heavy equipment, refueling, and fuel storage shall be located outside of riparian management zones to avoid water contamination. If no other location is appropriate and refueling or storage is needed within riparian management zones, locations must be approved by the Timber Contracting Officer, Contracting Officer, or their designee and have an approved spill containment plan.

FW-STD-RMZ-03. Herbicides, pesticides, and other toxicants and chemicals shall only be applied within riparian management zones when the activity does not retard attainment of aquatic and riparian desired conditions.

FW-STD-RMZ-05. Trees felled for safety shall be retained onsite unless more than what is needed to achieve aquatic and riparian desired conditions. Trees shall be directionally felled towards or into streams, where it is safe and practical to do so. If aquatic and riparian desired conditions for wood are met at the site, surplus wood can be transported to other aquatic and riparian restoration project sites. Exceptions to this standard are allowed in developed recreation and administrative sites where needed to address concerns for human safety or infrastructure and when not practicable to leave on site.

FW-GDL-RMZ-07. To reduce sediment delivery to streams during or after fire suppression activities, disturbed areas in riparian management zones, such as firelines, drop-points, camps, roads, and trails, should be restored by actions such as scattering slash piles, replacing logs and boulders, scarifying soils, re-contouring terrain, and reseeding with native species.

FW-STD-ARINF-04. New, replacement, and reconstructed stream crossing sites, such as culverts, bridges, and other permanent stream crossings, shall accommodate at least the 100-year flow, including associated bedload and debris.

FW-STD-ARINF-06. In fish bearing streams, construction, reconstruction, or replacement of stream crossings shall not impair passage of any life stages of native aquatic organisms, unless barriers are desired to maintain or prevent spread or invasion of non-native species in alignment with fish management agencies.

FW-GDL-ARINF-03. To reduce the risk of sediment delivery from gully formation or mass wasting when closing travel routes such as roads, skid trails, and temporary roads with physical barriers such as berms, drainage features should be left in a condition that will function without any maintenance for the planned duration of the closure.

FW-GDL-ARINF-07. To reduce sediment delivery from maintenance activities, such as road blading and snow plowing, avoid sidecasting into streams. Care should be taken when plowing snow so as not to include road soil. Breaks should be incorporated in the snow berms to direct water off the plowed surface.

FW-GDL-ARINF-11. Culverts and bridges in fish bearing and perennial streams should allow for passage of fish and other aquatic and riparian dependent species through the establishment of banks inside or beneath the crossing structure and mimicking the natural channel features, unless precluded by site characteristics such as bedrock or high channel gradient.

The watershed restoration program would have an effect on infrastructure as it would identify road and human use related issues on the watershed conditions. The program would work to identify and minimize human effects to the watershed by activities, such as, but not limited to, road decommissioning, road improvements, road relocation, bridge or culvert replacements, water quality improvements like stock pond relocation, abandoned mine land reclamation, additional toilet installation, and sediment controlling settling ponds. Increased timber harvest could provide additional funds for such projects through stewardship funds or projects that would improve water quality and provide for more road maintenance.

Tribal Trust Responsibilities

Tribal treaty rights would continue to be honored and all legally mandated trust responsibilities would continue to be fulfilled to the extent that they are determined to be applicable to National Forest System lands on the Nez Perce-Clearwater. Effects from tribal treaty rights on infrastructure are not anticipated under any of the alternatives.

Vegetation

Vegetation could have an effect on infrastructure under all alternatives. If vegetation can grow into the road prism or over infrastructure, the facility could become unsafe and unusable. Under all alternatives, it is expected that vegetation management would be implemented to ensure facilities remain free of nearby vegetation to protect these structures. Vegetation is expected to encroach on some Maintenance Level 1 roads, which would result in reduced drivability. Annual road maintenance, including brushing to remove roadside vegetation, would continue to occur under all alternatives.

Wildlife

Wildlife could influence roads within the Nez Perce-Clearwater under all alternatives as some roads may be closed for elk security and other wildlife needs.

Summary of Consequences

Table 342 contains a summary of potential plan consequences by alternative.

Table 342. Infrastructure summary of consequences by alternative

Measurement Indicator	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Acres within 1,600 feet existing roads	1,009,717	1,035,819	1,038,332	1,017,009	1,032,491	1,009,700
Relative number of new and temp roads	lower	higher	higher	moderate	lower	Higher
Acres recommended wilderness	197,695	856,933	0	309,332	474,659	258,210
Acres suitable wild and scenic river	155,477	64,587	0	99,120	145,976	61,849
Average annual timber volume (MMBF)	55	228	237	133	65	200
Annual commercial traffic counts	9800–14,800	44,000–48,000	48,000–52,000	26,000–30,000	12,000–16,000	38,000–42,000
Cubic yards aggregate for roads	17,000–20,000	74,000–82,000	82,000–89,000	42,000–48,000	21,000–24,000	65,000–72,000
Additional pits required annually	0	1–2	2	1	0	1–2

Measurement Indicator	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Percent roads maintained from timber sales	25	60	62	45	30	Still working
Miles of road maintained or improved	1200	1900	2000	1400	1250	Still working

3.4.5 Land Ownership and Land Uses

This report addresses land ownership administration and adjustments and lands special uses of National Forest System lands on the Nez Perce-Clearwater. The management of National Forest System land includes the surveying and marking of boundaries; acquisition and exchange of lands; handling of title claims and encroachments; acquisition of rights-of-way; and authorization and management of special uses to protect resource values and the interests of the federal government.

Adjustments of land ownership can occur through congressionally mandated or discretionary conveyances, exchanges, and acquisitions. The objectives of the Forest Service land ownership adjustment program (Forest Service Manual 5402) are to:

- achieve the optimum land ownership pattern to provide for the protection and management of resource uses to meet the needs of the nation now and in the future;
- avoid land use conflicts with non-federal landowners by settling land claims equitably and promptly; and
- provide resource administrators readily accessible and understandable title information affecting the status and use of the lands and resources they administer.

Land occupancy and use by private parties and other government entities is managed through the issuance of special-use authorizations, such as permits, term permits, leases, and easements. Authorized special uses on the Nez Perce-Clearwater include industrial or commercial uses, private uses, and a variety of recreational uses.

All occupancy, use, or improvements on National Forest System lands that are not directly related to timber harvest, grazing, mining activities, and recreation are referred to as “non-recreation special uses.” Typically, non-recreation special uses include uses such as roads, utilities, storage facilities, communications sites, research, and commercial filming. Use and occupancy of National Forest System lands may be authorized when such use is determined to be in the public interest.

Relevant Laws, Regulations, and Policy

Federal Laws

The following is a select set of the statutory authorities that govern landownership adjustments and the issuance and administration of special-use authorizations on the Nez Perce-Clearwater. They are briefly identified and described below to provide context to the management and evaluation of these resources. There are multiple other laws, regulations, and policies not described below that also guide the management of these programs; see Forest Service Manuals 2700, 5400, and 5500 for a comprehensive listing.

Laws and Executive Orders

Organic Administration Act of June 4, 1897 (16 U.S.C. 477-482, 551): This act authorizes the Secretary of Agriculture to issue rules and regulations for the occupancy and use of the National Forests. This is the basic authority for authorizing use of National Forest System lands for other than rights-of-way.

Preservation of American Antiquities Act of June 8, 1906 (16 U.S.C. § 431 et seq.): This act authorizes permits for archeological and paleontological exploration involving excavation, removal, and storage of objects of antiquity or permits necessary for investigative work requiring site disturbance or sampling that results in the collection of such objects.

Occupancy Permits Act of March 4, 1915 (16 U.S.C. § 497 et seq.), as amended: This act authorizes use and occupancy on National Forest System lands for recreational purposes, including resorts and recreation residences.

General Exchange Act of March 20, 1922 (16 U.S.C. 485, 486): This act authorized the Forest Service to consolidate its holdings in National Forests where a large percentage of private lands are intermingled with national forest lands. It makes possible the exchange of inholdings within national forests for private lands of equal value and within the same state.

Section 7 of the Granger-Thye Act of April 24, 1950 (16 U.S.C. 490, 504, 504a, 555, 557, 571c, 572, 579a, 580c-5801, 581i-1): This act authorizes special-use permits not to exceed 30-years in duration for the use of structures or improvements under the administrative control of the Forest Service and for the use of land in connection without acreage limitation.

Highway Act of August 27, 1958 (23 U.S.C. 317), supplemented by the Act of October 15, 1966 (49 U.S.C. 1651): This act authorizes the Federal Highway Administration to grant easements to states for highways that are part of the federal-aid system or that are constructed under the provision of Chapter 2 of the Highway Act. The Forest Service consents to the grant of these easements in a form agreed upon by the two agencies and upon the state highway agency's execution of stipulations. This is the only authority for granting rights-of-way for projects on the federal-aid system or projects constructed under the provisions of Chapter 2 of the Highway Act (Forest Service Manual 2731).

Wilderness Act of September 3, 1964 (16 U.S.C. 1131-1136): This act establishes requirements for special use authorizations in designated wilderness areas for temporary structures, commercial public services, and access to valid mining claims and non-federal lands. Under this act, Presidential approval is necessary for the establishment of new water facilities, power projects, and transmission lines. Except for the Alaska National Interest Lands Conservation Act of December 2, 1980, this act is the exclusive authority for rights-of-way occurring within designated wilderness areas.

Land and Water Conservation Fund Act of September 3, 1964, as amended (16 U.S.C. 4601-6a(c)): Section 4(c) of this act authorizes permits for recreation, such as group activities, organized events, motorized recreational vehicle use, and other specialized recreation activities of limited duration.

National Forest Roads and Trails Act of October 13, 1964 (16 U.S.C. 532-38): This act authorizes the Secretary of Agriculture to grant temporary or permanent easements to landowners who join the Forest Service in providing a permanent road system that serves lands administered by the Forest Service and lands or resources of the landowner. It also authorizes the grant of easements to public road agencies for public roads that are not a part of the federal-aid system (Forest Service Manual 2732).

Sisk Act of December 4, 1967, as amended (16 U.S.C. 484a): This act authorizes the exchange of lands with states and local governments.

Act of November 16, 1973 (30 U.S.C. 185): This act, amending Section 28 of the 1920 Mineral Leasing Act, authorizes the Forest Service to issue authorizations for oil and gas pipelines and related facilities located wholly on National Forest System land. When the land is under the jurisdiction of two or more federal agencies, authority for issuance is reserved to the United States Department of the Interior's Bureau of Land Management, subject to approval by the agencies involved.

Endangered Species Act of 1973 (16 U.S.C. 1531-1536, 1538-1540): This act provides for the conservation of endangered and threatened species and their habitats.

Federal Land Policy and Management Act of October 21, 1976 (43 U.S.C. 1761-1771): Title V of the Federal Land Policy and Management Act authorizes the Secretary of Agriculture to issue permits, leases, or easements to occupy, use, or traverse National Forest System lands. The Federal Land Policy and Management Act directs the United States to receive fair market value unless otherwise provided for by statute and provides for reimbursement of administrative costs in addition to the collection of land use fees (43 U.S.C. 1764(g)).

Alaska National Interest Lands Conservation Act of 1980 (16 U.S.C. 3210): The Alaska National Interest Lands Conservation Act (ANILCA) provides numerous authorities related to access that are specific to National Forests in Alaska. The provisions of section 1323(a) (16 U.S.C. 3210) of this act, however, apply to all National Forest System lands. This section provides that, subject to terms and conditions established by the Secretary of Agriculture, the owners of non-federal land within the National Forest System shall be provided adequate access to their land. Regulations implementing section 1323(a) are set forth in 36 CFR § 251, subpart D—Access to Non-Federal Lands. See Forest Service Manual 2701.3, paragraph 3, for the summary of the provisions of 36 CFR § 251, subpart D.

Small Tracts Act of January 12, 1983 (16 U.S.C. 521c-521i): This act authorizes the sale, exchange, or interchange of certain parcels of minimal size.

National Forest Ski Area Permit Act of 1986 (16 U.S.C. 497b): This act authorizes the Secretary of Agriculture to issue permits for ski areas and other snow sports and recreational uses on National Forest System lands.

Act of May 26, 2000 (16 U.S.C. 406l-6d): This act supplements the authority of the Secretary of Agriculture to regulate commercial filming and still photography on National Forest System lands. It also authorizes the Secretary to retain and spend land-use fees collected for commercial filming and still photography without further appropriation and provides for recovery of administrative and personnel costs in addition to the collection of the land use fee.

Federal Lands Recreation Enhancement Act of 2004 (16 U.S.C. 6801-6814): This act authorizes the Forest Service to charge standard and expanded amenity recreation fees and to require and charge fees for special recreation permits. Fee revenues may be retained and spent by the Forest Service in accordance with the act's requirements.

Cabin Fee Act of December 22, 2014 (16 U.S.C. 3193, 6901, 6201): This act directs the Forest Service to modify the Recreation Residence Program, as the program applies to units of the National Forest System derived from the public domain by implementing a simple, equitable, and predictable procedure for determining cabin user fees.

Code of Federal Regulations (CFR): The following regulations provide direction for the management of special uses on National Forest System lands:

- 36 CFR § 251— Land Uses, subparts A: Miscellaneous Land Uses; B: Special Uses; C: Appeal of Decisions Relating to Occupancy and Use of National Forest System Lands; D: Access to Non-Federal Lands; and E: Revenue-Producing Visitor Services in Alaska.
- 36 CFR § 254 — Landownership Adjustments, Subparts A: Land Exchanges; B: National Forest Town sites; C: Conveyance of Small Tracts.

Policy

The Lands Ownership and Adjustments program references the following policy manual and handbook direction:

- Forest Service Manual (FSM) 5400 (Landownership); Forest Service Handbook (FSH) 5409.13 (Land Acquisition Handbook); 5409.17 (Rights-of-Way Acquisition Handbook)
- FSM 5500 (Landownership Title Management); FSH 5509.11 (Title Claims, Sales, and Grants Handbook)
- The Lands Uses program references the following policy manual and handbook direction:
- FSM 2700 and FSH 2700 – Special Uses Management

Methodology

Spatial Scale

The effects analysis boundary for this report is the current number of acres administered by the Nez Perce-Clearwater, chosen due to the fact that potential project actions that may be considered within both the lands adjustment and lands uses programs will only be considered on National Forest System lands.

Temporal Scale

The time frame considered for the analysis of lands and lands uses is 15 years, as this is the anticipated time frame and expected life of the Land Management Plan.

Methods and Assumptions

The number of acres of National Forest System lands currently administered by the Nez Perce-Clearwater and the number of special-use authorizations currently issued were compared to potential changes that might result from implementation of any of the alternatives considered.

The aggregate number of acres in each alternative, as well as the management area description and direction for these acres, may have an impact on the lands adjustment and lands uses resource.

This is due to the assumptions that:

- if fewer acres of land are available for management, there may be fewer opportunities to provide lands uses authorizations for commercial and private entities; and
- the type of management area direction mix decided upon for National Forest System acres may impact or influence the numbers and types of lands uses authorizations that could be available for various entities.

Therefore, there may be a change in the types of uses authorized and the location of uses based on the suitability components for the various land allocations. The analysis will look at the number of special use authorizations administered, the types of uses authorized, and the location of the uses compared to potential changes that may result from implementation of the alternatives, such as existing and potential future uses that may not be suitable in recommended wilderness, backcountry areas, and other special areas.

Information sources

The Forest Service uses the Land Status Record System (LSRS) as the repository for all realty records and land title documents. The LSRS includes accurate information on ownership acreages, condition of title, administrative jurisdiction, rights held by the United States, administrative and legal use restrictions, encumbrances, and access rights on land or interests in land in the National Forest System.

The Forest Service uses the Special-Uses Database System (SUDS) to create and administer special-use authorizations. This data is supported by hard-copy files held at the Ranger District and Forest Supervisor’s Offices.

Measurement Indicators

Key indicators that will be looked at through this report include:

- Potential change to acres of National Forest System land administered – Land Adjustments and Lands Uses
- Potential change to the number of special use authorizations – Lands Uses

Affected Environment

Existing Condition

The Nez Perce-Clearwater currently contains 4,072,798 acres of land within its proclaimed boundary. Of that land, 3,935,456 acres are National Forest System lands in federal ownership and managed by the Forest Service. 137,342 acres within the proclaimed boundary are non-National Forest System lands managed by entities other than the Forest Service, such as other federal agencies, state or local governments, and private owners.

Public lands are generally retained in federal ownership to provide long-term values. The vision for the planning area is to retain in public ownership all lands currently under its administration that meet the long-term needs of maintaining the integrity of contiguous natural ecosystems, river frontage, riparian areas and wetland ecosystems, recreation and open space, scenery, clean air and water, and habitat for plant and animal populations. Through the methods available to the agency, the Forest Service acquires lands or mineral estates that enhance this vision. Lands or mineral estates that do not meet these needs may be disposed of using the limited authority available for the disposal of National Forest System lands. In all such cases, the primary guiding principle would be the greater public benefit.

Adequate access to public lands allows the Forest Service and the public to both enjoy and effectively manage National Forest System lands. Where access is inadequate to allow for the administration of National Forest System lands, the Forest Service actively pursues acquiring the needed access rights from non-National Forest System landowners.

Management of National Forest System lands on the Nez Perce-Clearwater is important to protect the public's estate interest in its national forest. Surveying and posting the national forest boundary, maintaining posted property lines, and defending public lands from trespass or encroachment are activities that maintain the integrity of the National Forest System.

The Nez Perce-Clearwater administers multiple types of non-recreation lands uses authorized by permits, term-permits, leases and easements ranging from research activities to more extensive uses such as water systems, communications facilities, roads, and utilities. Over half of the 389 currently issued land use authorizations are for transportation purposes, such as highways and roads for private land access, and water systems serving private property, such as ditches and water lines. Table 343 summarizes the types of use on the Nez Perce-Clearwater and the number of authorizations issued.

Table 343. Lands Uses Authorizations (Use codes 200-999)

Type of Use	Use codes	Number of authorizations
Agriculture	211-241	7
Community and Public Information Meetings	311-374	15
Feasibility, Research, Training, Cultural Resources, and Historical Feasibility	411-452	3
Industry	511-541 and 561-595	23
Energy and Gas Transmission	611-644	13
Transportation	711-771	227
Communication Uses	800-899	36
Water, Water Transmission	911-951	65
Total	**n/a**	**389**

Information taken from Special Uses Database System as of February 12, 2019

Environmental Consequences

Effects from No Action Alternative

The No Action Alternative identifies that there will be no changes to existing land management direction with implementation of the Land Management Plan. The Nez Perce-Clearwater will continue to accept and evaluate new requests for lands uses authorizations and evaluate the re-issuance of existing uses across the Nez Perce-Clearwater. The existing mix of congressionally designated areas, other protected areas, and general forest lands will remain the same as currently exists. With that, the Nez Perce-Clearwater will continue evaluating uses requests following screening criteria as outlined in applicable policy (36 CFR 251.54).

With this said, the No Action Alternative has slightly fewer acres allocated to the managed front-country lands found in Management Area 3 as compared to the action alternatives. Therefore, it can be expected that there may be slightly more lands use authorizations granted as the majority of existing uses are located within what would be classified as Management Area 3 lands.

Effects from Alternative Y

Alternative Y identifies the potential implementation of one item that would have an effect on the existing special use authorizations that are in the Pilot Knob Geographic Area. Currently, Pilot Knob is being used, in part, as an active communication site for a variety of uses, including both private and commercial mobile radio service.

Alternative Y identifies that existing communication site authorizations will be phased out as leases and permits expire and no new authorizations will be approved throughout the life of the Land Management Plan. Implementation of these steps would result in existing communication site lease and permit holders being required to remove their facilities from the Pilot Knob site. Furthermore, it is likely that current lease and permit holders would still require their current level of communication capability and request placement of these facilities at different locations, very likely on National Forest System lands.

Effects Common to Action Alternatives

Under all action alternatives, proposals for new land uses would be screened according to policy (36 CFR 251.54) and the authorized uses would be managed with terms and conditions that protect Nez Perce-Clearwater resources. New proposals for some special uses, such as power lines and communication towers, may not be suitable in protected and other special areas. Based on acreage land allocations in Management Area 3, Alternative Y would have the least number of acres that are suitable for lands uses, followed by Alternative Z, then W, then the Preferred Alternative, and then X (Refer to Management Area acres table in Chapter 2). It is important to note, however, that the amount of acreage typically suitable in Management Area 3 for issuance of lands uses authorizations varies very little among each of the action alternatives.

Alternatives that identify higher levels of Recommended Wilderness have the potential to reduce the number of lands uses authorizations that are granted. While this acreage is only *recommended* for Wilderness designation, if some of this land is eventually congressionally designated, the Nez Perce-Clearwater would be much less likely to issue lands uses authorizations in protected areas.

Similarly, alternatives that identify higher levels of Suitable Wild and Scenic Rivers also have the potential to reduce the number of lands uses authorizations that are granted. This is due to the understanding that potential Wild and Scenic River designation may result in some level of restrictions that would make it less likely to issue various lands uses authorizations.

Action alternatives will not impact the land ownership adjustment and boundary programs in a predictable way. Action alternatives identify different management strategies for existing National Forest System lands, whereas the land adjustment and boundary programs focus on the interaction with and interface between National Forest System and non-National Forest System lands. Access acquisition may be expected to increase with increased acreage being actively managed in Management Area 3; however, the relationship between access acquisition and management is highly specific to the conditions of the local area.

Cumulative Effects

The Nez Perce-Clearwater can expect requests for lands special-use authorizations to increase. As more private land is subdivided, an associated increase in requests for lands uses authorizations, such as road access and utilities, may result. Use of federal lands to facilitate energy transmission outlined within the Energy Policy Act of 2005 will likely continue to be an emphasis area to assist with the enhancement of these services to the American public. As technological advances, such as broadband

and fiber optic cable, are made, requests for modification of existing authorized communications sites and approval of new communication uses can reasonably be expected.

As human population increases expected trends include a greater use of National Forest System lands by the public, particularly those areas close to population centers. There is also expected to be more development of private lands adjacent to forest and on private inholdings within the forest boundary. Private access needs will likely increase. This may also result in challenges from other landowners to existing and perceived access to National Forest System lands, as private landowners are becoming more reluctant to grant easements. Access, in general, across all National Forest System lands is becoming more difficult to obtain. This is expected to continue.

Effects to Resource from Other Resources

Management Area Allocations

The slight variation of acreage in each alternative by management area allocation may have minor indirect and cumulative impacts to the lands and lands uses resource and are described in detail above.

Recommended Wilderness

The slight variation of Recommended Wilderness acreage identified by alternative may have minor indirect and cumulative impacts to the lands and lands uses resource.

Timber

The significant deviation with the amount of timber harvest identified by alternative may have minor indirect and cumulative impacts to the lands and lands uses resource. With the potential for new or enhanced road access due to timber harvest, the alternatives with higher amounts of harvest will have the potential to increase requests for access to adjacent private property.

There will be no indirect or cumulative impacts to the lands and lands uses resources from the following resource areas:

- Air Quality
- Carbon Storage
- Climate Change
- Cultural Heritage
- Designated Areas
- Ecology (other than fire ecology)
- Economic Sustainability
- Fire Management
- Fisheries
- Forest Products
- Infrastructure
- Invasive Species
- Livestock Grazing
- Minerals
- Rare Plants
- Research Natural Areas
- Roadless Areas
- Scenery
- Social Sustainability
- Soils

- Suitable Wild and Scenic Rivers
- Sustainable Recreation (including developed and dispersed recreation)
- Watershed (including watershed management and the watershed restoration program)
- Tribal Treaty Rights
- Vegetation
- Wildlife

Summary of Consequences

Table 344 includes of summary of potential plan consequences by alternative.

Table 344. Land ownership and land uses summary of consequences by alternative (Alt)

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Potential change to acres of National Forest System land administered (Lands and Lands Uses)	No change	No change	No change	No change	No change	No change
Potential change to the number of special use authorizations (Lands Uses)	Highest potential for fewer lands use authorizations to be issued – due to less Management Area 3 acreage	Equal potential for more lands use authorizations to be issued – due to more Management Area 3 acreage than in the No Action Alternative	Equal potential for more lands use authorizations to be issued – due to more Management Area 3 acreage than in the No Action Alternative	Equal potential for more lands use authorizations to be issued – due to more Management Area 3 acreage than in the No Action Alternative	Equal potential for more lands use authorizations to be issued – due to more Management Area 3 acreage than in the No Action Alternative	Equal potential for more lands use authorizations to be issued – due to more Management Area 3 acreage than in the No Action Alternative

3.5 Production of Natural Resources

3.5.1 Timber

The Nez Perce-Clearwater contains valuable timber resources that provide products in demand by the American public, such as lumber, house logs, and pulpwood. Timber harvest may be used to supply timber products and moves vegetation towards desired conditions and meets other resource objectives, such as improving watershed condition, improving wildlife habitat, and restoring fire regimes. Timber harvest also provides jobs and income in logging and manufacturing of wood products.

Other special forest products include plant materials, such as firewood, that are gathered from National Forest System lands. Timber and other forest products are analyzed at a scale that comprises the National Forest System lands administered by the Nez Perce-Clearwater.

Timber harvest and timber production were raised as issues during public scoping, including desires to increase or decrease the amount of harvest, lands suitable for timber production, and volume outputs over time, as well as concerns for the impacts of harvest on other resources and a desire to limit this use.

Changes between draft and final environmental impact statement

Multiple changes were made for the FEIS; however, all changes are within the scope of the DEIS analysis, and address issues that the public has had an opportunity to comment on. This section details the key changes between the draft and final analysis for timber resources. See the forestlands section also, as the modeling changes between these resources are interconnected.

Analysis was added for the Preferred Alternative. With respect to timber resources, this alternative is similar to all action alternatives W, X, Y and Z, with one distinction being in the objective functions used in the timber scheduling model (PRISM), as described in this report and Appendix B. A minimum value for long term sustained yield was incorporated into the PRISM runs for the Preferred Alternative.

- Incorporated “coarse woody debris retained” metric as a measurement indicator for use in evaluating the effectiveness of each action alternative to achieve desired conditions and to correlate sustainability of harvest measurement indicator to long term site productivity.
- Incorporated the preferred alternative into the analysis of; lands suitable for timber production, forest products availability, long term sustainability of harvest levels, effects of climate change on timber production, wood product supply including projected timber sale quantity and projected wood sale quantity, and the number of acres treated to achieve desired conditions. In addition, all action alternatives were updated to incorporate changes in management area boundaries resulting from updated GIS analysis of recommended wilderness boundaries.
- Updated PRISM and SIMPPLLE model analysis to incorporate the preferred alternative and changes to plan components.
- Updated consequences section to incorporate changes in plan components associated with other resources.

Definitions and metrics compared for alternatives

The metrics for estimating timber volume outputs have changed from the 1982 Planning Rule which guided the current plans and the No Action Alternative, and those defined in the 2012 Planning Rule, which guide the action alternatives. The metrics defined in 1987 for the current forest plans are disclosed to describe the No Action Alternative. However, the No Action Alternative was also included in the modeling to calculate the metrics, as defined in the 2012 Planning Rule. The timber volume metrics from both planning rules and associated directives are defined as follows:

- Long-term sustained yield capacity, which applies to the No Action Alternative, is the highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives (36 CFR, 219.3 1982).
- Allowable sale quantity, which applies to the No Action Alternative, is the quantity of timber that may be sold from the area of suitable land covered by the Land Management Plan for a time period specified by the plan. This quantity is usually expressed on an annual basis as the “average annual allowable sale quantity” (36 CFR, 219.3 1982).
- Sustained yield limit, which applies to the action alternatives and does not vary by alternative, is the amount of timber meeting applicable utilization standards, which can be removed from a forest annually in perpetuity on a sustained-yield basis. It is the volume that could be produced in perpetuity on lands that may be suitable for timber production. Calculation of the limit includes volume from lands that may be deemed not suitable for timber production after further analysis during the planning process. The calculation of the sustained yield limit is not limited by land management plan desired conditions, other plan components, or the planning unit’s fiscal

capability and organizational capacity. The sustained yield limit is not a target but is a limitation on harvest, except when the plan allows for a departure.

- Projected wood sale quantity, which applies to the action alternatives, is the estimated quantity of timber and all other wood products that is expected to be sold from the plan area for the plan period. The projected wood sale quantity consists of the projected timber sale quantity, as well as other woody material such as fuelwood, firewood, or biomass. The projected wood sale quantity includes volume from timber harvest for any purpose based on expected harvests that would be consistent with the plan components. It is also based on the planning unit's fiscal capability and organizational capacity. It is not a target nor a limitation on harvest.
- Projected timber sale quantity, which applies to the action alternatives, is the estimated quantity of timber meeting applicable utilization standards that is expected to be sold during the plan period. As a subset of the projected wood sale quantity, the projected timber sale quantity includes volume from timber harvest for any purpose from all lands in the plan area based on expected harvests that would be consistent with the plan components. The projected timber sale quantity is also based on the planning unit's fiscal capability and organizational capacity. The projected timber sale quantity is not a target nor a limitation on harvest.
- Suitability of lands determines the appropriateness of various lands within a plan area for various uses or activities based on the desired conditions applicable to those lands. The terms "suitable and suited" and "not suitable and not suited" can be considered the same.
- Land that may be suitable for timber production refers to a preliminary classification in the process of determining lands that are suited for timber production. This preliminary classification excludes National Forest System lands that are not suitable for timber production based on the factors identified in 36 CFR 219.11(a)(1)(i), (ii), (iv), (v), and (vi); the preliminary classification is made prior to the consideration of the factor at 36 CFR 219.11(a)(iii), which identifies suitability based on objectives and desired conditions established by the plan for those lands.

Based on these definitions, the long-term sustained yield capacity and sustained yield limit can be seen as somewhat analogous but differ in what lands are included in the calculation and whether other multiple-use resource direction is considered. Long-term sustained yield capacity is based on lands deemed suitable for timber production and considers multiple-use resource objectives, whereas sustained yield limit is based on all lands that may be suitable for timber production, regardless of land allocation decisions. Similarly, allowable sale quantity and projected wood sale quantity are somewhat analogous but also differ in that projected wood sale quantity includes volumes from all lands, whereas allowable sale quantity only includes volumes from lands suitable for timber production. Further, allowable sale quantity was the maximum that could be produced, whereas projected wood sale quantity is not a limitation but is only an estimate. Therefore, it is not appropriate to compare the measures estimated using the 1982 Planning Rule directly against the measures calculated based on the 2012 Planning Rule and associated directives.

Timber suitability for the No Action Alternative was also updated to account for additional regulation and policy that changed the management situation since 1987, such as the designation of inventoried roadless areas. This was important to ensure that the depiction of the No Action Alternative accurately reflects what the management situation would be if this alternative were selected. As with timber volume outputs, this also allows for a direct comparison to the suitability determinations made for the action alternatives.

Relevant Laws, Regulations, and Policy

Federal Laws

Multiple-Use Sustained Yield Act of 1960: This act states that "it is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed and wildlife, and fish purposes…The Secretary of Agriculture is authorized and directed to develop and administer the renewable surface resources of the national forests for multiple-use and sustained yield of several products and services obtained there from…the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land."

Forest and Rangeland Renewable Resources Planning Act of 1974 and **National Forest Management Act of 1976:** These acts set forth the requirements for Land and Resource Management Plans for the National Forest Service.

Organic Administration Act of 1897: This act established National Forests "to improve and protect the Forest within the boundaries, or for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States."

Agency Regulations

36 CFR 219: The procedures of the 2012 National Forest System Land and Resource Management Planning Rule require the identification of areas suitable for timber production and the amount of timber which can be removed annually on a sustained-yield basis. In addition, the procedures require the analysis of the supply and demand situation for resource commodities.

36 CFR 223 – Sale and Disposal of National Forest System Timber, Special Forest Products, and Forest Botanical Products: This regulation allows that trees, portions of trees, and other forest products on National Forest System lands may be sold for the purpose of achieving the policies set forth in the Multiple Use Sustained Yield Act, as amended, and the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended.

36 CFR 223.239 – Free Use by Individuals: This regulation provides regulations for free-use without a permit for members of Tribes with treaty or other reserved rights related to special forest products.

36 CFR 223.243 – Indian Tribes with Valid Treaty or other Reserved Rights: This regulation provides rules regarding harvest of special forest products by Tribes with treaty or other reserved rights.

36 CFR 261.6 – Timber and Other Forest Products: This regulation lists activities regarding timber and other products that are prohibited.

Policy

Forest Service Handbook 1909.12, Chapter 60: This policy sets forth the procedures for identification of lands as not suitable or suitable for timber production and methods for determining the sustained yield limit, the projected wood sale quantity, and the projected timber sale quantity.

State and Local Plans

Clearwater County Community Wildfire Protection Plan

Idaho County Natural Resources Plan

The Idaho County Natural Resources Plan, with respect to timber resources, focuses on forest vegetation restoration and a sustained flow of commodities from National Forest System lands. This plan also focuses on the need for resilient forests, actively managing lands that are classified as suitable for timber production and expresses concern over lands being lost to timber production and timber harvest. To determine consistency with the plan for timber resources, alternatives will be analyzed by the extent to which they provide a sustainable flow of timber products and maintain or increase the amount of land suitable for timber production and timber harvest. The extent to which forested vegetation is restored and resilience is increased will be analyzed in the Forestlands section.

Idaho County Wildland-Urban Interface Wildfire Mitigation Plan

Benewah County Natural Resources Plan

Latah County Community Wildfire Protection Plan

Shoshone County Fire Mitigation Plan

Methodology

Spatial Scale

Timber suitability was mapped using the best available geospatial information available. Lands that may be suitable for timber production were determined based on the factors required by National Forest Management Act and the 2012 Planning Rule, as described in Appendix B, and are the same for all alternatives. Of those lands that may be suitable, the lands that are suitable for timber production vary by alternative based on management objectives. Detailed documentation of the process used to map suitability can be found in the project record.

The analysis area for timber suitability, timber supply, timber harvest, and other forest products is comprised of the National Forest System lands administered by the Nez Perce-Clearwater. The primary analysis area for timber demand consists of five Idaho counties. A secondary economic analysis area is defined to account for all counties within the economic impact analysis area that contain infrastructure and communities that utilize timber from the Nez Perce-Clearwater. Refer to the Economic Sustainability Report for further details.

The counties included in the Primary Analysis Area included:

- Idaho County, Idaho
- Clearwater County, Idaho
- Lewis County, Idaho
- Nez Perce County, Idaho
- Latah County, Idaho

Counties included in the Secondary Analysis Area included:

- Benewah County, Idaho
- Adams County, Idaho
- Shoshone County, Idaho
- Mineral County, Montana
- Missoula County, Montana
- Ravalli County, Montana

All alternatives are identical in terms of vegetation and timber plan components and other elements that substantially influence timber production and harvest. The exception is Alternative Z, which requires retention of snags that are ten-inch diameter at breast height and larger. This distinction may reduce the amount of small diameter salvage timber available from lands administered under Alternative Z. The primary difference between alternatives include: the number of acres suitable for timber production, the number of unsuitable acres where timber harvest is allowed to achieve other resource objectives, the timing of harvest activities, and management intensity.

Temporal Scale

The temporal scale of this comparative analysis is 50-years. While the land management plan is expected to be in place for 15-years, quantitative effects were derived from the SIMPPLLE and PRISM models, which use whole decades as the modeling time steps. Furthermore, using the fifth-time step, rather than the first- or second-time step, more clearly demonstrates differences between alternatives and attainment of plan objectives.

Analysis models were run for 100-years to assess the stability of sustained yield capacity and targets for all modeled plan components for each alternative. Plan components and forest restoration strategies presented in the plan influence the quantities of merchantable timber available for harvest. Model runs of 100-years were used to examine required non-declining even flow constraints and to assess how each alternative effect long-term timber supply.

Past, Present, and Future Activities used in the Analysis

Capital investments within the region and adjacent county area have changed dramatically over time. The long-term sustained yield and allowable sale quantity established under the 1987 forest plans, in combination with harvest schedules developed for surrounding timber base ownerships have established the wood product supply for forest product processing facilities. The Nez Perce-Clearwater can only implement the land management plan within the context of a viable and competitive marketplace. Demand for timber and other forest products must remain at sufficient levels to support economically feasible vegetation management projects designed to trend forest vegetation towards the desired conditions detailed in the land management plan.

Methods and Assumptions

Timber harvest outputs, such as projected wood sale quantity, projected timber sale quantity, harvest by decade, and sustained yield limit, were modeled using Prism. Prism is a software modeling system designed to assist decision makers in exploring and evaluating multiple resource management choices and objectives. Models constructed with Prism apply management actions to landscapes through a time horizon and display outcomes for comparative analysis. Management actions are selected to achieve desired goals while complying with identified objectives and constraints. Prism outputs are used to display tradeoffs between alternatives and to predict sustainable timber harvest levels over time. The timber analysis is based on harvest schedule modeling conducted with the

PRISM model. The Prism model and assumptions associated with modeling are detailed in Appendix B.

Harvest prescriptions are generalized for this broad scale analysis. During implementation of the Land Management Plan under any alternative, site specific prescriptions and silvicultural practices would be tailored to the forest stand to be treated. Further, site specific mitigations and best management practices, such as those that apply in riparian management zones, would apply as described in the plan. These site-specific factors would not materially change the broad scale volume estimates made for planning purposes.

For the action alternatives, it is assumed that the management approaches described in Appendix 4 of the Land Management Plan would generally be followed.

Determination of projected timber sale quantity and projected wood sale quantity levels are made with respect to the achievement of long-term forest restoration strategies defined in the plan. Timber harvest is a tool used to achieve Land Management Plan objectives. In this context, success in achieving forest restoration objectives is dependent upon successfully marketing and selling timber products from the Nez Perce-Clearwater. Without timber markets, full restoration success is not likely. Demand for forest products is driven by local, regional, and national demand curves, which tend to change over time. Realization of projected timber sale quantity and projected wood sale quantity levels are partly dependent on open market economies, which fluctuate over time in response to natural supply and demand market curves.

Investments in forest product milling infrastructure and milling capacity are generally made by industry in response to the supply and demand curves discussed above. The local and regional forest products infrastructure has declined in recent decades in response to lower timber supplies from National Forest System lands, imports of finished forest products, improvements in milling technology, and cost of investment capital. The volume of timber offered by the Nez Perce-Clearwater has little impact on national supply and demand curves for forest products.

Best Available Science

The affected environment was described using Forest Service "cut and sold reports" from the Timber Sale Accountability database and treatment records in the Forest Activity Tracking System database. Information on the location and condition of other forest products that could be gathered is limited.

Vegetation plot data and a variety of geospatial data, such as soil and vegetation mapping, were used to determine the lands that may be suitable for timber production (see Appendix B). Yield tables were developed using the Forest Vegetation Simulator. This information, along with Prism modeling, was used to estimate acres treated by treatment type and volume outputs, as described in Appendix B. The actual timber harvest level that would occur during implementation of the plan is dependent on many variables, including the demand for forest products, resource management objectives and public engagement.

There is no incomplete or unavailable information for the timber analysis. This analysis was completed at the strategic level, using forest level data sources. Site-specific data at the project scale is expected to result in some changes to timber suitability and volume outputs. The data used is the latest available information. The effects of recent disturbances, including the fires of 2018, are not portrayed by this data. However, the analysis of alternatives includes the potential for future fire and, therefore, the relative comparisons at the programmatic scale remain valid.

Measurement Indicators

The issue statement from scoping and public collaboration relative to timber is:

The projected timber sale quantity should be increased or decreased to better provide for a balance of ecological sustainability and economic and social resiliency. The maximum regeneration harvest unit size should be increased or decreased.

This issue statement is addressed primarily in the Wood Product Supply analysis, as discussed below. However, the standards related to the maximum regeneration harvest unit size will be addressed in this Timber section and the effects of the maximum opening size will be addressed in the Forestlands section of the EIS. This timber analysis is framed to address the following areas:

- Identify lands suitable for timber production and unsuitable lands where timber harvest is allowed and the effects of those delineations
- The contribution of timber harvest to the ecological, economic, and social sustainability
- Maximizing benefits to the American people and demonstrating sustainability of harvest

To analyze the extent to which each alternative addresses the above needed findings, the following were chosen as indicators and measures.

Table 345. Measurement Indicators

Indicators	Measures
Timber Suitability	Acres suitable for timber production
Timber Suitability	Acres of unsuitable land where timber harvest is allowed
Wood Product Supply	Projected Timber Sale Quantity
Wood Product Supply	Projected Wood Sale Quantity
Wood Product Supply	Predicted Salvage
Wood Product Supply	Acres Harvest
Wood Product Supply	Firewood and biofuel availability
Sustainability of Harvest	Coarse woody debris retained
Sustainability of Harvest	Practices followed

Timber Suitability

Long-term production capacity is in part a function of timber suitability. Timber suitability as an indicator is intended to quantify the amount of timber that can be produced or harvested on the Nez Perce-Clearwater. This indicator shows how each alternative would affect the ability of the Nez Perce-Clearwater to produce or harvest timber based on the categorization of the land. For instance, when a river is found to be suitable for a designation of "wild," a corridor surrounding the river would be identified as not suitable for timber production or timber harvest. This indicator is intended to show the effect of delineating land such that timber harvest and production are precluded.

Wood Product Supply and Timber Harvest

Wood product supply is intended to show the effect each alternative has on the economic and social sustainability of the local communities. Projected timber sale quantity shows, in a quantifiable way, how merchantable sawtimber produced varies by alternative.

Projected wood sale quantity is "the estimated quantity of timber and all other wood products that is expected to be sold from the plan area for the plan period. The projected wood sale quantity consists of the projected timber sale quantity as well as other woody material such as fuelwood, firewood, or biomass that is also expected to be available for sale".

Biofuels and firewood are an important part of projected wood sale quantity and will be measured to display the effects each alternative would be expected to have on firewood supply and availability of biofuels.

Salvage harvest was raised as an important issue during public involvement. Because salvage harvest is not calculated as part of projected timber sale quantity or projected wood sale quantity; salvage harvest is predicted separately to provide an idea of how salvage harvest could vary based on the alternative selected. This is estimated by using the predicted fire amounts for each alternative, identifying total acreage where salvage harvest is permissible, and multiplying by the percentage of burned area historically salvaged on the Nez Perce-Clearwater.

Acres harvested is broken down by potential vegetation type group by management area to show the effect each alternative has on the proportion of the landscape being treated through timber harvest. This measure is intended to demonstrate the extent timber harvest would be used to produce commodities while trending the landscape toward desired conditions.

Firewood availability is important to local communities and contributes to social and economic sustainability. This indicator uses the disturbance expected by alternative, combined with acreage in the front country on which firewood gathering is permitted, to show how each alternative would be expected to affect the availability of firewood.

Sustainability of Harvest

The National Forest Management Act (U.S. Department of Agriculture 1976a) requires that timber harvest be carried out in such a way that the harvest is sustainable. Part of the need for change identified in revising the Land Management Plan was to incorporate best available scientific information into the revised plan. This indicator is intended to demonstrate, in a qualitative way, how the best available scientific information incorporated into all alternatives in the revised plan causes a difference in sustainability from the best available scientific information used in the 1987 Forest Plans.

Sustainability of harvest is dependent on maintaining long-term site productivity. Management of coarse woody debris is an essential part of long-term site productivity. The land management plan incorporates plan components designed to maintain sufficient coarse woody debris to promote long-term site productivity and, thus, promote sustainability of harvest levels. Coarse woody debris management objectives are based on work published by Graham et al. and are an integral part of maintaining the soils resource. Refer to the Soils Resource section (3.2.1.6) for a more detailed discussion of plan components and best management practices related to protecting and maintaining the soils resource.

Affected Environment

Existing Condition

Use and development of natural resources on the Nez Perce-Clearwater and surrounding lands played an essential role in the economy and growth of the area since early American settlement. Mining for gold and other minerals boomed in the late 1800s and tree cutting that occurred for fuelwood, mine timbers, and railways was extensive in accessible drainages. Harvest became associated with a demand for pulpwood during World War II and the need to support numerous small mills (U.S. Department of Agriculture 1986b, c). Demand for construction lumber dramatically increased following World War II.

The original mission of the Forest Service focused on protecting water and timber (Kline and Mazzotta 2012). These ecosystem services remain important today, along with wildlife habitat and recreational opportunities. Timber harvested on the Nez Perce-Clearwater provides a variety of wood products, such as sawlogs, veneer logs, and house logs, as well as logs used for pulpwood, posts and poles, firewood, furniture, and energy.

Timber suitability

Lands suitable for timber production were used to derive the allowable sale quantity in the 1987 Forest Plans. The plans determined 1,070,415 acres to be suitable for timber production on the Nez Perce National Forest and 987,700 suitable acres on the Clearwater National Forest (U.S. Department of Agriculture 1986b, c).

The National Forest Management Act directs forests to identify lands which are not suited for timber production. The act states in section 6(k):

the Secretary shall identify lands within the management area which are not suited for timber production, considering physical, economic, and other pertinent factors to the extent feasible, as determined by the Secretary, and shall assure that, except for salvage sales or sales necessitated to protect other multiple-use values, no timber harvesting shall occur on such lands for a period of 10 years (U.S. Department of Agriculture 1976a).

The assessment of suitable timberlands was accomplished using a geographical information system. Utilizing a geographical information system resulted in identifying consistent steps to determine suitability.

Criteria for determining lands not suitable for timber production are outlined in Forest Service Handbook 1909.12, Section 61. A two-step process is used: Step 1: Identify lands that are not suited for timber production based on legal and technical factors, as follows:

- Statute, executive order, or regulation prohibits timber harvest on the land or the Secretary of Agriculture or the Chief of the Forest Service has withdrawn the land from timber harvest, as described in Section 61.11.
- Technology is not currently available for conducting timber harvest without causing irreversible damage to soil, slope, or other watershed conditions, as described in Section 61.12.
- There is no reasonable assurance that such lands can be adequately restocked within five years after final regeneration harvest, as described in Section 61.13.
- The land is not forest land, as described in Section 61.14.

After subtracting the lands that are not suited from the total of National Forest System lands, the remaining lands are lands that **may be** suited for timber production and are considered in Step 2: From the lands that may be suited for timber production, identify the lands that are suited for timber production based on their compatibility with the land area’s desired conditions and objectives, as described in Section 61.2.

Step 2 varies by alternative, based on management area allocation and desired conditions of management areas. After determining lands that may be suited for timber production in Step 1, lands where management guidance and Land Management Plan components precludes timber production are subtracted to yield the total lands suitable for timber production. The subtracted lands are added to the sum of withdrawn lands from Step 1 to yield the total unsuitable lands. Table 346 displays the acres for each step for determining lands suitable for timber production for the No Action Alternative.

Table 346. Lands suitable for timber production for the No Action Alternative.

Suitability category	1987 Nez Perce Plan	1987 Clearwater Plan	No Action Alternative
Administrative Forest Boundary[1]	2,247,040	1,837,100	4,074,832
Non-Forest Lands[2]	-29,000	-24,400	-135,775
Forest Service Lands	2,218,040	1,812,700	3,939,056
Withdrawn Lands[3]	-1,005,250	-276,900	-1,231,638
Irreversible Resource Damage is Likely or Adequate Restocking Not Assured[4]	-132,916	-199,800	-189,203
Tentatively Suitable Timber Production Lands	1,079,874	1,336,000	2,518,215[5]
Lands where management guidance precludes timber production, where management requirements cannot be met, or not cost efficient to meet timber production objectives	-9,459	-348,300	-1,660,729
Lands Suitable for Timber Production	1,070,415	987,700	857,486[6]

[1]Change in GIS mapping technology.

[2]Change in lands not administered.

[3]Change in withdrawn lands is largely due to the addition of eligible wilderness designations which are no longer suitable for timber production as designated by Congress.

[4]The difference between irreversible damage and adequate restocking is due to higher quality data becoming available.

[5]62 percent of National Forest System lands.

[6]26 percent of National Forest System lands.

There have been changes to timber suitability as the forest plans have been implemented. These changes include de-facto reductions in lands suitable for timber production caused by the designation of inventoried roadless areas. There have also been changes in available vegetation data and land ownership status. To accurately portray the existing condition and the No Action Alternative, timber suitability was re-calculated to reflect these changes, as shown in Table 346. Roughly 1,200,629 fewer acres are suitable for timber production than in the original 1987 Forest Plans.

Refer to Appendix A for maps of lands suitable for timber production. The acres suitable for timber production in the existing condition are equivalent to that of the No Action Alternative. Harvest may occur on an additional one percent of National Forest System lands on the Nez Perce-Clearwater that are not suitable for timber production but where harvest may occur for purposes other than timber production. The existing acres unsuitable for timber production where harvest may occur for other purposes is equivalent to the 1,660,729 acres illustrated for the No Action Alternative (Table 346). The lands where harvest may occur include inventoried roadless areas. While harvest could occur in inventoried roadless areas, it would be greatly constrained by the 2008 Idaho Roadless Rule.

Wood product supply and Timber Harvest

Forest growth rates directly influence potential timber production over time. Site productivity is generally considered to be fixed based upon site attributes such as topography, soil type, and climate.

On the Nez Perce-Clearwater, site productivity in terms of tree growth is estimated to be between 20 and 225 cubic feet per acre per year on suitable lands with average rotation ages ranging from 80 to 120 years, depending on the species and site (U.S. Department of Agriculture 1987b).

The long-term sustained yield capacity calculated for the 1987 Forest Plans was 210 million board feet for the proclaimed Nez Perce National Forest and 429 million board feet for the proclaimed Clearwater National Forest. The allowable sale quantity, as defined for the 1987 Forest Plans, is 108 million board feet on the Nez Perce National Forest and 267 million board feet on the Clearwater National Forest, for a total of 375 million board feet. The actual annual timber volume of timber products offered averaged 46 million board feet for the period 1997 through 2018.

The 1990s saw a sharp decline in the volume harvested on both the Nez Perce and Clearwater National Forests. For the Clearwater National Forest, its lowest point in 2000 was 10 million board feet. The Nez Perce and Clearwater National Forests have achieved steady increases in timber volume sold since 2000 with a high of 87 million board feet sold in 2018 for the combined forests.

Figure 139 displays the total volume of timber cut and sold on the Nez Perce-Clearwater from 1997 to 2018. The amount illustrated includes sawtimber and all other timber products, which includes non-saw material, firewood, and posts and poles. Sawtimber volume sold has increased on average since the early 2000s. Firewood has been a consistent contributor to wood volume sold and has been particularly abundant in the last decade due to the availability of dead trees in areas affected by wildfire and mountain pine beetle. The last decade, more specifically 2008 to 2018, has seen an increase in sawtimber sold compared to the previous decade. This increase is due in part to the application of stewardship contracting and good neighbor authority granted by Congress. These authorities leverage partnership dollars and expertise to accomplish restoration projects.

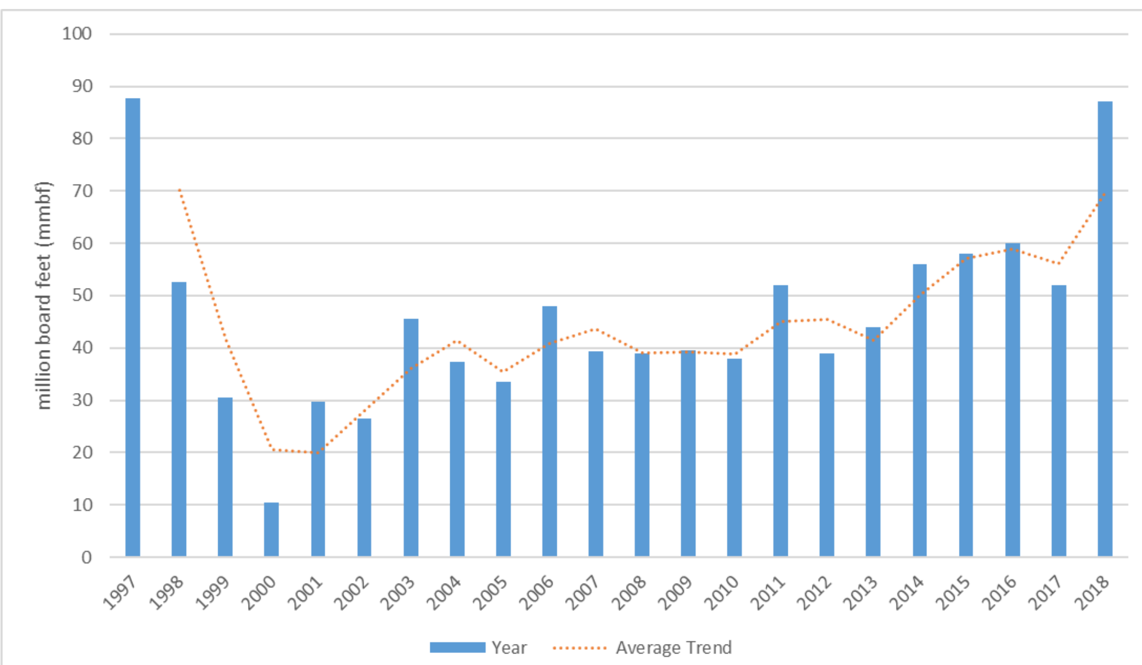


Figure 139. Timber product volume sold from the plan area (1997-2018).

Data Source: Retrieved from: Region 1 - Resource Management (usda.gov)

The supply and demand for timber is driven by regional, national, or global issues. Local drivers are small in scope and scale and generally have inconsequential effects on the overall market for timber and lumber products. Export demand, housing starts, home improvement trends, and interest rates are examples of larger national and global issues that affect the supply and demand for timber. Local environmental issues, as well as involvement by local, regional, and national special interest groups, have some impact on the supply of federal timber to the market within the plan area. Appeals have delayed projects or reduced the extent of proposals.

Figure 140 shows sawtimber volume sold by tree species. The primary species utilized for sawtimber include lodgepole pine, Douglas-fir, and grand fir. Intermediate quantities of sawtimber include subalpine fir, western hemlock, western redcedar, and Engelmann spruce. Very minor quantities of ponderosa pine and western larch are harvested. Salvage category is not recorded by species.

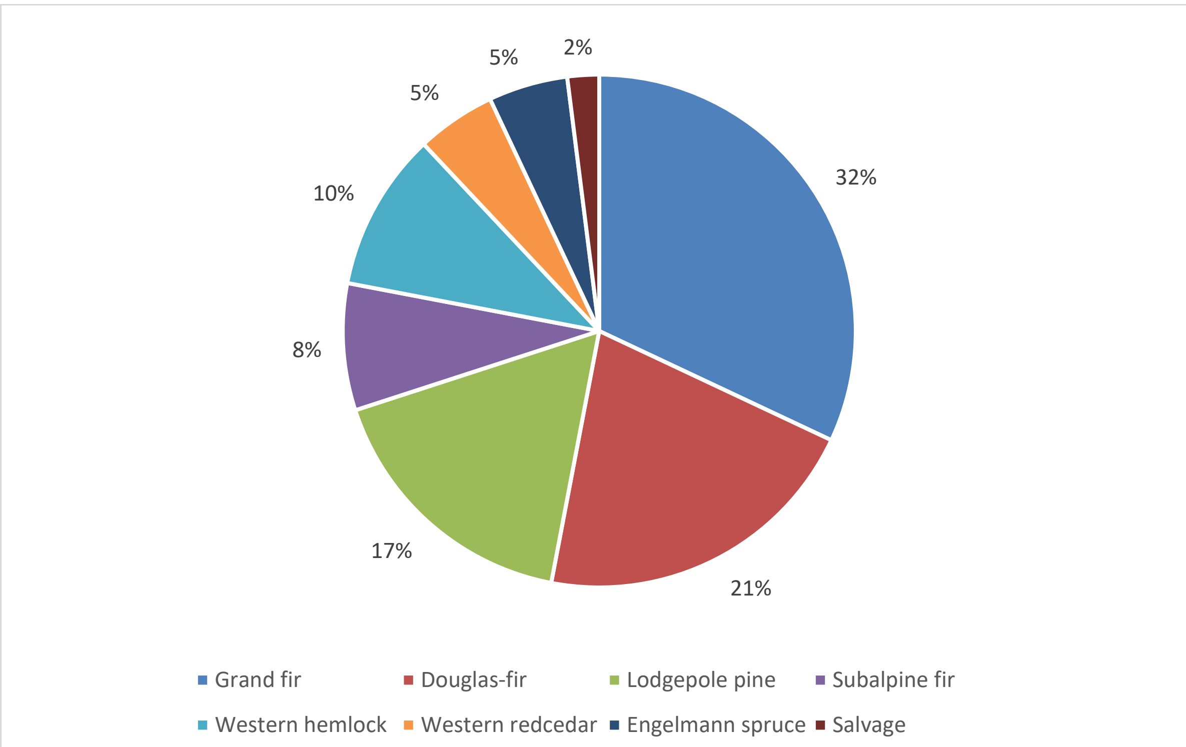


Figure 140. Percent of sawtimber harvest volume sold by species (1997-2018, in MMBF).

Data Source: Retrieved from: : Region 1 - Resource Management (usda.gov)

The largest factor reducing the stability and resiliency of the Nez Perce-Clearwater landscape over the past 100-years has been the introduction of white pine blister rust. This disease has dramatically decreased the composition of western white pine from the Nez Perce-Clearwater and left grand fir, Douglas-fir, lodgepole pine, and subalpine fir as the major species components of the Nez Perce-Clearwater. Those species are much more susceptible to root disease and insect infestations, and the result has been lower productivity on the lands that once supported vast stands of valuable and resilient white pine. Apart from that change, ecosystem drivers such as wildland fire continue to affect the Nez Perce-Clearwater, much as they have for centuries. Soils are productive and forests regrow quickly following disturbance. Climate varies over time but still supports the forests that are found here, which have been adapted to the climatic variations that have occurred.

Interrelated factors, such as site productivity, climate, disturbances, and human activities, influence the availability of timber. Stand replacing fires were common on the Nez Perce-Clearwater during the warm and dry climate period in the late 1800s. These fires, along with early forest practices, were followed by a relatively moist climate suitable for tree establishment and growth. In general, forest cover established quickly in the early 1900s in burned or cut-over areas. Large portions of the Nez Perce-Clearwater burned in the great fire of 1910. The moist conditions that prevailed during most of the next century limited the potential for wildfires and insect outbreaks. These factors, along with forest management policies, contributed to decades of successful fire suppression. Thus, relatively extensive continuous forests of the same age and density developed.

These forests were susceptible to drought stress when the climate shifted into a warm and dry phase in the 1980s. The buildup of fuels that resulted in some areas, along with the dry climate, resulted in more large wildfires. From 1987 to 2017 approximately 53 percent of the Nez Perce-Clearwater burned in wildfire. Of this, about 2.6 million acres burned in areas deemed suitable for timber production in the 1987 Forest Plans. Over this 30-year span of time, many of these acres experienced re-burns. Where stand-replacing fires occurred, forests were returned to an early successional stage of development, and it will be at least 50- to 80-years before the trees reach a size where commercial harvest may be feasible. Growth rates and species composition vary greatly across the forest and between potential vegetation type groups. Site productivity varies across the forest, which influences the rate of recovery following wildland fire events. Intensive silviculture practices, such as pre-commercial thinning, may improve the recovery rate and species composition of developing stands.

Timber demand

Ultimately, the United States market demand for lumber is a derivative for the demand for construction of residential and commercial structures. As a derived demand, lumber markets tend to reflect shifts in national housing construction rates. Across subsectors, residential construction is the single largest consumer of lumber nationwide. Housing starts are measured by the United States Census Bureau. Historical annualized rates are graphed in Figure 141. The losses and eventual recovery following the great recession are evident. Since 2008, starts have rebounded but to a steadier state rising and flattening out above one million annually. See www.census.gov/economic-indicators/ for additional information. Demand for new and remodeled housing can, and will, change over the planning decades but, for the present, markets which consume United States lumber are considered relatively healthy with room for growth.

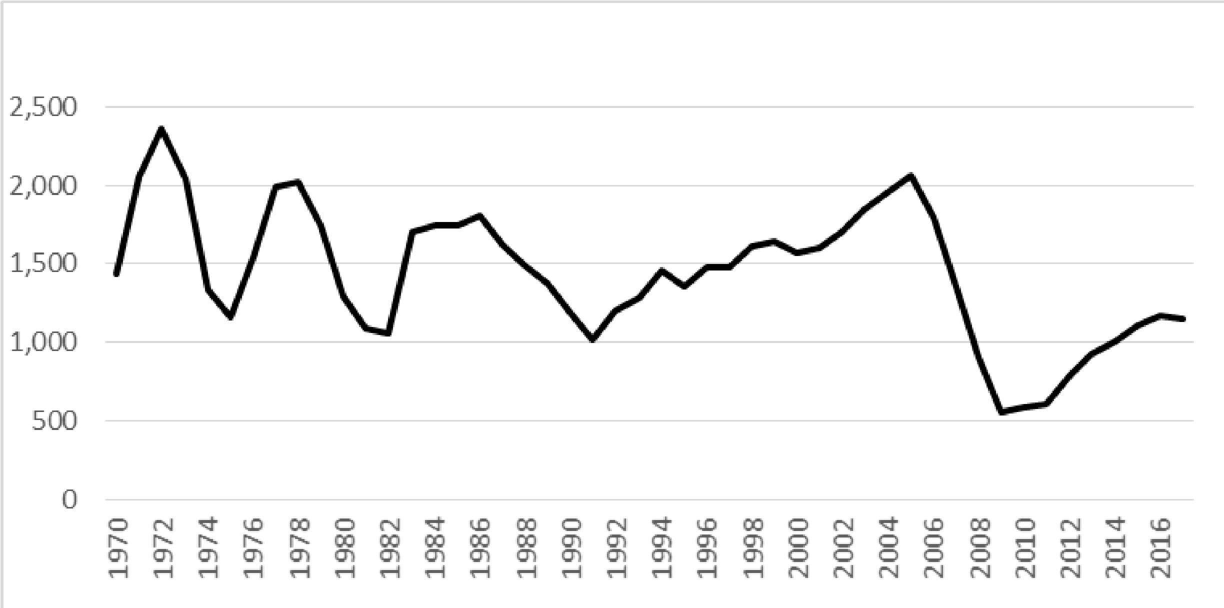


Figure 141. United States housing starts (in thousands of starts) by year.

Data Source: Census Bureau, census.gov/economic indicators

Firewood gathering for home heating is an important ecosystem service provided to the local area. The firewood itself provides an inexpensive heat source and gathering the firewood is often a family recreational activity. Small commercial firewood operations also meet a need for firewood among people who cannot gather their own wood.

Idaho forest products industry

Since the end of the 2007 to 2009 economic recession, the Idaho forest products industry has begun to rebound. This rebound is partly due to a recovery of United States housing starts which grew approximately ten percent between 2014 and 2016. However, there are continued annual fluctuations in the lumber export markets, as well as domestic lumber prices and sawlog prices. This slow economic recovery has spurred investment in Idaho's forest product sector, including increases in employment (Cook, Morgan, et al. 2016).

Lumber production in Idaho has increased slightly from 2014 averages by five percent. Sawmill capacity utilization has increased from 60 percent to 75 percent due in part to increased housing demand and rising lumber process (Cook, Morgan, et al. 2016).

Economic forecast modelling relative to the land management plan alternatives is presented in the Economic and Social Sustainability sections. These sections indicate that, in general, all alternatives will maintain or improve employment in the forest products industry within the analysis area.

Since the mid-1990s, Idaho's forest products industry has been sustained primarily by timber harvests from private and state lands. During 2015, private lands provided 62 percent of Idaho's timber harvest volume, while state lands provided 27 percent. About 11 percent of the timber harvest volume came from United States National Forest System lands. Approximately 39 percent, or 20.4 million acres, of Idaho's land is within the United States National Forest System. More than three-fourths of Idaho's timber resources are on federal lands, a total that does not include four million acres of federal forest lands in the National Wilderness Preservation System. Between 1947 and 1990, federal lands provided, on average, 43 percent of the timber harvested in the state. In 1990, federal timber harvests began a system-wide decline. In the past ten years, federal lands within Idaho have provided about ten percent of the harvest (Cook, Morgan, et al. 2016).

Today, approximately 88 primary forest product firms remain operating in Idaho. Forest product milling and processing facilities range widely in production capacity and products produced. Most of them are mid-sized firms with production capacities of up to 100 million board feet per year (Simmons and Morgan 2017).

Since the 1970s, the contribution of sawtimber coming from National Forest System Lands has declined substantially. In 1979, approximately 46 percent of timber harvest in Idaho was sourced from National Forest System Lands compared to 7 percent in 2006 (Brandt et al. 2012).

The current gap between mill capacity and timber harvest for all ownerships combined is partially explained by timber coming into the multi-county plan area from outside sources, including adjacent states. The majority of the timber harvested in the five-county area comes from private and state lands; thus, the demand for timber from the Nez Perce-Clearwater is affected by the supply of timber from other sources (Brandt et al. 2012).

Collectively, the multi-county plan area has a vastly shrunken capacity from historic industry levels. For the multi-county plan area, the total timber capacity and harvest levels have declined since 1980 but have indicated a slight increase over the last five years as illustrated in Figure 142. Demand for timber remains strong in the multi-county plan area resulting in competitive bids for offered timber (Cook, Morgan, et al. 2016). Competitive markets suggest the industry is capable of scaling in the short term to meet increased national lumber demand if timber supply remains elastic.

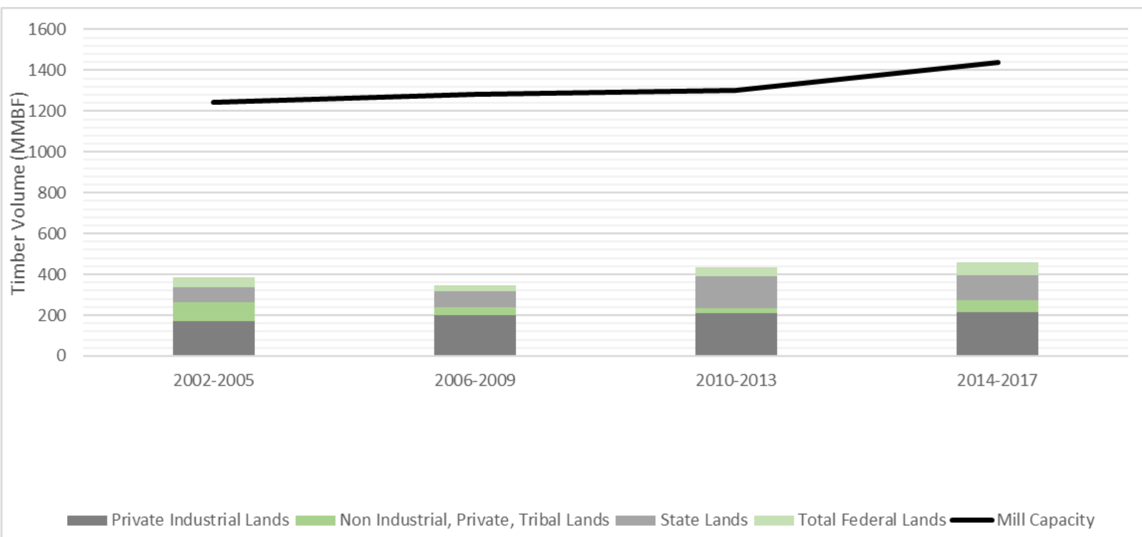


Figure 142. Five Idaho county timber sold versus mill capacity, 2002-2017.

Data Source: Bureau of Business and Economic Research, University of Montana, Idaho's Forest Products Industry and Timber Harvest, 2015

Relative to the multi-county plan area for the Nez Perce-Clearwater, timber production remains of economic importance. The demand for timber has changed over time. In 1987, there were 42 active primary wood product facilities in the primary multi-county plan area. However, by 2017, this number dropped to 21 (Simmons and Morgan 2017).

Timber harvest

Timber harvest is a tool used not only to provide timber products and contribute to the local economy but also to achieve multiple resource objectives. These objectives include, but are not limited to, reducing insect or disease impacts, improving wildlife habitat, increasing tree growth, improving timber productivity, reducing fuels and fire risk, and altering vegetation conditions to enhance forest resilience. All of these resource management objectives are incorporated into the desired conditions discussed in this plan.

Three main types of harvest are displayed:

- even-aged regeneration harvest, such as clearcutting, shelterwood, and seed-tree cuts;
- uneven-aged regeneration harvest, such as group selection and individual-tree selection; and
- intermediate harvest, such as commercial thins and improvement cutting.

Pre-commercial thinning and prescribed fire are included, as these are typically associated with harvest activities. Table 347 shows acres harvested from 1987 through 2018. Roughly 476,300 acres of harvest has been accomplished since 1987. The majority, 89 percent, occurred on lands suitable for timber production; the remainder occurred on unsuitable lands where harvest was implemented to accomplish other resource objectives. Even-aged harvest prescriptions were the most common, representing approximately 51 percent of harvest treatments. This is because the primary forest cover types treated by harvest are mixed species stands with a high composition of grand fir and Douglas-fir. These species have a high occurrence of root disease which limits options for natural regeneration. Artificial regeneration is used to establish seral species, such as ponderosa pine, western white pine, and western larch, which are generally resistant to root diseases and resilient under natural fire regimes.

Table 347. Harvest by type and decade for the Nez Perce-Clearwater, 1987-2018.

Silviculture Treatment	Even-aged timber harvest	Uneven-aged timber harvest	Intermediate harvest	Pre-commercial thinning[1]	Prescribed fire[2]
Nez Perce N.F. acres	198,837	51,862	147,831	21572	39,996
Clearwater N.F. acres	45,551	8,748	23,471	22,047	44,832
Total	244,388	60,610	171,302	43619	84,828
30-Year Annual Average	7,883	1,955	5,526	1,407	848

[1]Pre-commercial thinning acres includes both acres associated with commercial harvest and acres associated with naturally developed stands.

[2]Prescribed fire acres include prescribed fire associated with site preparation following harvest and prescribed fire used to achieve other resource objectives.

Data Source: FACTS.

Included in the acreage figures are salvage projects that occurred after wildfires. The volumes produced from salvage projects are part of the total volume sold in the past as depicted in Figure 143 however, per planning direction, these volumes are not part of the estimated future timber outputs over time shown in the environmental consequences section. In the past, salvage has occurred on a small proportion of burned acres on the Nez Perce-Clearwater. Since the 1990’s, salvage has occurred on about two percent of wildfire acres and was focused on lands suitable for timber production.

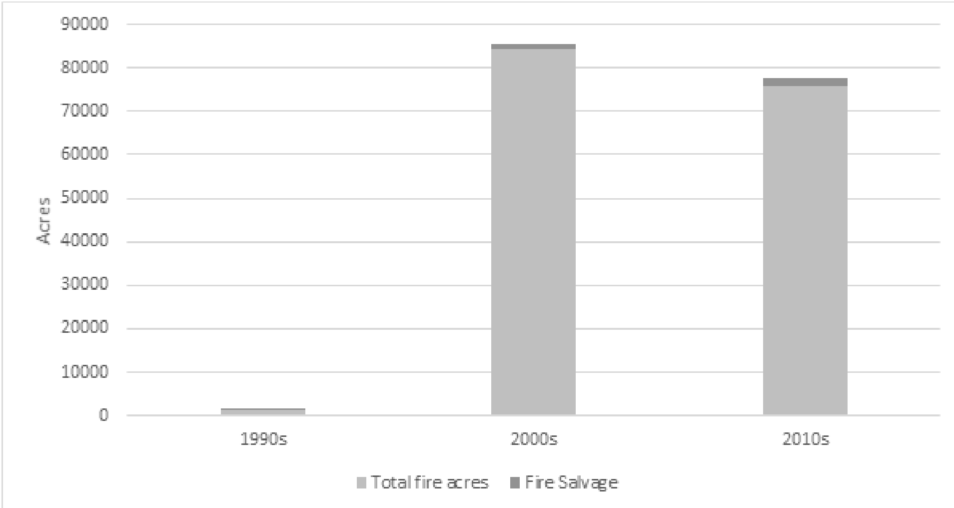


Figure 143. Fire salvage acres compared to total wildfire area burned by decade since 1990.

Data Source: FACTS.

Other activities associated with the tending of harvested stands occur on the Nez Perce-Clearwater, including reforestation, pre-commercial thinning, and prescribed burning. Stands treated with regeneration harvest are reforested either naturally from available seed or artificially through planting. Reforestation also occurs following natural disturbances. This activity tends to be focused on lands suitable for timber production to maintain appropriate forest cover but may also occur on other burned lands to meet other resource objectives. Pre-commercial thinning may occur on a subset of previously harvested areas to improve composition or density of young trees. Prescribed burning to reduce fuels or prepare seedbeds for reforestation are also common forest management activities.

Availability of firewood and other forest products

Special forest and botanical products include, but are not limited to, mosses, fungi including mushrooms, roots, bulbs, berries, seeds, wildflowers, forbs, sedges, grasses, nuts, ferns, boughs, bark, cones, burls, transplants, and Christmas trees. Huckleberries are also periodically commercially harvested in appropriate areas. Other than personal use and commercial firewood permits, the Nez Perce-Clearwater offers little in the way of commercial or personal use permits for special forest products due to the limited demand relative to the resources needed to administer the permits. Figure 144 illustrates the number of cords and sawlog equivalent volume of firewood sold under permit from 2000 to 2108. Forest access for firewood gathering is determined by the open road system identified in motorized travel plans for the Nez Perce-Clearwater. Availability of firewood is largely determined by effects of forest succession and disturbance processes, such as wildfire and insects and disease agents which result in tree mortality. Desired conditions defined for all alternatives are focused on maintaining disturbance processes, which operate under the ranges calculated for the natural range of variation. Forest management and natural disturbances can influence the supply of firewood and other forest products. For example, fire can increase availability of firewood, mushrooms, and thinning of young sapling stands; conifer regeneration can increase production of Christmas trees under favorable conditions.

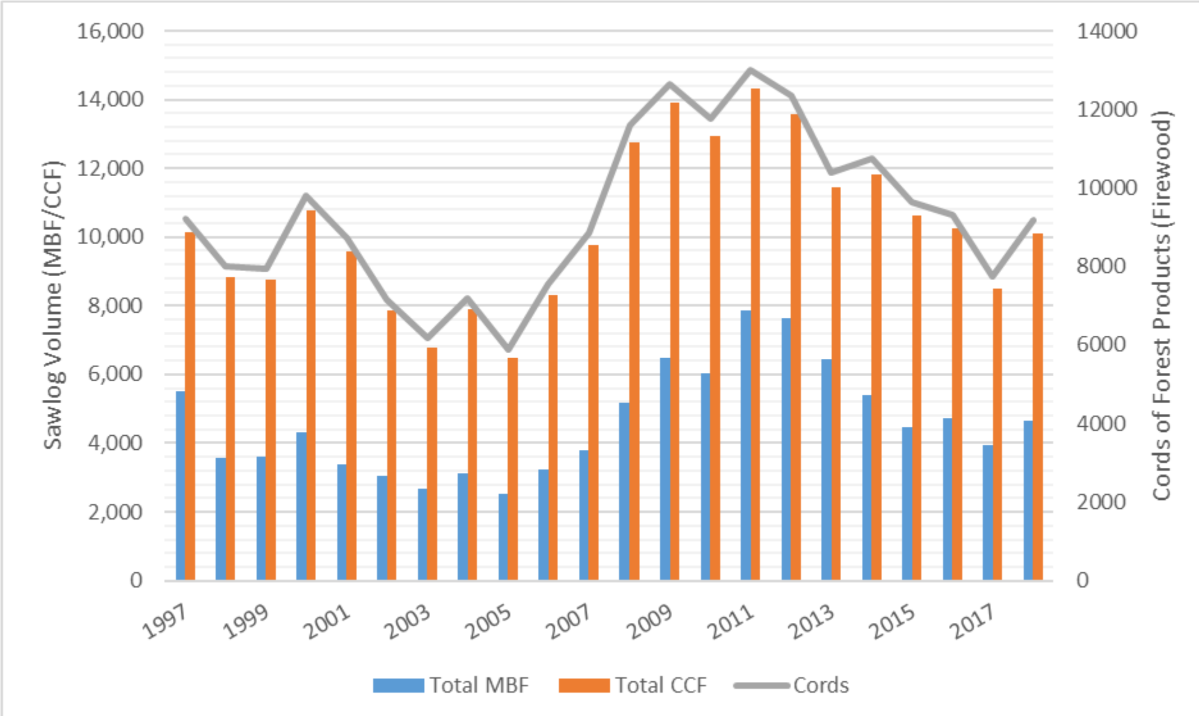


Figure 144. Number of cords of firewood from the plan area sold (2000-2018).

Data Source: TimberHarvestbyDecade.xlsx.

Special forest and botanical products have importance to the Nez Perce Tribe for traditional and cultural uses. As per current handbook direction, the Nez Perce-Clearwater considers treaty rights to include customary and traditional uses (including first foods and other historical uses) of plant material by Tribes to be part of the federal trust responsibility to Tribes. Nez Perce-Clearwater considers competitive market demands in determining which products would be excluded from or allowed for sale to commercial harvesters. When there is a shortage of any particular special forest product for tribal use, commercial permits would be issued only to the extent that the tribal use can be accommodated.

Benefits to people

Timber products and other forest products are identified as multiple uses and key ecosystem services provided by the Nez Perce-Clearwater. The economy of local communities can directly benefit from the use of these products. Please refer to the Economic and Social Sustainability sections for more information about multiple uses, key ecosystem services, and benefits to people.

Milling infrastructure within the plan area has remained relatively intact over the past decade. Bidding competition for timber sales and stewardship contracts has remained high. The capacity for logging and restoration services exists at a level adequate to accomplish Land Management Plan objectives for the No-Action Alternative. Implementation of any action alternative would require an increase in milling and biomass utilization infrastructure to achieve restoration objectives. Capacity includes mills within and adjacent to the plan area, as shown in Table 348.

Table 348. Forest products mills and processing facilities within the multi-county area.

County	Sawmills	Post and Pole Mill	Wood Chip Processing	Cedar Products	Pulp and Paper	Biomass, Bark, Fuel pellets
Idaho	2	1	0	1	0	1
Clearwater	2	0	0	1	0	0
Lewis	0	1	0	0	0	0
Nez Perce	0	1	0	0	0	1
Latah	1	1	1	1	1	1

Data Source: (Cook, Morgan, et al. 2016).

Environmental Consequences

Effects Common to All Alternatives

Timber Suitability

Lands suitable for timber production were determined following the 2012 Planning Rule and associated directives. Lands that *may* be suitable for timber production differ by alternative. Differences between alternatives of lands suitable for timber production are due to different allocations of lands suitable or eligible for other resources, as shown in Figure 145 and Table 349. The No Action Alternative represents eligible lands. These lands are physically and biologically capable of timber production and have not been administratively withdrawn. Based on management direction and desired conditions, land determined to be suitable for timber production varies by alternative and represent a subset of the lands that may be suitable for timber production.

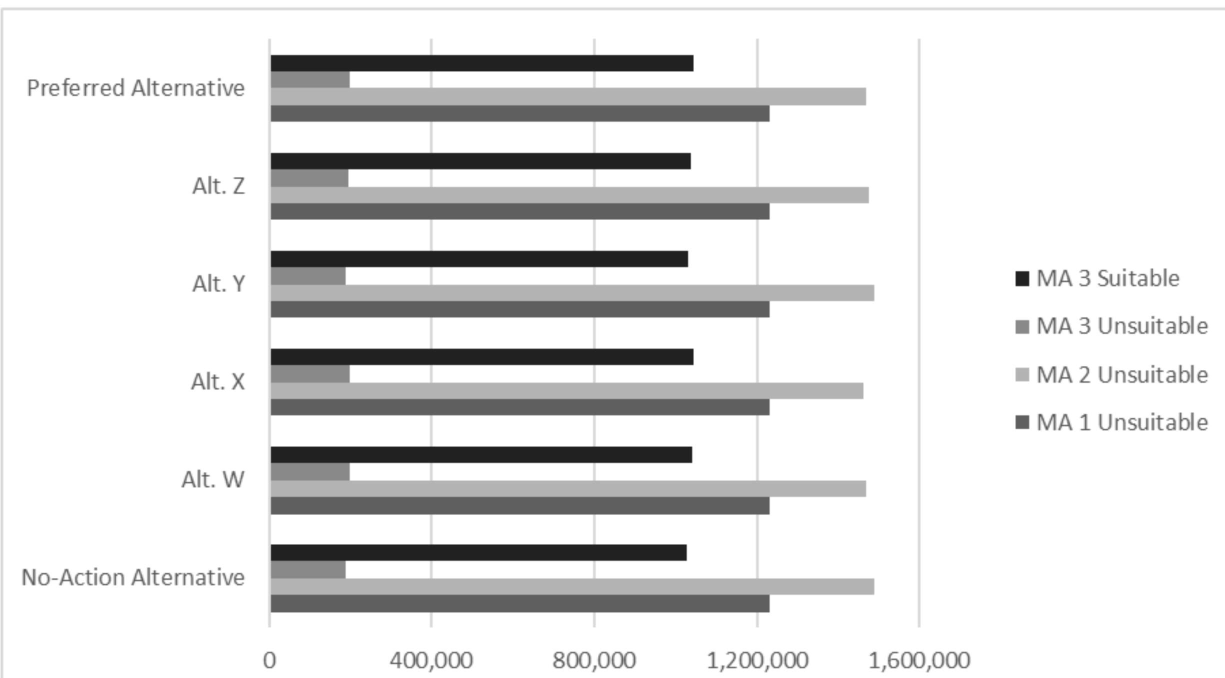


Figure 145. Determination of lands that may be suitable for timber production (in acres).

Data Source: VMap.

Table 349. Unsuitable lands where timber harvest is allowed (in acres), by alternative.

Land Classification Category	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Backcountry Restoration IRR Theme	377,575	377,575	377,575	377,575	377,575	377,575
Primitive IRR Theme	124,246	124,246	124,246	124,246	124,246	124,246
Special Areas of Historic or Tribal Significance IRR Theme	34,442	34,442	34,442	34,442	34,442	34,442
Riparian Management Zones (MA 3 Outer Zone Only)	85,658	89,180	90,017	85,952	88,618	89,387
Total Unsuitable Lands where timber harvest is allowed	621,920	625,442	626,279	622,214	624,880	625,649
Potential Treatment Acres per Decade	6,219	6,254	6,263	6,222	6,249	6,256

Data Source: VMap

Broad-scale information is used to determine suitability. Changes may occur at the project-scale level using site-specific data. Changes to lands suitable for timber production would be monitored during implementation of the plan.

In all alternatives, timber harvest is allowed on lands not suitable for timber production but suitable for timber harvest when consistent with management direction for the area. These lands are referenced as unsuitable lands where timber harvest is allowed. Timber harvest on these lands is not scheduled or managed on a rotation basis but does contribute towards projected sale quantities. Unsuitable lands where harvest would never be allowed are primarily within Management Area 1 and include designated wilderness, recommended wilderness, wilderness study act areas, research natural areas, wild and scenic river corridors, and primitive recreation settings, as well as the inner zone of all riparian management zones. Unsuitable lands where timber harvest is allowed are primarily within Management Area 2 and include areas designated as Special Areas of Historic or Tribal Significance, Primitive, and Backcountry Restoration theme in the Idaho Roadless Rule (36 CFR 294 Subpart C), as well as portions of Management Area 3 defined as the outer zone of riparian management zones (FW-STD-RMZ-01). Table 349 provides a summary of acres of unsuitable lands where timber harvest is allowed, by alternative.

Wood Product Supply and Timber Harvest

All alternatives provide for availability of timber. The availability of forest products would fluctuate based on disturbances, as well as the implementation of harvest projects. In addition, the actual amount of timber offered would be influenced by a variety of factors, including site-specific environmental analyses, public involvement, harvest methods, and administrative appeals and litigation (Morgan and Baldridge 2015). Site-specific project analyses would consider factors that are not well-represented by programmatic level modeling, such as specific design criteria that may apply to meet resource objectives like scenic integrity and wildlife habitat requirements.

Under all alternatives, the amount of harvest that occurs would be a function of Agency budgets as well as workforce and partnership capacities. The influence of reasonably foreseeable budget limitations was incorporated into the timber volume modeling.

Timber management primarily revolves around fuel reduction in the wildland-urban interface. In non-wildland-urban interface areas, timber management is focused on forest structure, species composition, and size class distributions appropriate for a given ecotone. Although watershed and wildlife habitat improvement are primary benefits at times, they are usually secondary benefits that accrue from accomplishing vegetation restoration objectives.

Where timber management is an option on the roaded portions of the Nez Perce-Clearwater, it can provide opportunities to reestablish early seral species, such as ponderosa pine, western white pine, and western larch, which have declined in abundance. Timber management can also restore forest structure where historically one- and two-storied forests now have a continuous canopy from ground to treetops. Where forest densities are higher than historic levels, timber harvest can reduce densities and decrease risks of damage from insects and disease and uncharacteristic wildland fire effects.

Timber management has the potential to improve forest resistance and resilience to stressors in areas identified for treatment, usually in the roaded portions of the forest. Timber management is a relatively slow process, taking two- to five-years from the beginning of planning to implementation. Therefore, timber management cannot respond quickly to rising threats; it works better as a long-term modification of forest composition and structure, helping the trees gradually achieve resistance and resilience.

With any alternative, timber volume offered is influenced by factors outside the authority of the Forest Service. For example, the United States Fish and Wildlife Service provides direction that limits harvest levels that presumptively protect threatened and endangered species. Further, conditions and activities on adjacent lands can limit harvest when certain conditions are needed at broader scales because harvest on other ownerships is taken cumulatively into account when assessing the environmental impacts of projects on National Forest System lands.

Under any alternative, if additional non-sawtimber infrastructure were developed in the nearby communities, new opportunities may arise that could enhance the amount and types of material utilized from National Forest System lands. For example, more biomass utilization could result in greater volume removal following pre-commercial thinning or fuels reduction treatments versus the disposal of material in burn piles and the resulting release of carbon.

Other Forest Products

Under all alternatives, personal use of special forest products is allowed across Management Area 3 and portions of Management Area 2, excepting areas where special restrictions may apply such as primitive or research natural areas.

Under all alternatives, commercial harvest of special forest products would not be allowed in designated wilderness, recommended wilderness, research natural areas, wild and scenic river designations, or national historic landmarks.

Fire may influence the availability of some special forest products, such as huckleberries and mushrooms. Future wildfire patterns and amounts have a high degree of uncertainty; all alternatives would have the potential to provide special forest products that are linked to fire. Timber harvest and other management activities may increase or decrease the availability of some special products. For example, the availability of Christmas trees may be increased after regeneration harvest. All alternatives propose some amount of harvest and would have the opportunity to affect the availability of associated products.

Areas that are suitable for commercial or personal use of special forest products and that allow access by road or trail would provide greater opportunities for gathering of special forest products. Conversely, the potential for over-harvest of special forest products may increase with greater access. In general, areas expected to have the most road access are those that are established in the plan as suitable for timber production because roads are more likely to exist for vegetation management purposes.

Sustainability of timber harvest

Sustainability of timber harvest is largely dependent on sustaining the productivity of the land base for which timber production is desirable. Productivity of forested ecosystems is dependent on both abiotic and biotic factors. Abiotic factors, such as climate, are not influenced by forest management at the plan or regional scales. Soil parent material and topographic features are considered static and are not influenced by forest management activities. Biotic components, such as species composition, vegetation densities and disturbance events, both influence and are influenced by forest management.

Plan components are developed to promote and sustain site productivity and, in turn, the sustainability of timber harvest. One of the primary missions of the Forest Service is to provide for a sustainable harvest of timber in perpetuity. To promote this mission directive, best available scientific information is utilized and developed to both maintain and enhance long-term site productivity. Research devoted to understanding the drivers of site quality and productivity has spanned many decades. Our understanding of forested ecosystems continues to grow as we endeavor to manage these systems for the benefit of the public.

Coarse down woody debris is a key component of soil formation and function in forested ecosystems (Graham et al. 1994) and is integral to soil productivity. Forest management practices designed to incorporate retention of coarse woody debris may help to promote long-term site productivity. The coarse woody debris management recommendations presented by Graham et al are an example of applying best available scientific information, which promotes site productivity and sustainability of timber harvest.

Table 350 compares the existing quantities of coarse woody debris with the desired conditions across all broad potential vegetation types for Management Areas 2 and 3. Existing amounts of coarse woody debris are typically within the specified ranges. Given that no active management is proposed for Management Area 1, no coarse woody debris desired conditions are specified.

Table 350. Coarse woody debris quantities (tons/acre) by management area and potential vegetation type.

Management Area	Potential Vegetation Type	Existing Condition	Desired Condition
MA 2	Warm Dry	8	7-15
MA 2	Warm Moist	14	17-33
MA 2	Cool Moist	11	9-18
MA 2	Cold	10	7-24
MA 3	Warm Dry	13	7-15
MA 3	Warm Moist	19	17-33
MA 3	Cool Moist	17	9-18
MA 3	Cold	13	7-24

Data Source: R1 Hybrid 2015 FIA dataset (Also see Soils Resource report).

Portions of the Nez Perce-Clearwater, particularly north of the Lochsa River, are referred to as the grand fir mosaic. This area is distinguished from surrounding habitat types by high soil moisture, cooler growing season conditions and understory vegetation dominated by bracken fern (*Pteridium aquilinum*) and western cone flower (*Rudbeckia occidentalis*). The grand fir mosaic is where pocket gophers (*Thomomys talpoides*) are common (Ferguson and Byrne 2000). Regeneration of these sites can be very difficult due to high levels of predation on planted seedlings. To improve regeneration success, Ferguson et al recommended forest management practices which have proven beneficial in improving seedling establishment and regeneration success (Ferguson and Byrne 2000). This is an example of applying best available scientific information that promotes sustainability of timber harvest.

Climate change

Climate is integrated into both the PRISM and SIMPPLLE models via ranges for species composition, size class, and density derived from the natural range of variation analysis. Climate is a major driver of vegetation change, which will affect each of the alternatives over time and, thus, may influence the availability of timber. Considerations for the potential effects to forests associated with climate change are described in the Forestlands section and Appendix B.

The lands that may be suitable for timber production were mapped with the best available information regarding vegetation and site potential. Lands at the margins of producing forest cover, where reforestation may not necessarily be assured due to harsh site conditions, were not included. The potential that future climate may further inhibit tree growth on sites that are currently suitable for timber production, particularly in the warm dry broad potential vegetation type, is unknown. It is possible that continued drought may cause shifts on some of the driest lands and, thus, the lands suitable for timber production could decrease in the future. It would be paramount to determine suitability at the project level during implementation of the plan to identify such areas. It is not possible to further anticipate possible decreases in expected timber volume outputs as a function of climate.

The expected change in climate in future decades could influence availability of other forest products as well. Increased frequency or severity of fire could cause changes or shifts on the landscape in plant species compositions or abundance. Uncertainty exists regarding possible effects of climate change on vegetation and on the availability and distribution of plants that may be gathered as special forest products.

Effects to No Action Alternative

The No Action Alternative is bounded by the Land Management Plan components found in the existing forest plans (U.S. Department of Agriculture 1986b, c) developed under the 1982 Planning Rule. The expected effects of plan components related to timber for the action alternatives is summarized in in the following table.

Table 351. Summary of 1987 Timber and Other Forest Products Plan Components.

Plan Components	Summary of expected effects
Forest-wide Timber Standard for Clearwater National Forest	Describes the requirements from the National Forest Management Act, such as requiring silvicultural prescriptions and using clearcutting only where it is the optimum method. This component is similar to components found in the draft land management plan and would ensure that timber activities are consistent with the law.
Forest-wide Timber Standard for	This standard for the design of transportation plans and logging systems would ensure that these are efficient and meet the needs of other resources.

Plan Components	Summary of expected effects
Clearwater National Forest	
Forest-wide Timber Standard for Clearwater National Forest	Describes the forty-acre opening maximum. In contrast to the action alternatives, this standard does not supply an exception to the size limit. This standard would ensure compliance with the National Forest Management Act regarding maximum size openings.
Forest-wide Timber Standard for Clearwater National Forest	This standard requires feasibility analyses of sales over one million board feet and would help ensure that timber sales are economically viable.
Forest-wide Firewood Standards	These components would help ensure a viable firewood program is provided.
Forest-wide Cultural Resources Standards	Ensure that cultural and historical sites are surveyed and protected from damage from timber harvest activities.
Forest-wide Wildlife & Fisheries Standards for Clearwater National Forest	Guide and/or limit timber harvest activities, including but not limited to elk hiding cover, elk thermal cover, bald eagles, gray wolves, plant species of concern, old growth, and snags.
Forest-wide Watershed, Soil, & Air Standards for Clearwater National Forest	Provides soil standards that would guide and/or limit timber harvest activities. Generally, more qualitative and less specific than the revised plan components found in the action alternatives.
Forest-wide Protection Standards for Clearwater National Forest	Help guide timber management to be used as a tool for preventative pest management, and guide the forest to harvest stands at high risk for mountain pine beetle attack and to break up contiguous natural fuel. The effect may be to lessen tree mortality where harvest is feasible.
Forest-wide Prescribed Fire Desired Conditions for Clearwater National Forest	Help ensure that prescribed fire that occurs in lands suitable for timber production would be conducted in a manner that enhances timber productivity.
Forest-wide Riparian Standards for Clearwater National Forest	Limit timber harvest in riparian areas and are less quantitative than the plan components found in the draft revised plan.
Management Areas for Clearwater National Forest	Describe what areas are suitable for timber production. They also state the required visual quality objectives and other resource objectives, such as recreation, wildlife, range, soil, water, and minerals, that would guide and potentially limit timber harvest.
Cultural Resource Management for Nez Perce National Forest	This component would ensure that cultural resources are protected.
Wildlife Coordination and Habitat Management; Wildlife Trees for Nez Perce National Forest	This standard includes elements that would guide and/or limit timber harvest activities, including but not limited to big game cover analysis, elk analysis areas, threatened and endangered species, snags, and downed woody debris.
Timber Management, Firewood, Reforestation, Timber Harvest for Nez Perce National Forest	Provide detailed guidance for timber and other forest products, including reforestation requirements, riparian considerations, soils, cultural resources, old growth forest, threatened and endangered species, and economic feasibility of timber sales. The standards help ensure compliance with law and policy.

Plan Components	Summary of expected effects
Soil, Water and Air Protection for Nez Perce National Forest	This standard includes components that would guide timber projects, such as sustaining site productivity.
Protection for Nez Perce National Forest	This standard would result in harvest being emphasized in stands at high risk to mountain pine beetle attack; break up continuous natural fuel accumulations, controlling insects and disease with silvicultural and biological practices; and use prescribed fire as appropriate.
Debris Control for Nez Perce National Forest	Guides where dozer piling can occur and the location and how much woody debris could be left after timber harvest.
Management Areas for Nez Perce National Forest	Management area guidance describes what areas are suitable for timber production. They also state the required visual quality objectives and other resource objectives, such as recreation, wildlife, range, soil, water, and minerals, that would guide and potentially limit timber harvest.

To provide a comparative basis between the No Action Alternative and the action alternatives, the management area designations developed for the action alternatives are superimposed onto the administrative boundaries of the Nez Perce and Clearwater National Forests. Management Area 1 is primarily designated wilderness areas, designated wild and scenic rivers, and national historic landmarks. Management Area 2 is primarily composed of Idaho Roadless Rule areas, eligible wild and scenic rivers, the Gospel Hump Multiple-Use Planning Area, and established and proposed research natural areas. Management Area 3 is composed of all remaining lands.

Timber Suitability

Timber suitability for the No Action Alternative is based on the 1987 Forest Plans, as amended and implemented, and shown in Table 351. The total land area considered suitable for timber management under the No Action Alternative is roughly 26 percent of the Nez Perce-Clearwater. Timber harvest would be allowed on lands unsuitable for timber production for purposes other than timber production, when consistent with other management direction. In the No Action Alternative, lands unsuitable for timber production where harvest is allowed represent roughly 14 percent of the Nez Perce-Clearwater, although harvest may be very limited in some of these areas depending on management direction and objectives, as well as existing vegetation conditions. The following sections further discuss timber suitability among all alternatives.

Wood Product Supply and Timber Harvest

Timber supply metrics for the No Action Alternative would theoretically be as described in the affected environment, including the allowable sale quantities which total 375 million board feet for the Nez Perce-Clearwater. However, due to regulatory changes on the landscape, including changes to the areas that may be suitable for timber production, the estimates in the 1987 Plans no longer reflect the management situation in the future if the No Action Alternative were selected. For this reason, and to make direct comparisons to the action alternatives, the allowable sale quantities in the 1987 Forest Plans were updated to display a projected timber sale quantity and projected wood sale quantity following current handbook requirements using the PRISM model. As required by the planning rule and handbook direction, the projected timber sale quantity and projected wood sale quantity reflect currently foreseeable budget levels.

The harvest levels achieved to date during the implementation of the 1987 Forest Plans are shown in the affected environment section. The PRISM model was used to estimate the expected acres of harvest treatments that would occur under the No Action Alternative, based on existing management direction found in the 1987 Forest Plans, as well as new laws and regulations and updated lands suitable for timber production.

Salvage harvest for the No Action Alternative is calculated in the same manner as the action alternatives. Salvage harvest acres are difficult to predict because salvage results from disturbance events which are unpredictable in both spatial and temporal scales. To estimate salvage acres and harvest volumes, disturbance acres are estimated by the SIMPPLE model. A percentage of each disturbance type is subject to salvage harvest based on historical averages. For example, if 100 acres of lodgepole pine were killed by mountain pine beetle and 50 percent of these acres were harvested to recover salvage volume, then 50 acres would be salvaged, and the yield associated with lodgepole pine is used to estimate the volume recovered.

Under the No Action Alternative, the availability of firewood is calculated in the same manner as the action alternatives. A specified percentage of disturbance acres within Management Area 3 are assumed to be available for firewood gathering.

Biofuel availability is assumed to derive from pre-commercial thinning and fuels reduction treatments. Wood fiber designated as biofuel is non-commercial sized material typically ranging from two to seven inches diameter at breast height. Based on desired conditions specified in the SIMPPLLE model, estimates of pre-commercial thinning and fuels reduction acres are calculated for each alternative. Cubic-foot volume per acre estimates include the sum of yield outputs for all treatment acres.

Sustainability of Harvest

As discussed in the affected environment and existing conditions section, sustainability of harvest is dependent on sustainability of long-term site productivity. The same best available scientific information would be applied under the No Action Alternative.

Effects Common to Action Alternatives

All action alternatives contain the same plan components for timber and other forest products. The land management plan was developed under the 2012 Planning Rule and all action alternatives provide direction for sustainable levels of forest products.

Effects that Vary by Action Alternative

Timber Suitability

Based on management guidance and desired conditions, the lands suitable for timber production vary by alternative, as shown in Table 352.

The No Action Alternative has the least amount of land suitable for timber production by a small fraction compared to the action alternatives. Alternative X and the Preferred Alternative have the most lands suitable for timber production, with about 15,479 and 14,039 more acres, respectively, than the No Action Alternative. Alternatives W, Y, and Z represent midpoint values. Nevertheless, overall values are somewhat similar for all alternatives. The lands suitable for timber production on the Nez Perce-Clearwater in in the No Action Alternative and all action alternatives represent roughly 26 percent of the total forested landscape. There is relatively little variance because of primary factors that do not vary by alternative, such as the inherent capability of the land and designations, such as wilderness and inventoried roadless areas. Unsuitable lands differ by the number of acres proposed as recommended wilderness and eligible suitable wild and scenic river designations.

Table 352. Lands suitable for timber production (in acres) by alternative.

Land Classification Category	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
A. Total NFS lands in the plan area	3,939,056	3,939,056	3,939,056	3,939,056	3,939,056	3,939,056
B. Lands not suited for timber production – withdrawn lands.	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638
C. Lands that may be suited for timber production (A-B)	2,707,418	2,707,418	2,707,418	2,707,418	2,707,418	2,707,418
D. Total lands suited for timber production because timber production is compatible with the desired conditions and objectives established by the plan	1,028,480	1,041,522	1,043,959	1,029,983	1,037,058	1,042,519
E. Lands not suited for timber production because timber production is not compatible with the desired conditions and objectives established by the plan (C-D)	1,678,938	1,666,897	1,663,460	1,677,436	1,670,360	1,664,899
F. Total lands not suited for timber production (B+E)	2,910,576	2,897,534	2,895,097	2,909,073	2,901,998	2,896,536

Table 353 displays the lands suitable for timber production by alternative in each management area. The No Action Alternative has the least acres suitable for timber production across all management areas, while all other alternatives have similar amounts. By a small margin, Alternative X and the Preferred Alternative have the largest number of suitable acres across all management areas.

Table 353. Acres and percent of national forest system land suitable [1] for timber production by management area and alternative.

Management Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 1 Suitable	0	0	0	0	0	0
MA 1 % Suitable	0%	0%	0%	0%	0%	0%
MA 2 Suitable	0	0	0	0	0	0
MA 2 % Suitable	0%	0%	0%	0%	0%	0%
MA 3 Suitable	1,028,480	1,041,522	1,043,959	1,029,983	1,037,058	1,042,519
MA 3 % Suitable	26.1%	26.4%	26.5%	26.2%	26.3%	26.5%

[1]Suitable acres include both acres suitable for timber production in Management Area 3 and acres suitable for timber harvest (unsuitable acres where timber harvest may occur to achieve other resource objectives) in Management Areas 2 and 3. Management Area 1 acres are classified as unsuitable.

Table 354 displays the acres of lands unsuitable for timber production by alternative in each management area and the associated percentage for each category. The No Action Alternative and all Action Alternatives have the same percentage of acres unsuitable for timber production across all management areas. Alternative X has the largest number of unsuitable acres across within Management Area 3 and the least acres within Management Area 2.

Table 354. Acres and percent of national forest system land unsuitable for timber production by alternative and management area.

Management Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 1	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638	1,231,638
MA 1	100%	100%	100%	100%	100%	100%
MA 2	1,489,735	1,468,512	1,463,088	1,487,457	1,474,157	1,467,078
MA 2	100%	100%	100%	100%	100%	100%
MA 3	189,203	197,385	200,372	189,969	196,122	197,385
MA 3	16%	16%	16%	16%	16%	16%

Total acres of National Forest System lands unsuitable for timber production where harvest may occur. Excludes lands where harvest would not be permitted for any purpose, such as designated wilderness, wilderness study areas, recommended wilderness, research natural areas, or wildland recreation settings. For the No Action Alternative, additional areas are excluded based on management area direction that prohibits harvest.

To the extent that recommended wilderness and backcountry restoration themes vary by alternative, so too does the area where harvest may be allowed on lands unsuitable for timber production. Table 355 compares the acres of unsuitable lands where harvest may occur for each management area. The total acres, as well as those that are within inventoried roadless areas found in Management Area 2, are displayed. This distinction is useful because within inventoried roadless areas only very limited harvest could occur per the 2008 Idaho Roadless Rule. The acres shown do not include non-forested vegetation types where no harvest would occur.

Table 355. Unsuitable lands where timber harvest may occur per decade, by alternative.

Management Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 1 - Unsuitable lands where timber harvest may occur	0	0	0	0	0	0
MA 2 - Unsuitable lands designated under the Backcountry Restoration Theme	377,575	377,575	377,575	377,575	377,575	377,575
MA 2 - Unsuitable lands designated under the Primitive Theme	124,246	124,246	124,246	124,246	124,246	124,246
MA 2 - Unsuitable lands designated under Special Area of Historic or Tribal Significance Theme	34,442	34,442	34,422	34,422	34,422	34,422
Total MA 2 Unsuitable Lands where timber harvest may occur	536,262	536,262	536,262	536,262	536,262	536,262
MA 2 - Percent of lands where timber harvest may occur per decade	1%	1%	1%	1%	1%	1%
MA 2 - Unsuitable lands where timber harvest may occur per decade	5,363	5,363	5,363	5,363	5,363	5,363
MA 3 - Unsuitable lands where timber harvest may occur (excludes RMZ)	103,545	108,206	110,355	104,018	107,503	108,434
MA 3 - Unsuitable lands where timber harvest may occur (Outer zone of RMZ)	85,658	89,180	90,017	85,952	88,618	89,387
Total MA 3 Unsuitable Lands where timber harvest may occur	189,203	197,385	200,372	189,969	196,122	197,821
MA 3 - Percent of lands where timber harvest may occur	1%	1%	1%	1%	1%	1%

Management Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 3 - Unsuitable lands where timber harvest may occur per decade	1,892	1,974	2,004	1,900	1,961	1,978
Total Unsuitable lands where timber harvest may occur per decade	7,255	7,337	7,367	7,263	7,324	7,341

Data Source: VMap and TimberSuitability20200923.xlsx.

Wood Product Supply

Projected timber and wood sale quantities were estimated using the Prism model based on reasonably foreseeable budget levels (Table 356 through Table 361). The model was run with a mix of objective functions based on the specific objectives for each alternative. Alternatives W and X target moving towards vegetation desired conditions as quickly as possible while meeting other resource constraints. Alternatives Y and Z had the same objective functions as W and X but the model was allowed to achieve desired conditions over a 50-and 100-year period, respectively. The Preferred Alternative was modelled similarly to Alternatives W and X in that the objective function was to achieve desired conditions within the specified time frame of 35 to 40 years. However, the distinctive variation within the Preferred Alternative is to also achieve the maximum sustained yield output following attainment of desired conditions. Model outputs are average annual outputs, which are averaged across projected decades. The model was constrained to harvest from both lands suitable for timber production and unsuitable lands where harvest may occur. These designations differ by alternative and influence the total acres available for timber harvest. All alternatives achieve the desired timber volume outputs within the time frames specified to accomplish the desired conditions. While Alternative X would generate the most volume, the Preferred Alternative achieves a volume between Alternative W and Alternative Y and achieves the highest non-declining even-flow volume through time.

Table 356. No Action Alternative – Average annual projected timber and wood sale quantities with reasonably foreseeable budget, PRISM model; sustained yield of 45 MMCF/241 MMBF.

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Timber Products	Volumes other than salvage or sanitation volumes that meet timber product utilization standards			
Lands suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
A1. Sawtimber	8.05	42.64	8	42.39
A2. Other products[2]	1.8	9.36	1.8	9.31
Lands not suitable for timber production				
B1. Sawtimber	1.24	6.56	1.28	6.81
B2. Other products	0.27	1.44	0.28	1.49
C. Projected Timber Sale Quantity (PTSQ)[1] (A1+A2+B1+B2)	11	60	11	60
Other Estimated Wood Products	Fuelwood, biomass, and other volumes that do not meet timber product utilization standards			
Empty cell	**MMCF**	**Tons**	**MMCF**	**Tons**
D. Fuelwood	1.17	14,000	1.17	14,000

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
E. Projected Wood Sale Quantity (PWSQ)[3] (C+D)	13	n/a	13	n/a

[1]Timber Products and Projected timber sale quantity (PTSQ) include volumes from harvested material (other than salvage or sanitation) that meet timber product utilization standards.

[2]Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

[3]Projected wood sale quantity (PWSQ) is the average annual estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. It consists of the PTSQ plus other material such as fuelwood, firewood, or biomass that is also expected to be available for sale.

Data Source: ptsw_pwsq_rev_FEIS.xlsx

Table 357. Alternative W – Annual average projected timber and wood sale quantities with reasonably foreseeable budget, PRISM model; sustained yield of 45 MMCF/241 MMBF.

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Timber Products	Volumes other than salvage or sanitation volumes that meet timber product utilization standards			
Lands suitable for timber production				
A1. Sawtimber	35.9	190.4	36.02	190.9
A2. Other products[2]	7.9	41.8	7.9	41.9
Lands not suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
B1. Sawtimber	1.36	7.22	1.27	6.72
B2. Other products	0.3	1.58	0.28	1.48
C. Projected Timber Sale Quantity (PTSQ)[1] (A1+A2+B1+B2)	45	241	45	241
Other Estimated Wood Products	Fuelwood, biomass, and other volumes that do not meet timber product utilization standards			
Empty cell	**MMCF**	**Tons**	**MMCF**	**Tons**
D. Fuelwood	1.17	14,000	1.17	14,000
E. Projected Wood Sale Quantity (PWSQ)[3] (C+D)	47	n/a	47	n/a

[1]Timber Products and Projected timber sale quantity (PTSQ) include volumes from harvested material (other than salvage or sanitation) that meet timber product utilization standards.

[2]Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

[3]Projected wood sale quantity (PWSQ) is the average annual estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. It consists of the PTSQ plus other material such as fuelwood, firewood, or biomass that is also expected to be available for sale.

Data Source: ptsw_pwsq_rev_FEIS.xlsx

Table 358. Alternative X – Annual average projected timber and wood sale quantities with reasonably foreseeable budget, PRISM model; sustained yield of 45 MMCF/241 MMBF.

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Departure increment	4.0	20	4	20
Departure Limit	49	261	49	261

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Timber Products	Volumes other than salvage or sanitation volumes that meet timber product utilization standards			
Lands suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
A1. Sawtimber	39.05	206.97	39.1	207.21
A2. Other products2	8.57	45.43	8.58	45.49
Lands not suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
B1. Sawtimber	1.33	7.05	1.28	6.81
B2. Other products	0.29	1.55	0.28	1.49
C. Projected Timber Sale Quantity (PTSQ)1 (A1+A2+B1+B2)	49	261	49	261
Other Estimated Wood Products	Fuelwood, biomass, and other volumes that do not meet timber product utilization standards			
Empty cell	**MMCF**	**Tons**	**MMCF**	**Tons**
D. Fuelwood	1.17	14,000	1.17	14,000
E. Projected Wood Sale Quantity (PWSQ)3 (C+D)	50	n/a	50	n/a

[1]Timber Products and Projected timber sale quantity (PTSQ) include volumes from harvested material (other than salvage or sanitation) that meet timber product utilization standards.

[2]Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

[3]Projected wood sale quantity (PWSQ) is the average annual estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. It consists of the PTSQ plus other material such as fuelwood, firewood, or biomass that is also expected to be available for sale.

Data Source: ptsw_pwsq_rev_FEIS.xlsx

Table 359. Alternative Y – Annual average projected timber and wood sale quantities with reasonably foreseeable budget, PRISM model; sustained yield of 45 MMCF/241 MMBF.

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Timber Products	Volumes other than salvage or sanitation volumes that meet timber product utilization standards			
Lands suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
A1. Sawtimber	21.89	116.03	21.92	116.19
A2. Other products[2]	4.81	25.47	4.81	25.51
Lands not suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
B1. Sawtimber	1.32	6.97	1.28	6.81
B2. Other products	0.29	1.53	0.28	1.49
C. Projected Timber Sale Quantity (PTSQ)[1] (A1+A2+B1+B2)	28	150	28	150

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Other Estimated Wood Products	Fuelwood, biomass, and other volumes that do not meet timber product utilization standards			
Empty cell	**MMCF**	**Tons**	**MMCF**	**Tons**
D. Fuelwood	1.17	14,000	1.17	14,000
E. Projected Wood Sale Quantity (PWSQ)[3] (C+D)	29	n/a	29	n/a

[1]Timber Products and Projected timber sale quantity (PTSQ) include volumes from harvested material (other than salvage or sanitation) that meet timber product utilization standards.

[2]Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

[3]Projected wood sale quantity (PWSQ) is the average annual estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. It consists of the PTSQ plus other material such as fuelwood, firewood, or biomass that is also expected to be available for sale.

Data Source: ptsw_pwsq_rev_FEIS.xlsx

Table 360. Alternative Z – Annual average projected timber and wood sale quantities with reasonably foreseeable budget, PRISM model; sustained yield of 45 MMCF/241 MMBF.

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Timber Products	Volumes other than salvage or sanitation volumes that meet timber product utilization standards			
Lands suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
A1. Sawtimber	11.33	60.02	11.05	58.55
A2. Other products[2]	2.49	13.18	2.42	12.85
Lands not suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
B1. Sawtimber	1.05	5.58	1.33	7.05
B2. Other products	0.23	1.22	0.29	1.55
C. Projected Timber Sale Quantity (PTSQ)[1] (A1+A2+B1+B2)	15	80	15	80
Other Estimated Wood Products	Fuelwood, biomass, and other volumes that do not meet timber product utilization standards			
Empty cell	**MMCF**	**Tons**	**MMCF**	**Tons**
D. Fuelwood	1.17	14,000	1.17	14,000
E. Projected Wood Sale Quantity (PWSQ)[3] (C+D)	16	n/a	16	n/a

[1]Timber Products and Projected timber sale quantity (PTSQ) include volumes from harvested material (other than salvage or sanitation) that meet timber product utilization standards.

[2]Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

[3]Projected wood sale quantity (PWSQ) is the average annual estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. It consists of the PTSQ plus other material such as fuelwood, firewood, or biomass that is also expected to be available for sale.

Data Source: ptsw_pwsq_rev_FEIS.xlsx

Table 361. Preferred Alternative – Annual average projected timber and wood sale quantities with reasonably foreseeable budget, PRISM model; sustained yield of 45 MMCF/241 MMBF.

Empty cell	First Decade MMCF	First Decade MMBF	Second Decade MMCF	Second Decade MMBF
Timber Products	Volumes other than salvage or sanitation volumes that meet timber product utilization standards			
Lands suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
A1. Sawtimber	27.99	148.34	27.69	146.78
A2. Other products[2]	6.14	32.56	6.08	32.22
Lands not suitable for timber production	Empty cell	Empty cell	Empty cell	Empty cell
B1. Sawtimber	1.41	7.46	1.7	9.02
B2. Other products	0.31	1.64	0.37	1.98
C. Projected Timber Sale Quantity (PTSQ)[1] (A1+A2+B1+B2)	36	190	36	190
Other Estimated Wood Products	Fuelwood, biomass, and other volumes that do not meet timber product utilization standards			
Empty cell	**MMCF**	**Tons**	**MMCF**	**Tons**
D. Fuelwood	1.17	14,000	1.17	14,000
E. Projected Wood Sale Quantity (PWSQ)[3] (C+D)	37	n/a	37	n/a

[1]Timber Products and Projected timber sale quantity (PTSQ) include volumes from harvested material (other than salvage or sanitation) that meet timber product utilization standards.

[2]Other Wood Products - Fuelwood, biomass, and other volumes that do not meet timber product utilization standards (small diameter 3 -7 inches).

[3]Projected wood sale quantity (PWSQ) is the average annual estimated quantity of timber and other wood products that is expected to be sold from the plan area for the plan period. It consists of the PTSQ plus other material such as fuelwood, firewood, or biomass that is also expected to be available for sale.

Data Source: ptsw_pwsq_rev_FEIS.xlsx

The effects on timber production are related to both the number of acres classified as suitable for timber production and acres classified as unsuitable lands where harvest may occur, as well as the objective functions of the model. Alternative X and the Preferred Alternative have slightly more suitable acres than the other action alternatives. Alternative X represents a departure alternative with 20 MMBF above the sustained yield limit, which generates the highest projected timber and wood sale quantities in the short-term. The Preferred Alternative generates yields below Alternative X and W but maintains a higher level of sustained yield over the next fifty years. The No Action Alternative and Alternatives Y and Z do less to meet the desired future vegetation conditions due to the extended time frame for implementation as described further in subsequent sections of this report.

Alternative W was modeled to represent harvest levels at the sustained yield limit of 241 MMBF. Implementation of Alternative W was scheduled to achieve desired conditions within 30 years. While Alternative W does achieve harvest levels at or near the sustained yield limit, the pace of desired condition attainment results in a decline of long-term timber yield over the next fifty years.

The sustained yield limit is constant at 241 MMBF except for Alternative X which is modeled as a departure alternative. As shown above, Alternative X, with a budget constraint, estimates a projected timber sale quantity slightly above (20 MMBF) the sustained yield limit for the first decade and second decades. Alternative X was modeled to allow for a departure from the sustained yield limit up to 261 MMBF per year based on departure analysis for the first two decades.

Alternative Y was modeled to achieve a projected timber sale quantity of twice the current harvest average but delay attainment of desired conditions until year 50. Due to limiting harvest over the first five decades, Alternative Y does not perform as well as Alternatives W and X and the Preferred Alternative at promoting preferred dominance types. Alternative Z was modeled to constrain timber harvest on both lands suitable for timber production as well as unsuitable lands where harvest may occur to analyze potential effects to Canada lynx and fisher habits. Given the time span of the Alternative Z projection, it does not produce meaningful results for comparison of projected timber sale quantity or projected wood sale quantity.

Development of the PTSQ objectives for the Preferred Alternative differs from the other action alternatives in that a minimum long-term sustained yield limit was set. The PRISM model was used to calibrate the highest long-term sustained yield limit possible following attainment of desired conditions for forested vegetation. Harvest volumes for the Preferred Alternative are expected to fluctuate between 190-210 MMBF per year over the first 4 decades of plan implementation. Following attainment of desired conditions, the harvest volumes are expected to fluctuate between 145 and 160 MMBF per year under the Preferred Alternative. This strategy of maximizing short term harvest volumes while also maximizing long term yields generates the best results in terms of reducing departure of forested vegetation to within the natural range of variation estimates.

The consequences related to attainment of projected timber sale quantity between alternatives are driven by the difference in the allocation of suitable lands and unsuitable lands where harvest is allowed, as well as the implementation schedule (pace and sale of restoration). The differences between alternatives related to unsuitable lands where harvest is allowed is driven by differences in the acres classified as recommended wilderness and recommended wild and scenic river designations. Additionally, the application of non-declining even flow constraints influenced attainment of projected timber sale quantity targets for all alternatives. Non-declining even flow, or non-declining yield, means that the volume from a certain land area is steady or increasing into the future. See Appendix B for further information.

Timber Demand

National and international market forces, as well as trade policies, have increased demand for regional timber. According to the Bureau of Business and Economic Research annual outlook in 2017, primary wood product sales, labor income, and employment levels are all up from previous years. The COVID-19 global pandemic caused short term shortages of timber products at all scales. Post pandemic demand for forest products is increasing in response to increases in demand for housing.

Alternative selection for the Nez Perce-Clearwater plan would not directly affect timber demand but may have some impact on timber supply elasticity and solvency for regional or state firms. Flexible timber supply chains are important for mills remaining in Idaho and the five-county area to compete and scale to meet national and international lumber demand. As observed in Figure 146, remaining mills in the region have an estimated additional capacity. Alternatives W and X and the Preferred Alternative would make a positive contribution to the regional timber supply in the short term. Considering the non-declining even-flow quantities projected by the model, Alternative X would contribute most to the regional timber supply in the short-term, but the Preferred Alternative contributes most over the fifty-year projection period.

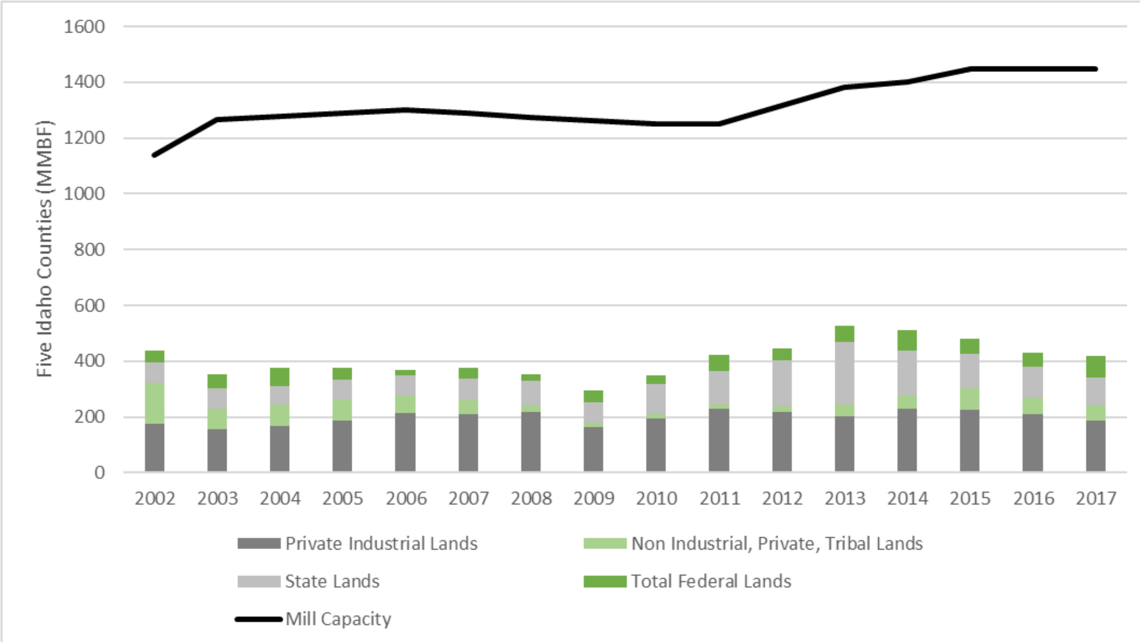


Figure 146. Timber sold versus mill capacity (in MMBF) for five Idaho counties, 2002-2017.

Data Source: Bureau of Business and Economic Research, University of Montana, Idaho's Forest Products Industry and Timber Harvest, 2015

Generally, substitution occurs where there is a mix of public and private land forests available to a mill. However, in the five-county area, the Nez Perce-Clearwater Preferred Alternative selection may have a direct impact on supply availability and, subsequently, sawlog prices.

The influence over timber supply also directly relates to area employment. Statewide, timber industry employment has dropped over the past decade in response to both mill closures and investments made by regional mills to increased efficiencies. See the Economic Sustainability and Social Sustainability sections for more information.

Timber Harvest

Table 362 and Table 363 display the projected acres of harvest that may occur to achieve the volumes shown in the previous section, assuming reasonably foreseeable budget constraints. Acres harvested are a mix of silvicultural prescriptions, including even-aged regeneration, such as clearcut, seed-tree, and shelterwood, and non-regeneration harvest, such as commercial thinning.

Table 362. Average annual treated acres by treatment type and alternative for Decade 1.

Management Area Vegetation Management Practices	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 2 Even-aged regeneration harvest methods	5,600	5,600	5,600	5,600	5,600	5,600
MA 2 Intermediate Treatments	0	0	0	0	0	0
MA 2 Prescribed fire	82,494	63,567	91,261	50,941	25,371	64,802
MA 2 Total Decade 1	88,094	69,167	96,861	56,541	30,971	70,402

Management Area Vegetation Management Practices	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 3 Even-aged regeneration harvest methods	13,168	114,334	113,017	69,904	31,823	83,628
MA 3 Intermediate Treatments	116,209	46,590	85,911	51,765	67,947	29,742
MA 3 Prescribed fire	146,151	22,948	50,001	34,697	49,999	15,992
MA 3 Total Decade 1	275,528	183,872	248,929	156,366	149,769	129,362

Data Source: PRISM – NPC_Alts_Outputs_111820.xlsx

Table 363. Average annual treated acres by treatment type and alternative for Decade 2.

Management Area Vegetation Management Practices	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 2 Even-aged regeneration harvest methods	5,600	5,600	5,600	5,600	5,600	5,600
MA 2 Intermediate Treatments	0	0	0	0	0	0
MA 2 Prescribed fire	94,507	88,119	87,514	56,068	7,298	48,023
MA 2 Total Decade 2	100,107	93,719	93,114	61,668	12,898	53,623
MA 3 Even-aged regeneration harvest methods	28,870	106,101	126,671	66,883	38,224	85,617
MA 3 Intermediate Treatments	11,490	37,234	44,090	54,739	39,006	34,836
MA 3 Prescribed fire	48,261	19,789	33,788	25,456	28,005	9,848
MA 3 Total Decade 2	88,621	163,124	204,549	147,078	105,235	130,301

Data Source: PRISM – NPC_Alts_Outputs_111820.xlsx

Projected treatment acres for Management Area 2 and 3 combined for both short term (20 years) and long term (50 years) are illustrated in Figure 147. Differences in acres treated between comparative periods and alternatives is due to the different pace and scale specific to each alternative, as well as the ratio of mechanical treatments and prescribed fire. Desired conditions for forested vegetation are constant for all alternatives. Given that the No-Action Alternative implements fewer harvest acres than the action alternatives, higher levels of prescribed fire are utilized to achieve desired conditions. Alternative X is designed to achieve desired conditions within 20 years. This results in implementing a high level of both mechanical harvest treatments and prescribed fire to meet desired conditions within two decades and a subsequent reduction in treated acres between the second and fifth decades. Both Alternative Y and the Preferred Alternative indicate an increase in treatment acres between short term and long-term projections. This is due to a projected increase in the application of prescribed fire to maintenance acres treated during the first 20 years.

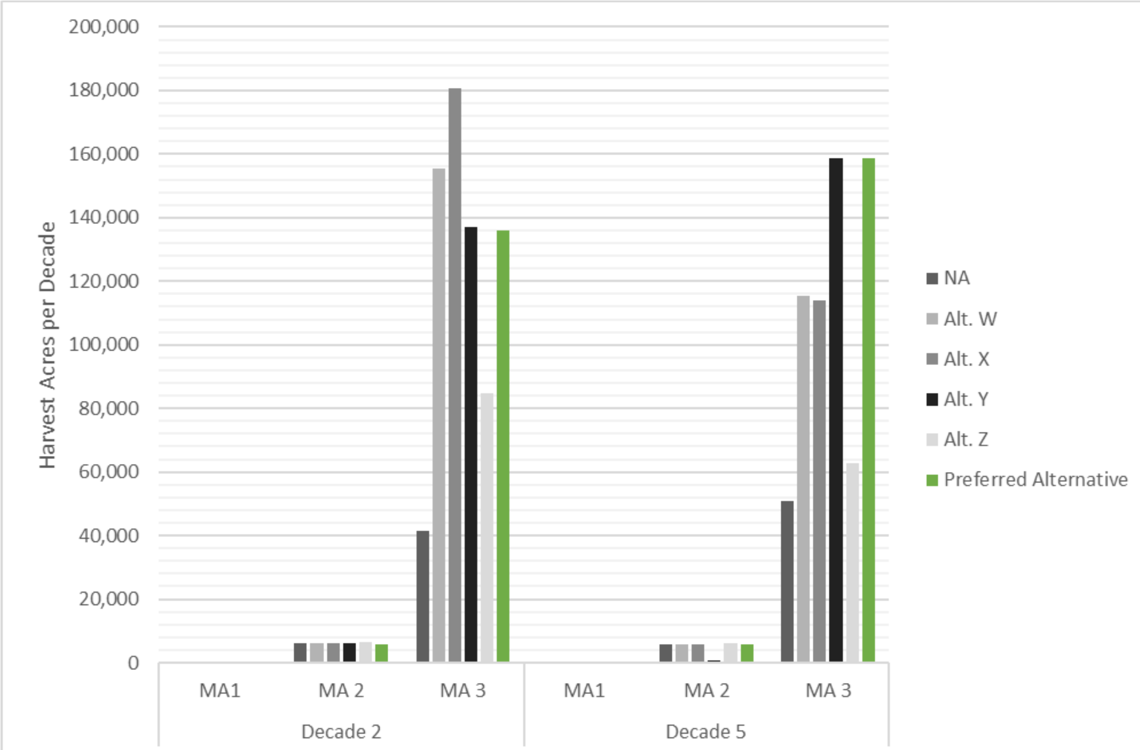


Figure 147. Harvest acres by decade for each Management Area.

Data Source: PRISM – Treatment_Tables_Graphs.xlsx

Alternative Z treats less acres per decade overall due to the long-time horizon (100 years) allowed to achieve desired conditions. With Alternative W and X, the constrained budget run shows substantially greater acres harvested in the short term because of the objective function to maximize timber volume. This aggressive short-term strategy to achieve desired conditions results in a decline in long term yields. Alternative Y falls in the middle between Alternatives W, X, and the Preferred Alternative. Acres treated per decade are generally lower in the Preferred Alternative compared to Alternatives W and X but promote higher yields following attainment of desired conditions. To achieve these treatment acres, budgets and management partnerships would have to be sustained through the entire rotational period for each alternative.

The differences in the alternatives with respect to acres of projected harvest and timber volume outputs can also be demonstrated by the vegetation types associated with the stands the model chose to harvest to meet the objective functions of each alternative (Figure 148). In all alternatives, the model prioritized the warm moist potential vegetation type group. This potential vegetation type is primarily composed of grand fir and associate species of Douglas-fir and lodgepole pine. The model was driven to do this based on the desired conditions that were supplied, such as looking for opportunities to increase the amount of western white pine, western larch, and ponderosa pine and to increase the abundance of large size classes. All alternatives prioritized treatment acres in the same order. The total acres treated in each potential vegetation type is similar across alternatives because the ratio of potential vegetation type acres is similar. There are more warm moist potential vegetation type acres available to the model for attainment of objectives functions than warm dry potential vegetation type acres, with the cold potential vegetation type having the least acres available for treatment. Site productivity is generally highest within the warm moist potential vegetation type group. To achieve harvest targets, the model prioritized treatment of the warm moist potential vegetation type group where average per acre volume yields and growth rates are highest.

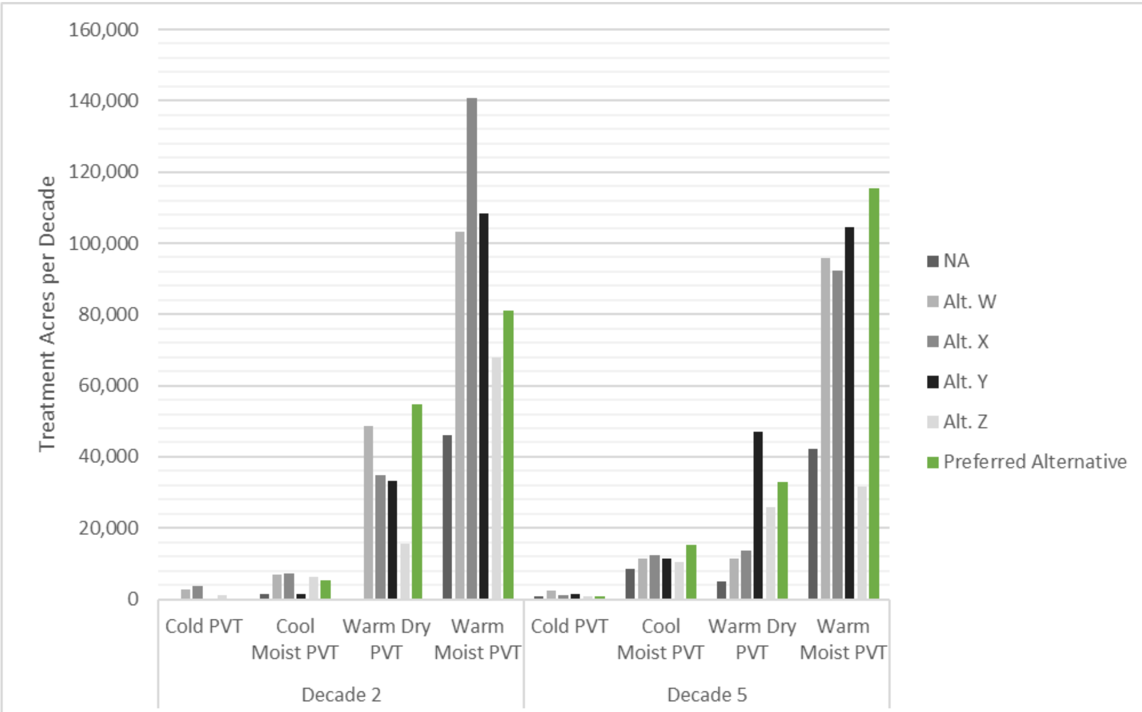


Figure 148. Projected harvest acres by potential vegetation type (PVT) by decade and alternative.

Data Source: PRISM – PRISM – Treatment_Tables_Graphs.xlsx.

PRISM optimized choices to maximize desired condition attainment using only desired conditions for dominance type, size class, and density class. More complex parameters for desired conditions were not feasible in the model design. These are very broad depictions of the desired condition at the forest-wide scale. While the model optimized these broad depictions of the desired condition by focusing treatments in warm moist and warm dry potential vegetation type groups in all alternatives, the results should not be misinterpreted to indicate that harvest treatments would not also be appropriate in cool moist and cold forests to contribute to other desired conditions, such as individual tree species presence, vertical structure, or landscape pattern patch size. Refer to the Forestlands section for a more detailed discussion of vegetation desired conditions.

Other Forest Products

Commercial use of other forest products is not allowed in Management Area 1, which is composed of designated wilderness, recommended wilderness, wilderness study areas, research natural areas, and wild and scenic river corridors. The differences between alternatives are driven primarily by the acres included in Management Area 2 (Idaho Roadless Rule areas) with designations of recommended wilderness, suitable and eligible wild and scenic rivers, and proposed research natural areas. The No Action Alternative is the only alternative that contains eligible wild and scenic rivers as defined under the 1982 Planning Rule. Access for the public to acquire other forest products is generally limited to the roaded front country referred to as Management Area 3. Table 364 summarizes acres where commercial use of special forest products is not allowed in Management Area 2. Acres within Management Area 2 do not differ by alternative relative to the restrictions for commercial use of forest products. Commercial use of special forest products is greatest in Alternative X and the Preferred Alternative, and least in the No Action Alternative.

Table 364. Acres by Idaho Roadless Rule theme where commercial use of special forest products is not allowed in Management Area 2.

Idaho Roadless Rule Categories	All Alternatives
Management Area 2	1,427,763
Backcountry Restoration	835,649
Land Management Plan Special Area	12,805
Primitive	311,155
Special Area of Historic or Tribal Significance (Includes 71 acres of the Lolo National Historic Trail administered by the Lolo National Forest)	21,020
Wild Land Recreation	247,133
Grand Total	1,427,763

Data Source: VMap.

Sustainability of timber harvest

Sustainability of timber harvest on lands suitable for timber production, as well as lands suitable for timber harvest, is integrated into the desired conditions for terrestrial vegetation. Best available scientific information is incorporated into the plan components, which inform each alternative. Standards and guidelines for the management and protection of the soils and coarse woody debris resource are applied to each alternative. Sustainability of timber harvest is required under the National Forest Management Act of 1976. The effects of the continued application of best available scientific information will promote the continued maintenance and improvement of site quality and productivity. As site productivity is maintained and enhanced through application of best available scientific information, sustainability of timber harvest is also maintained.

Effects Analysis

Effects from Land Management Plan components associated with terrestrial vegetation

The revised plan for the action alternatives contains detailed desired conditions for terrestrial vegetation. Timber harvest is one of the tools available to help move the forest toward those conditions. Although these desired conditions, or any similar metrics, are not enumerated in the existing 1987 Forest Plans, in practice, the Nez Perce-Clearwater would likely be managed in the spirit of these desired conditions under the No Action Alternative. The desired conditions translated into the PRISM model included the desired distribution of vegetation type species composition, size, and density classes. The most substantial desired shifts include an increase in western white pine, western larch, and ponderosa pine cover types and an increase in seedling/sapling and very large size classes. The potential types, locations, and frequency of future harvest would be influenced by these desired conditions. For example, harvest treatments may commonly be designed to increase the abundance of large size classes, open forests, or intolerant species compositions to contribute to the desired conditions of the forest.

The desired conditions for vegetation were a key component in the PRISM modeling to ensure the future projected harvest types and volumes would be consistent with the plan components for terrestrial vegetation. Prescribed burning, natural stand growth, and natural disturbances, such as wildfire and bark beetles, were also included in the model.

Figure 149 displays the relative performance of each alternative in terms of achieving forest plan desired conditions for dominance type, size class distribution and canopy cover density as projected with the PRISM model. This analysis assigns penalty points for acres not meeting forest vegetation desired conditions. Penalty points represent the degree of departure from desired conditions at the forestwide scale. Departure is assessed at each decadal time step (period 1 through period 10) of the model projection for a total of 10 decades (100 years). This analysis is also useful for comparing the pace and scale of forest restoration across alternatives.

The "horizontal bars" represent cumulative departure over 10 decades (x-axis at the top). This represents the scale of restoration. The lines represent Departure at each point in time (y-axis on the left). This represents the pace of restoration. The dots represent the point at which each alternative is intended to achieve desired conditions for dominance type, size class distribution and cover type density. As discussed above, Alternative W is designed to achieve desired conditions within 30 years, Alterative X within 20 years, Alternative Y within 50 years, Alternative Z within 100 years and the Preferred Alternative between 35 and 40 years.

Fewer penalty points indicate vegetation conditions were closer to the desired condition. Alternatives W and X and the Preferred Alternative indicate similar results in terms of moving the forest toward the desired conditions based on cumulative penalty points (horizontal bars on graph). The Preferred Alternative differs by less than ten percent from the cumulative penalty point totals of Alternatives W and X. At the forestwide scale, the Preferred Alternative performs best at achieving desired conditions. Alternative Z incurs the most penalty points, indicating it does not achieve the desired conditions as well as the other alternatives. Desired conditions for species composition, size class distribution, and density are not used as constraints on attainment of PTSQ and PWSQ objectives. The PTSQ and PWSQ objectives are obtained as a result of achieving desired conditions.

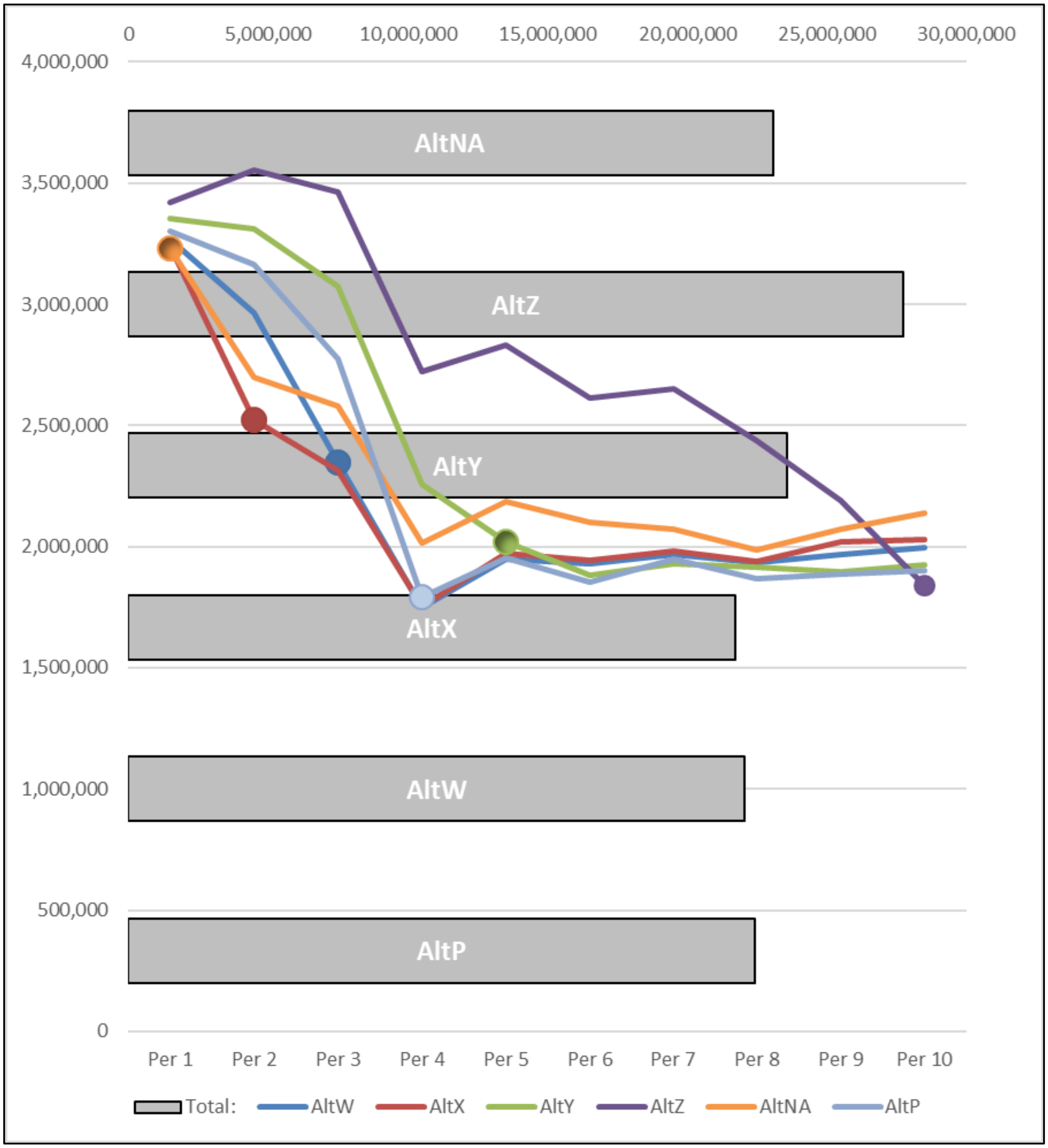


Figure 149. Desired condition PRISM penalty points by alternative under constrained budget.

Data Source: PRISM – NPC_Alts_Outputs_111820.xlsx.

The desired condition penalty points provide a relative comparison of how well treatments in PRISM contribute to terrestrial vegetation desired conditions; however, these results do not include dynamic interactions between treatments and ecological processes over time. To accomplish this, the PRISM results were incorporated into the SIMPPLLE model. Refer to the Forestlands section and Appendix B for more information on how each alternative meets the desired conditions for vegetation over time as modeled with the SIMPPLLE model.

Effects from Land Management Plan components associated with fire, fuels, insects and disease

Plan components related to the management of natural disturbances and prescribed fire would have effects to timber. Insects, disease, prescribed fire, and wildfire can affect the production of timber by killing and damaging trees. Conversely, these events can also provide for thinning of the forest and, while economic loss of specific trees may occur, can contribute to the long-term forest health and timber productivity depending on the site and severity of disturbance.

Under all action alternatives, plan components associated with prescribed burning and other fuels management would generally complement timber management, and vice versa, because all treatments would be designed to move towards desired vegetation conditions. Plan components in the No Action Alternative would also ensure that burning on lands suitable for timber production would complement timber production; less specificity is provided for lands unsuitable for timber production, as these lands are managed to achieve desired conditions for other resources.

The PRISM model included prescribed burning to move the forest toward desired future conditions. Burning treatments were applied as site preparation burns to promote reforestation, maintenance burns to manage stand density within harvested stands, and stand-alone burning prescriptions which typically support resource objectives other than timber management. Table 365 displays the acres of projected prescribed burning by alternative as an average per decade over the first three decades. The ability to achieve burning is highly uncertain and dependent upon many factors including prescribed burning windows, which are highly dependent on weather conditions. Prescribed burning is the primary tool used in the model, as well as in practice, to achieve desired conditions in Management Area 2. The No Action Alternative and Alternatives W and X project similar prescribed burning results for Management Area 2. Alternative Z utilizes prescribed burning to a lesser extent over the first three decades. Alternatives Y and the Preferred Alternative exhibit similar results.

Table 365. Average acres burned[1] per decade by alternative, reasonably foreseeable budget.

Management Area	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
MA 1	0	0	0	0	0	0
MA 2	62,937	58,599	64,184	42,597	11,101	45,386
MA 3	88,731	23,856	37,218	30,472	42,667	9,643

[1]Burning includes prescribed burning in harvested stands, as well as stand-alone ecosystem burning in forested vegetation types only. Additional burning would be expected to occur in non-forested vegetation types.

Data Source: PRISM model.

Prescribed burning treatment acres within Management Area 3 is more variable. The Preferred Alternative utilizes prescribed burning the least due to greater use of commercial thinning prescriptions. Alternatives W, Y, X, and Z utilize progressively more prescribed burning treatments to achieve desired conditions. The No Action Alternative utilizes the most prescribed fire considering both Management Areas 2 and 3. These results are directly correlated with the number of acres treated through timber harvest. If the model cannot achieve desired conditions through timber harvest, more prescribed fire is substituted to achieve desired conditions.

The SIMPPLLE model included a predicted amount of wildfire on the Nez Perce-Clearwater based on current fire suppression success and historic fire starts, as well as potential insect and disease activity. Refer to the Forestlands section for a summary of the acres affected. Under the action alternatives, plan components recognize the importance of these processes on the landscape. The No

Action Alternative emphasizes the control of these disturbances on lands suitable for timber production.

Under all alternatives, potential for salvage treatments exists to harvest dead and damaged timber after natural disturbances or sanitation treatments are utilized to attempt to slow or impede insect and disease infestations from spreading. The degree to which these harvests are undertaken would depend upon the risks associated with wildfire potential, infestation spread into healthy stands, public safety, the presence of high value resources, and the resource emphasis of the area. The risks would all be determined at the site-specific project level of analysis and decision. Sanitation and salvage treatments are not part of the estimated timber volume outputs over time. In the past, fire salvage has occurred on a small proportion, about two percent, of burned acres on the Nez Perce-Clearwater. In general, it would not be expected that future salvage would occur to a much greater degree than has been done in the past; however, the potential for future salvage would depend on the type and location of future fire events. It is possible that increasing large fires in lands suitable for timber production could result in an increased amount of salvage harvest, as permitted by plan components. This activity could result in additional volume outputs beyond what is predicted by the projected timber sale and wood sale quantities. These plan components are not considered constraints on attainment of PTSQ or PWSQ objectives.

Effects from Land Management Plan components associated with recreation opportunity settings

Recreation opportunity settings are mapped designations that may influence access for harvest or how much timber harvest can occur on the landscape for all alternatives, as described in the Land Management Plan. The existing 1987 Forest Plans, also known as the No Action Alternative, utilized the visual quality objective methodology, a system analogous to the recreation opportunity spectrum. The recreation opportunity spectrum was not used in the modelling process to restrict harvesting or prescribed burning treatments nor restrict attainment of desired conditions for forest vegetation.

The recreation opportunity spectrum utilizes six classes that describe settings ranging from highly modified and developed, to primitive and undeveloped. Each class defines and sets broad management direction for specified motorized access and recreation settings. Recreation opportunity classes vary by alternative in size and location across the Nez Perce-Clearwater and influence potential vegetation treatments, particularly timber harvest. Generally, the rural and roaded natural classes provide the most opportunity for suitable roaded access and levels of development that support timber harvest and other vegetation treatments. The semi-primitive motorized class would allow for some timber harvest but at reduced levels from the rural and roaded natural classes. Timber harvest is essentially prohibited in the semi-primitive non-motorized and primitive classes.

Given that the primitive recreation opportunity spectrum class is associated with wilderness and classified as unsuitable acres, this designation is accounted for in the modelling process and has no impact on potential timber harvest. Semi-primitive non-motorized is primarily associated with unsuitable lands designated under the Idaho Roadless Rule area in Management Area 2. Approximately one percent of Idaho Roadless Rule areas are subject to harvest. Harvest is restricted to the backcountry restoration, Land Management Plan special areas, primitive, and special areas of historic or tribal significance themes and may only occur to achieve other resource objectives.

The acres allocated to summer recreation opportunity settings by action alternative are shown in Table 366 for lands suitable and unsuitable for timber production. From the perspective of summer recreation opportunity spectrum classes, Alternative X would allow for the most opportunity for timber harvest with 57.5 percent of the summer recreation opportunity spectrum categories in roaded classes. Alternative Z would offer the least opportunity with 42.6 percent in roaded classes. The other alternatives offer intermediate levels of opportunity, with Alternative W at 46.8 percent, No Action Alternative at 44.7 percent, and Alternative Y at 43.8 percent in roaded classes.

Table 366. Acres of summer recreation opportunity spectrum classes by action alternative, for lands suitable and unsuitable for timber production.

Alternative by Suitability Class	Primitive[2]	Semi-Primitive Non-Motorized	Semi-Primitive Motorized	Roaded Natural	Rural
Alternative W Suitable	22	8,024	371,270	514,377	116,360
Alternative W Unsuitable	1,167,405	917,130	542,414	262,980	39,073
Alternative X Suitable	11	9,161	371,670	515,139	116,362
Alternative X Unsuitable	1,167,462	495,766	688,740	335,673	39,071
Alternative Y Suitable	11	7,273	369,307	506,668	115,843
Alternative Y Unsuitable	1,184,141	1,017,851	384,124	314,249	39,590
Alternative Z Suitable	11	6,881	371,510	512,709	116,360
Alternative Z Unsuitable	1,184,141	1,067,210	345,334	295,829	39,073
Preferred Alternative Suitable	0	17,885	76,841	1,023,595	122,019
Preferred Alternative Unsuitable	1,139,059	624,187	886,665	46,490	2,315

[1]Alternative Y varies slightly from Alternative Z in terms of recreation opportunity spectrum classes in unsuitable lands and are within a few hundred acres for all classes. These differences are negligible in the context of the timber analysis, and the relative amounts and trends are the same. The acres for suitable lands are the same.

[2]The small inclusion of primitive in suitable lands for all Alternatives is likely the sum of tiny mapping errors.

Data Source: GIS

Primitive settings are not suitable for timber production and no harvest is allowed. Plan components in the Land management plan ensure that no vegetation management occurs. This setting often corresponds to designated and recommended wilderness. Natural processes are the drivers of vegetation change.

Semi-primitive non-motorized areas are not suitable for timber production, although limited amounts of harvest can occur to maintain desired vegetation conditions. These areas are often, but not always, associated with inventoried roadless areas and limitations on harvest from the 2008 Idaho Roadless Rule may also apply. These areas typically have poor access and either natural processes or prescribed fire would be drivers of vegetation change more often than timber harvest.

Semi-primitive motorized settings may or may not be suitable for timber production based on other factors and harvest for other purposes is generally allowed. Harvest would be expected to occur at low to moderate levels. This recreation opportunity spectrum is considered a constraint on attainment of desired conditions for species composition, size class distribution, and density.

Roaded natural settings are suitable for timber production and harvest is generally allowed. Typically, good road access and vegetation management may be evident while in harmony with the scenic character of the area. Harvest may be a commonly used tool in these areas to affect vegetation change.

Effects from Land Management Plan components associated with scenery management

Scenic integrity objectives (SIO) are also mapped allocations that may influence timber harvest intensity and distribution of harvest units on the landscape for all action alternatives, as described in the plan components in the Revised Forest Plan. Scenic objectives are consistent with recreation opportunity spectrum classes and timber suitability and are inherently reflected in the timber projections shown in previous sections of this report. In all alternatives, a scenic integrity objective of high makes up a substantial portion of unsuitable lands, which is largely driven by inventoried roadless areas and wild and scenic river corridors. High scenic objectives may also occur on suitable lands based on viewpoints and other criteria. All alternatives are similar with respect to the proportions of scenic integrity objectives identified as high, moderate, and low across lands suitable for timber production as illustrated in the following Table.

Table 367. Acres of scenic integrity objectives by Management Area and alternative

Management Area / SIO	Alt. NA	Alt. W	Alt. X	Alt. Y	Alt. Z	Preferred Alternative
MA1/ High	123,062	53,344	74,897	74,812	74,798	74,642
MA1 / Very High	1,108,576	1,178,293	1,156,741	1,156,826	1,156,840	1,156,996
MA2/ High	535,779	552,610	326,324	564,220	604,917	400,979
MA2/ Low	146	427	427	145	0	427
MA2/ Moderate	953,811	915,468	1,136,329	923,069	867,447	1,065,671
MA3/ High	7,478	43	43	43	43	926
MA3/ Low	444,242	529,110	529,646	529,110	529,020	524,394
MA3/ Moderate	765,962	709,760	714,648	690,831	705,992	715,021
Total Acres	3,939,056	3,939,056	3,939,056	3,939,056	3,939,056	3,939,056

Harvest may be precluded in areas with a very high scenic quality objective where the valued landscape character should be intact, and landscapes generally reflect natural ecological processes only. Such areas typically correspond to primitive recreation opportunity settings, including wilderness, recommended wilderness, wilderness study act areas, and research natural areas.

Areas with a high scenic integrity objective primarily correspond to inventoried roadless areas, wild and scenic river corridors, portions of the Gospel Hump geographic area, and the Lolo Trail National

Historic Landmark corridor. Timber production and harvest may be allowed on limited areas in some of these areas, but scenery and other regulatory limitations would result in low to moderate amounts of harvest. This scenic integrity objective requires that landscape character appear intact and management activities do not dominate the landscape.

Areas with a moderate scenic integrity objective are often suitable for timber production or harvest for other purposes, depending on other factors. These landscapes may appear slightly altered, although management activities remain visually subordinate to the overall landscape character.

Areas with low scenic integrity objectives are also often suitable for timber production or harvest for other purposes. These landscapes may appear altered and management activities are visible.

The existing 1987 Forest Plans, also referred to as the No Action Alternative, do not include the scenic management system or associated scenic integrity objectives as described above for the action alternatives. However, visual quality objectives, as described for the visual management system (U.S. Department of Agriculture 1974c), were specified by management area, as shown in Table 368.

Table 368. Acres of visual quality objective for lands suitable and unsuitable for timber production in the No Action Alternative.

Visual Quality Objective	Lands Suitable for Timber Production	Lands Unsuitable for Timber Production
Preservation	0	1,231,638
Retention	27,645	403,250
Partial Retention	93,828	304,065
Modification	336,461	551,692
Maximum Modification	374,065	439,931

Data Source: GIS.

In areas with a preservation visual quality objective, only ecological changes are allowed; no timber harvest would occur. Primarily wilderness and recommended wilderness have this objective. No lands suitable for timber production have a visual quality objective of preservation.

A retention visual quality objective allows for management activities which are not visually evident. While some harvest could be allowed, these lands are generally not suitable for timber production and may correspond to designations such as inventoried roadless areas.

A partial retention visual quality objective indicates that management activities must remain visually subordinate to the characteristic landscape. Some of these lands are suitable for timber production and harvest on unsuitable lands, although the type and rate of harvest would likely be less than lands with a modification or maximum modification objective.

With a modification visual quality objective, management activities, such as timber harvest, may visually dominate the original characteristic landscape. This is the most common visual quality objective on the Nez Perce-Clearwater for both lands suitable and unsuitable for timber production.

Under the maximum modification visual quality objective, management activities, such as timber harvest, may visually dominate the original characteristic landscape. Scale is the primary difference between modification and maximum modification.

Under all alternatives, additional site-specific scenery requirements would influence project design and potentially the amount, type, or location of harvest activities. Scenery plan components are potential constraints on attainment of PTSQ and PWSQ objectives.

Effects from Land Management Plan components associated with inventoried roadless areas

Inventoried roadless areas are not suitable for timber production and the extent of roadless areas vary by alternative as a function of recommended wilderness acres. Timber harvest may be allowed but is limited under the 2008 Idaho Roadless Rule as a function of the designated roadless rule theme. The legal requirements for management of inventoried roadless areas would influence timber harvest and outputs under all alternatives. Recommended wilderness areas may be adjacent to inventoried roadless areas and harvest may be further restricted. Therefore, to the extent that recommended wilderness areas vary by alternative, so too does the amount of inventoried roadless areas where harvest may occur.

Table 352 compared the area of unsuitable lands where harvest may occur across alternatives, including inventoried roadless areas. Table 369 displays the acres of inventoried roadless areas where harvest could potentially occur within inventoried roadless areas that are not also recommended wilderness, primitive recreation settings, or where harvest is otherwise prohibited. The estimate of unsuitable acres is the same for all action alternatives and is confined to the area within one mile of any open road within the inventoried roadless area. Unsuitable acres are also limited to only those Idaho Roadless Rule themes for which timber harvest is allowed, including backcountry restoration, primitive, and special areas of historic or tribal significance.

Table 369. Lands (in acres) where harvest may occur in inventoried roadless areas under all action alternatives.

Inventoried Roadless Areas	Harvestable Acres
Acres of Inventoried Roadless Area Classified as Unsuitable Lands where harvest may occur to achieve other resource objectives	536,263
% Of Nez Perce-Clearwater	14
% Of Management Area 2	38

Data Source: GIS.

In inventoried roadless areas where harvest may be allowed, the legal requirements of the 2008 Idaho Roadless Rule would limit the purposes for which harvest could occur for ecosystem restoration and to achieve desired conditions for other resources. Possible purposes of harvesting would include improving at-risk species habitat or maintaining or restoring ecosystem composition and structure within the natural range of variation. Appendix E of the revised plan provides guidance for implementing activities in inventoried roadless areas. The effect of this direction would be to limit the acres of harvest and volume outputs that may occur. Timber harvest in inventoried roadless areas also requires additional analysis and receives a great deal of both public and agency scrutiny.

The PRISM model was formulated to allow limited harvest in inventoried roadless areas not precluded by any other designations as a possible option in the management solution to move towards desired future conditions. Plan components related to management of inventories roadless areas are not considered constraints on attainment of PTSQ and PWSQ objectives.

Effects from Land Management Plan components associated with recommended wilderness

Recommended wilderness designations have little impact on potential timber outputs. This is because recommended wilderness areas tend to be in areas that do not contain lands that may be suitable for timber production and tend to be in designated inventoried roadless areas where harvest is greatly limited, as described in the preceding section. In short, timber harvest would be limited in these areas regardless of whether they are recommended as wilderness due to other restraining factors. Across all alternatives, there are no (0%) acres of recommended wilderness that are suitable for timber production. Alternative W has the greatest acres of recommended wilderness that were classified as unsuitable acres were timber harvest can achieve other resource objectives and represents the highest degree to which potential timber harvest was forgone for recommended wilderness. Several recommended wilderness areas including East Meadow Creek, West Meadow Creek and Bighorn-Weitas contain roaded access which provides opportunities to manage vegetation to achieve other resource objectives. A recommended wilderness designation would limit management options, preclude mechanical vegetation treatment options, and rely only on the use of wildland fire to achieve desired conditions. Plan components related to recommended wilderness areas are not considered constraints on attainment of PTSQ and PWSQ objectives.

Effects from Land Management Plan components associated with livestock grazing

In all alternatives, livestock grazing would occur both in lands suitable for timber production and in unsuitable areas where harvest occurs for other purposes. Acres of land suitable for timber production that are also within current livestock allotments are shown in Table 370 by alternative. Alternative X has the most lands where harvest could occur in livestock allotments because it has the most lands suitable for timber production and no recommended wilderness areas. The Preferred Alternative has the second highest number of acres suitable for timber production followed by Alternatives W, Z, Y and the No Action Alternative, in descending order of suitable acres. By contrast, the No Action Alternative has the largest number of active grazing allotment acres within lands unsuitable for timber production. In descending order of active grazing allotment acres, Alternative Y has the most acres of all the action alternatives, followed by Alternatives Z, W, and the Preferred Alternative.

Table 370. Acres where timber harvest can occur within livestock allotments.

	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Acres suitable for timber production	410,597	415,068	416,341	411,601	414,160	416,082
Acres unsuitable for timber production	195,696	191,226	189,952	194,692	192,133	190,212

Data Source: GIS.

Management direction that addresses livestock grazing and timber harvest and production would have similar results across all alternatives. While grazing and trampling from livestock can damage seedlings and saplings, plan components would ensure that grazing is managed to avoid impacting the regeneration of forests impacted by harvest, fire, or other disturbances. Plan components would also ensure that grazing is managed in a manner that would not lower site productivity through damages, such as compaction, and would not preclude the production of timber or other forest products under any alternative. The action alternatives also contain plan components that would encourage grazing activities that complement timber stand tending goals, and vice versa, where appropriate, such as reducing fine fuels to lower fire risk or utilizing forage stimulated by harvest. Plan components related to livestock grazing are not considered constraints on attainment of PTSQ and PWSQ objectives.

Effects from Land Management Plan components associated with watershed and conservation watershed network management

Watershed plan components exist for all alternatives but are more specific in the action alternatives than in the No Action Alternative. These components may affect timber management in that the scale and types of harvest would be influenced by the desired conditions intended to protect watershed function and water quality. Watershed and conservation watershed network plan components will result in limiting harvest, such as when forest cover needs to be retained to limit erosion. This may also limit vegetation management including timber harvest intended to reduce fuel loading to buffer effects of potential high severity wildfire and lesson crown fire potential. The management direction in the action alternatives recognizes more flexibility in these scenarios than the No Action Alternative. The action alternatives also include components that specifically address conservation watershed network and restoration strategies. In all alternatives, plan components related to reducing sediment by limiting or reducing road miles may limit access for timber harvest or reduce feasibility due to the cost of accessing some areas. Such limitations are more explicitly identified in the action alternatives than in the No Action Alternative but the impacts to future management would be similar for all alternatives. Plan components associated with watershed and conservation watershed network management are considered constraints on attainment of PTSQ and PWSQ objectives.

Effects from Land Management Plan components associated with soils management

Under all alternatives, plan components related to soils would generally benefit the timber resource by ensuring that soil productivity and future timber growth is maintained in the long-term. Standards and guidelines related to soils would have the general impact of limiting timber production and harvest in some areas to the extent that activities that may be detrimental to soils, such as repeated compaction and operating equipment on steep slopes or under saturated soil moisture conditions, would be restricted. Such restrictions have been applied to recent timber management activities and continuing these practices would help sustain future timber production and are generally the same for all alternatives. The action alternatives provide greater specificity in the standards and guides for soils than the No Action Alternative, particularly with respect to allowable detrimental disturbance and post-treatment ground cover requirements. Plan components related to soils management are not considered constraints on attainment of PTSQ and PWSQ objectives.

Effects from Land Management Plan components associated with aquatic habitat and riparian areas

Measures to protect aquatic habitat and riparian areas would apply under all alternatives. Refer to the Soils Resources, Water Resources, Ecology, and Wildlife sections for information detailing the vegetation management that is allowed in these areas. The desired conditions, management restrictions, and other regulations that apply to areas near streams, water bodies, and wetlands would limit the amount of timber that may be harvested and affect the types of harvest systems used or may reduce operational feasibility of harvest.

Under all alternatives, riparian management zones would be established. Riparian management zones (RMZ) are superimposed onto riparian areas. Due to changing topography, slope, and slope position, riparian management zones typically include both riparian areas and upland areas. The width of the zones depends on the class of stream and both inner and outer management zones are defined. These management zones are exclusion zones which define limitations specific to vegetation management and harvest. Limitations are more stringent in the inner riparian zones where management must specifically benefit the aquatic resource. In the outer riparian management zones, vegetation management may occur to achieve a wide range of desired conditions if it does not preclude achievement of desired conditions for riparian resources and wildlife in the inner zone. No salvage harvest or fuelwood cutting could occur in the inner riparian management zone and no clearcutting could occur in any part of the riparian management zones. Other standards and guidelines related to landing and road construction would also apply.

Riparian areas, as defined by any alternative, are not suitable for timber production because management requirements and constraints preclude planning a scheduled flow of timber products. However, harvest may occur when consistent with management restrictions and desired conditions for the riparian resources. Under all alternatives, riparian management zones were excluded from the mapping of lands suitable for timber production due to the difficulty in mapping explicit ecotone boundaries. Rather, riparian management zones associated with water features are unsuitable inclusions. Within each riparian management zone, the inner management zone is classified as unsuitable for timber harvest and the outer management zone is classified as unsuitable lands where harvest may occur to achieve other resource desired conditions or objectives.

Across all action alternatives, unsuitable lands where timber harvest may occur to achieve other resource objectives are all associated with outer riparian management zones. All inner riparian management zones are classified as unsuitable lands where timber harvest is prohibited. Within Management Area 2, the differences between alternatives is driven by differences in total acreage of unsuitable lands where timber harvest may occur to achieve other resource objectives. Alternative W has the largest percentage of unsuitable lands associated with outer riparian management zones. Both the Preferred Alternative and Alternative X have the lowest percentage of unsuitable lands associated with outer riparian management zones.

At the forestwide scale, differences in outer riparian management zone acreage between alternatives is negligible. It is estimated that only one percent of the outer riparian management zone may be managed to achieve desired conditions each decade. For this reason, it is unlikely that desired conditions for riparian vegetation will be achieved. Natural disturbance events will continue to dominate forest succession and vegetation pattern within riparian areas. For the No Action Alternative, suitability was defined differently under the 1987 Plans and are not relevant to Management Area 3. Plan components associated with aquatic habitat and riparian areas are considered potential constraints on attainment of PTSQ and PWSQ objectives.

Riparian management zone guidance associated with fish-bearing perennial streams would have the potential to limit timber harvest on one to two percent of lands suitable for timber production or other lands where harvest could occur, depending on alternative. However, vegetation management could occur within the outer riparian management zones identified for the action alternatives. The most stringent guidance would apply to the inner riparian management zones, which would not differ substantially from the size of streamside management zones.

Previous harvest has occurred in the riparian zones for perennial fish-bearing streams before 1995 when the PACFISH and INFISH regulations were adopted. Since 1995, only minimal pre-commercial thinning has been accomplished in riparian management zones. Over the last 80 years, fire suppression has limited natural fire disturbance within defined riparian management zone areas. During this same span of time, forested riparian corridors have increased in density and species composition has shifted toward climax species dominance. Forest succession has begun to shift species composition within riparian management zones toward a dominance of conifer species and reduced composition of hardwood species, such as cottonwood, birch, willows, and alder. The current forested riparian ecosystems are not functioning within the natural range of variation for fire return interval or species composition and age class distribution. The continued practice of excluding riparian management zones from vegetation management will further jeopardize these important ecotones and threaten fisheries and riparian habitats.

Based on the extent of riparian management zones in potential harvest areas and because harvest may occur to some degree, the potential impact of the management restrictions in riparian areas is not likely so great that the projected timber volumes and expected harvest treatments generated by the PRISM model would be affected to a great degree with respect to the programmatic timber analysis.

Effects from Land Management Plan components associated with the Lolo Trail National Historic Landmark

The Lolo Trail National Historic Landmark runs through the Nez Perce-Clearwater plan area. Many stretches of this trail lie within designated wilderness, where timber harvest is prohibited. Other stretches are in inventoried roadless, where timber harvest is largely constrained. However, some stretches of this trail are also located in areas where harvest could occur, including both areas that are suitable for timber production and those unsuitable for timber production where harvest can occur for other purposes. In these areas, harvest may occur but would be constrained by plan components associated with the trail, which are designed to maintain a high or very high scenic integrity objective within half a mile of either side of the trail.

The lands where some form of harvest is permitted within half a mile of the Lolo Trail National Historic Landmark are shown in Table 371. Alternatives W and Y and the Preferred Alternative have identical acreage adjacent to the Lolo Trail that are suitable for timber production, with Alternative X having the most and Alternative Z the least. Alternative Z has the most lands unsuitable for timber production where harvest may occur to achieve other resource objectives and adjacent to the Lolo Trail; Alternative W has the least. The differences between alternatives are largely as a function of recommended wilderness areas. In these areas, the types of harvest and amount of volume removed may be limited or may be more complex to implement to meet the guidelines associated with the trail. Plan components associated with the Lolo Trail National Historic Landmark are not considered constraints on attainment of PTSQ and PWSQ objectives given the limited scale of this resource.

Table 371. Acres where harvest may occur within half a mile on either side the Lolo Trail National Historic Landmark.

	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Lands Suitable for Timber Production	27,506	27,506	27,618	27,506	26,964	27,506
Lands Unsuitable for Timber Production where Harvest may Occur	26,268	8,369	31,180	31,239	31,780	31,239

Data Source: VMap.

Effects from Land Management Plan components associated with elk management

Under all alternatives, the management of elk habitat is commensurate with managing for vegetation desired conditions. Management of elk habitat is focused on four components, including improved nutrition, distance from open motorized access, habitat use in context of elk use of slopes, and vegetation interspersion. Plan components do not vary by alternative or management area. The potential influences of elk management plan components cannot be explicitly modeled and quantified with PRISM or SIMPPLLE models but can be inferred from vegetation management plan components and modelled vegetation response to management.

Elk management plan components focused on improved nutrition are not likely to restrict timber harvest. Elk plan components may influence selection of treatment locations and the distribution of treatments focused on areas with the highest potential to produce high quality forage for elk. Management guidelines focused on access management are driven more specifically by forest level travel management decisions than road systems developed for timber harvest units. Most roads utilized for timber harvest unit access are temporary roads, which may or may not be accessible to the public. Elk management guidelines may influence the construction of new road segments proposed for timber access relative to location and closure status.

Given the scale of analysis for ecosystem restoration projects; elk management components focused on topographic position of elk habitats are not likely to influence decisions related to location of timber harvest units. Forest-wide vegetation plan components are focused on moving vegetation towards desired conditions across all broad potential vegetation type groups located on all topographic positions. Arrangement of harvest units on the landscape are intended to reflect landscape forest patterns and variation in patch size resulting from natural fire regimes. Elk management components focused on vegetation interspersion are compatible with vegetation management components. Plan components associated with elk management are not considered constraints on attainment of PTSQ and PWSQ objectives.

Effects from plan components associated with Canada lynx management

All alternatives would incorporate the Northern Rockies Lynx Management Direction (U.S. Department of the Interior 2017c). This direction would influence timber activities in potential lynx habitat, which is identified based on potential vegetation types. Refer also to Appendix 8 of the Land Management Plan. For the timber resource, the impacts of lynx management would have the greatest effect on lands suitable for timber production but would also influence harvest that occurs on unsuitable lands.

The management guidance that would influence timber production and harvest in potential lynx habitat includes not allowing harvest in multi-storied forest except in specified situations, possibly limiting the extent of regeneration harvest depending on how much stand initiation habitat is present in each lynx analysis unit, and not allowing pre-commercial thinning in stand initiation habitat. Some exceptions and considerations would apply, including, but not limited to, treating lands adjacent to administrative sites, treating lands in the wildland urban interface, and conducting treatments to restore whitebark pine. The lynx management direction also notes the potential for vegetation management to occur that would help develop desired habitat characteristics. This may influence the type of harvest conducted in some areas; for example, uneven-aged harvests may be used to help develop multi-storied forests.

Although the management constraints are only required in occupied lynx habitat, the guidance is considered on all lands as per Regional Office direction. This focus on applying lynx habitat guidance on all lands creates potential conflicts with the restoration of both western white pine and whitebark pine. Occupied lynx habitat has been identified by the United States Fish and Wildlife Service. However, because the guidance should be considered on all lands and there is potential for occupied habitat to change, lynx constraints are analyzed across the entire Nez Perce-Clearwater. Lynx constraints were applied to the PRISM model. The projected harvest quantities, types, and volume outputs shown in this section reflect lynx management direction to the extent possible. These constraints included:

- Limiting the percent of areas that can have a regenerating harvest or prescribed burn
- Not allowing pre-commercial thinning in certain vegetation types
- Not allowing treatment in multistoried[25] habitat

Table 372 compares the area suitable for timber production with those areas also characterized as potential lynx habitat, by alternative. This illustrates the magnitude of potential impact to lynx habitat and are similar across all alternatives. In general, potential lynx habitat influences approximately 20 percent of lands suitable for timber production under each alternative.

Table 372. Potential lynx habitat (acres and percent) within lands suitable for timber production, by alternative.

	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Acres Suitable for timber production	1,028,480	1,041,522	1,043,959	1,029,983	1,037,058	1,042,519
Acres of potential lynx habitat in areas suitable for timber production	211,759	212,218	212,769	211,894	209,253	212,209
Percent of land suitable for timber production in potential lynx habitat	20.6%	20.4%	20.4%	20.6%	20.2%	20.4%

Source: Vmap.

Plan components associated with Canada Lynx management are considered potential constraints on attainment of PTSQ and PWSQ objectives. See Appendix B for more information. Also see the Forestlands section for a description of effects from lynx management on vegetation management and desired conditions.

Effects from plan components associated with fisher habitat management

Alternative Z and the Preferred Alternative incorporate management direction for fisher. This direction would influence timber activities in potential fisher habitat. Refer also to Appendix C for a detailed discussion on fisher habitat. For the timber resource, the impacts of fisher management would have the greatest effect on lands suitable for timber production but would also influence harvest that occurs on unsuitable lands.

The management guidance that would influence timber production and harvest in potential fisher habitat includes maintaining connectivity between large patches of mature trees where mature trees occupy approximately 50 percent of the forest cover type. The remaining forest cover type is

[25] The definition of multistoried habitat as used in context of lynx habitat is not the same as the silviculture context. Please refer to the Northern Rockies lynx Management Direction (2007) for an explanation of how multistoried habitat is defined.

composed of a mosaic of height and age classes in a distribution that reflects natural disturbance patterns. Large trees and snags of 20-inch plus diameter at breast height are distributed in both patches and scattered within the habitat. Fisher management direction also notes the potential for vegetation management to occur that would help develop desired habitat characteristics. This may influence the type of harvest conducted in some areas; for example, uneven-aged harvests may be used to help develop multi-storied forests which provide multiple canopy layers needed to provide denning and resting habitats.

Fisher constraints were applied to the PRISM model for specific habitat types primarily associated with the warm moist potential vegetation type group. The projected harvest quantities and volume outputs shown in this section reflect fisher management direction to the extent possible. These constraints included:

- Limiting regeneration harvest and / or prescribed burning which results in a canopy opening to ten percent of fisher habitat per decade.
- Openings in canopy cover created through vegetation management are expected to last for up to 20-years.
- In overlap areas with potential lynx habitat, lynx management guidelines are imposed.

Table 373 compares the lands suitable for timber production and the proportion of those lands that are also in potential fisher habitat for Alternative Z and the Preferred Alternative. Potential fisher habitat influences approximately 57 percent of lands suitable for timber production within the warm moist potential vegetation type group. The remaining balance of suitable fisher habitat occur within the warm dry and cool moist potential vegetation types. Plan components associated with fisher habitat management are considered potential constraints on attainment of PTSQ and PWSQ objectives.

Table 373. Acres potential fisher habitat within lands suitable for timber production.

	Alt Z	Preferred
Total lands suitable for timber production	1,037,058	1,042,520
Acres of potential fisher habitat in land suitable for timber production	600,000	600,000
Percent of land suitable for timber production in potential fisher habitat	58%	57%

Data Source: SIMPPLLE.

Cumulative Effects

There are many factors that influence timber harvest. The demand for timber products and supply from other sources, policy, regulations, and litigation all affect the amount of timber that may be harvested from the Nez Perce-Clearwater. Budgets and partnership capacity also impact timber supply. The effects that past activities have had on components of forest vegetation, such as forest composition and structure or landscape pattern, were discussed in the “Affected Environment” section and are reflected in the current condition.

Increasing human population

Increasing human populations is an additional stressor that may affect management of forested lands both locally and nationally, which results in growing demands and pressures on public lands. Locally, present populations are increasing in some counties surrounding the plan area but are declining or stable in other areas. Refer to the Economic Sustainability and Social Sustainability sections for more information. These changes may lead to increased tensions between the demand for timber and changing societal desires related to the mix of other uses public lands may provide. The sustainable use of other forest products may become increasingly vulnerable and require permitting and limitation of use.

Management of Adjacent Lands

Portions of the Nez Perce-Clearwater adjoin other national forests, each having its own forest plan. The Nez Perce-Clearwater is also adjacent and intermixed with lands of other ownerships, including private lands, other federal lands, tribal lands, and state lands. Some management areas contain inholdings of such lands, while others are more un-fragmented in terms of ownership. Harvesting or conversion of forests on adjacent lands would affect vegetation conditions at the landscape level. State law applies to all harvest activities regardless of ownership; therefore, basic resource protections would be consistent. However, harvest practices on other lands would not necessarily be conducted to meet the same desired conditions as those outlined in the Nez Perce-Clearwater Land Management Plan.

Some adjacent lands are subject to their own resource management plans. The cumulative effects of these plans, in conjunction with the Nez Perce-Clearwater Land Management Plan, are summarized in Table 374 for those plans relevant to the timber resource. The project record contains a summary of all resource plans considered.

Table 374. Summary of cumulative effects to timber from other resource management plans.

Resource plan	Summary of effects
Forest/Land Management Plans of Adjacent National Forests	The Nez Perce-Clearwater shares boundaries with the Idaho Panhandle, Payette, Willowa Whitman, Bitterroot, and Lolo National Forests. The Lolo and Bitterroot are currently in Land Management Plan under the 2012 Planning Rule. The Idaho Panhandle National Forest has implemented a hybrid forest plan consisting of both 1982 and 2012 planning rules. All of the forest plans contain plan direction that meets the requirements of the National Forest Management Act, such as limitations on harvest, reforestation practices, and maximum sized openings. Generally speaking, management of the timber resource is consistent across national forests due to consistency in law, regulation, and policy. The management of the specific areas that are adjacent would be complementary across boundaries.
Idaho Forest Practices Act (Bauer et al. 1988)	The forest action plan is complementary to the timber management on the Nez Perce-Clearwater by including strategies related to increased resilience, wildfire safety, and, most especially, providing forest products. The cumulative effect would likely be additive in terms of the amount of timber harvest treatments that occur across the landscape and in a broader sense moving towards at least some of the vegetation desired conditions as described in the land management plan.
Nez Perce Tribe Forestry and Fire Management Plan (Nez Perce Tribe Forestry and Fire Management Division)	The forestry and fire management plan is complementary to timber management on the Nez Perce-Clearwater by including strategies related to increased resilience, wildfire safety, wildlife habitat management, and providing forest products. The cumulative effect would likely be additive in terms of the amount of timber harvest treatments that occur across the landscape and in a broader sense moving towards at least some of the vegetation desired conditions as described in the land management plan.
United States Army Corps of Engineers, Walla Walla District, Dworshak Five Year Vegetation Management Plan (2015-2020) (U.S.	The five-year vegetation management plan contains plan direction that meets the requirements of the National Forest Management Act, such as limitations on harvest, reforestation practices, and maximum sized openings. Generally speaking, management of the timber resource is consistent with Nez Perce-

Resource plan	Summary of effects
Army Corps of Engineers 2015)	Clearwater due to consistency in law, regulation, and policy. The management of the specific areas that are adjacent would be complementary across boundaries.
Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b)	Vegetation management recommendations presented in the 2015 Idaho State Wildlife Action Plan are consistent with Land Management Plan objectives under the land management plan.
County wildfire protection plans	Some county wildfire protection plans map and define the wildland urban interface. The Nez Perce-Clearwater notes that these areas may be a focus for hazardous fuels reduction and other plan components, such as the Northern Rockies Lynx Management Direction, and have guidance specific to these areas. Treatments, including harvest, may be emphasized in these areas more so than others.

Timber Demand

The demand for wood products allows for successful vegetation management and timber sales from the Nez Perce-Clearwater. If demand for wood products increases, so too will demand for timber sales from the Nez Perce-Clearwater. Alternatively, if demand decreases and mills close there may be less desire for Nez Perce-Clearwater timber. A decrease in demand may reduce the amount of timber sold regardless of the alternatives. Lower wood quantity may contribute to total public and private land timber supply chain elasticity, especially for mills isolated from other ownership and highly dependent on Nez Perce-Clearwater Forests. If enough timber is collectively removed from markets, it would have the effect of increasing sawlog prices and decreasing operating profits for existing mills.

Effects from Other Resources

Access and Infrastructure

In all alternatives, limits related to road access on existing roads as well as construction of both permanent and temporary new roads could impact the ability to conduct harvest on portions of the forest due to the lack of economically feasible access. The magnitude of this influence cannot be calculated but is implied within recreation opportunity settings that are included in the timber model.

Mining and Mineral Extraction

Mining undergoes site-specific analysis to determine effects and required mitigation and effects to vegetation from mining is determined at the project level. Generally, the impacts to timber from mineral extraction on the forest are localized and at the forest-wide scale they would be insignificant.

Wildlife Management

Plan components for wildlife may limit specific actions, such as timber harvest. In all alternatives, plan components for species, such as bats and raptors, would limit disturbances caused by harvest to specific areas during certain sensitive time periods but these locations and restrictions would not be so extensive as to alter the general expected harvest levels.

Conclusion

The following conclusions are based on the timber and other forest products resource analysis:

- Timber suitability: The No Action Alternative has the least amount of land suitable for timber production and Alternative X has the most, but all alternatives are relatively similar. In all alternatives, timber harvest has the potential to occur in lands that are unsuitable for timber production to achieve other objectives. Alternative X has the largest number of unsuitable lands where harvest may occur because it has no recommended wilderness areas. The Preferred Alternative has the second largest number of unsuitable lands where harvest may occur, and Alternative W has the least. Harvest from lands unsuitable for timber production are expected to be minimal for all alternatives. Alternative Z has the most unsuitable lands suitable for designation as wild and scenic rivers. The greatest impact to timber suitability is constraints associated with riparian areas, conservation watershed networks, fisher and lynx habitat, and the recreation opportunity spectrum. Individually, these constraints have little impact at the forestwide scale but will cumulatively constrain attainment of the PTSQ and PWSQ objectives at the management area scale.

- Wood Product supply: Alternative X is modelled to produce the highest level of timber outputs; Alternatives W, the Preferred Alternative, Alternative Y, Alternative Z, and the No Action Alternative result in progressive decreases in timber outputs.
- Timber demand: The trend for timber demand is independent of alternatives, but alternatives may offer different supply chain flexibility for the forest products industry.
- Potential Timber Sale Quantity: Alternatives W and X and the Preferred Alternative are similar in terms of expected harvest treatment acres; Alternative Z would treat fewer acres over a longer period and achieve less volume outputs. Alternative X does more than the other alternatives to achieve vegetation desired conditions due to greater number treatment acres. The Preferred Alternative will produce harvest levels between Alternatives W and X but will maintain a higher level of timber output following attainment of desired conditions.
- Sustainability of Timber Harvest: Long term sustained yield timber outputs are modeled for each alternative. These sustained yield outputs are maintained through time through the application of Land Management Plan components intended to protect soil resources and maintain coarse woody debris needed to maintain long term site productivity.
- Other forest products: Special and other forest products such as firewood, huckleberries and mushrooms would remain available into the future to a similar degree in all alternatives. Areas where commercial use of other forest products may vary relate to the extent that recommended wilderness varies by alternative.

3.5.2 Energy and Minerals

As directed by the Organic Administration Act of 1897 and the Multiple-Use Sustained-Yield Act of 1960, the National Forests are managed by the Forest Service for continuous production of renewable resources on National Forest System lands. Renewable resources include timber, clean water, wildlife habitat, forage for livestock, and outdoor recreation. Although not renewable, minerals are resources of the National Forests and are important to the nation’s welfare.

Forest Service Role in Minerals Management

In the Mining and Minerals Policy Act of 1970, Congress declared that, in the interest of the nation, it is the continuing policy of the federal government to foster and encourage private enterprise in the development of domestic mineral resources and the reclamation of mined land. This federal policy applies to National Forest System lands.

The Forest Service recognizes the importance of mineral resources to the well-being of the nation and encourages bona fide mineral exploration and development. However, it also recognizes its responsibility to protect the surface resources of the lands under its care. Thus, the Forest Service is faced with a double task – to make minerals from National Forest System lands available to the national economy and, at the same time, minimize the adverse impacts of mining activities on other resources.

Land management planning, as mandated by the National Forest Management Act of 1976, is a principal tool for ensuring that mineral resources are given proper consideration. Before plans are approved, specialists evaluate resource activities, including existing and potential mineral development. Planners and decision makers then formulate plans to minimize potential resource conflicts and maximize the various uses and values of National Forest System lands. Since mineral resources are often subsurface, relatively rare, and governed by certain preferential laws, land management planning procedures provide for the availability of minerals and development of mineral operations where possible.

Minerals management of National Forest System lands requires interagency coordination and cooperation. Although the Forest Service is responsible for the management of the surface resources on National Forest System lands, the Bureau of Land Management is primarily responsible for management of government-owned minerals. Since it is not possible to separate mineral operations from surface management, the agencies have developed cooperative procedures to accommodate their respective responsibilities.

Mineral exploration and mining activity on the Nez Perce-Clearwater falls into three federally recognized legal and regulatory mineral categories – locatable, mineral materials, and leasable.

Locatable

Locatable minerals are those that may be "located" with a mining claim under the General Mining Law of 1872, as amended. There are four types of claims: lode, placer, millsite, and tunnel. Locatable minerals include, but are not limited to, gold, silver, copper, lead, zinc, platinum, precious gems, uranium, bentonite, and chemical grade limestone. Lands that are open to location under the Mining Law of 1872 guarantee U.S. citizens the right to prospect and explore lands reserved from the public domain and open to mineral entry. The right of access for exploration and development of locatable mineral is guaranteed.

Mineral Materials

Also known as salable minerals, mineral materials include common variety mineral materials, such as common varieties of sand, rock, stone, cinders, gravel, pumice, clay, most building stone, and other similar materials. The Forest Service has the authority to dispose of these materials on public lands through a variety of methods. The disposal of these materials is discretionary.

Leasable

According to the amended Mineral Leasing Act of 1920, leasable minerals include coal, phosphate, potassium, oil, oil shale, gas, and sodium resources that occur on public domain lands. The Mineral Leasing Act was amended to include minerals associated with lands acquired by the United States. The Geothermal Steam Act of 1970 also incorporated geothermal resources. Additionally, locatable minerals on acquired lands may fall under the Mineral Leasing Act; however, their leasing is at the discretion of the Forest Service and is subject to all standards and guidelines for other resources.

This report neither evaluates nor provides information in support of a decision to approve any mining-related activity on the Nez Perce-Clearwater. The Forest Service itself generally does not initiate exploration or development of mineral or energy resources. Rather, external parties and market forces drive proposals for access to, exploration for, and development of mineral resources. Management of the Nez Perce-Clearwater's minerals program supports the goal of environmentally sound energy and minerals development and reclamation; therefore, operations on the Nez Perce-Clearwater are required to be conducted in a manner that minimizes adverse environmental impacts to surface resources. Minerals related proposals require a site-specific National Environmental Policy Act review to evaluate compliance with applicable laws, regulations, and the Land Management Plan.

Relevant Laws, Regulations, and Policy

With respect to National Forest System land management, mineral resources are divided into three groups: locatable minerals, salable minerals, and leasable mineral materials. The authority of the Forest Service to influence and regulate the exploration, development, production, and reclamation phases of mining operations varies with each group. Therefore, the Forest Service manages mineral resource programs that are specific to each group. Minerals management on National Forest System lands is subject to laws, regulations, and Forest Service policies in the Forest Service Manual 2800, Forest Service Handbook 2800, and 36 Code of Federal Regulations 228.

Locatable Minerals

The Forest Service is obligated to process, administer, and manage mining operations on National Forest System lands that are conducted under the authorities of the following laws and regulations:

- United States Mining Laws of May 10, 1872
- Organic Administration Act of 1897 (Ch. 2, 30 Stat. 11, as amended; 16 U.S.C. 477-482, 551)
- Public Law 91-631, entitled the Mining and Minerals Policy Act of 1970

Regulations promulgated on September 1, 1974, enacted 36 CFR 228 Subpart A, which "sets forth rules and procedures through which use of the surface of National Forest System lands, in connection with operations authorized by the United States mining laws, which confer a statutory right to enter upon public lands to search for minerals, shall be conducted so as to minimize adverse environmental impacts on National Forest System surface resources." Additional direction for locatable mineral management can be found in Forest Service Manual 2810.

All lands on National Forests are open to operations under the General Mining Law of 1872, as amended, except those formally withdrawn from mineral entry by Congress or the Secretary of the Interior or otherwise exempted. The General Mining Law grants every United States citizen the right to prospect and explore public domain lands that are open to mineral entry. This right of access is guaranteed; that is, denying access to minerals on public land is not a Forest Service discretionary action. Upon discovering a valuable mineral deposit, citizens have the right to locate a mining claim and remove the mineral resources.

If the land is open to mineral entry and the mining claim is properly filed with the Bureau of Land Management, the claimant has legal title to the minerals. The Bureau of Land Management's mining claim database lists active, closed, and pending mining claims recorded on public lands. The status of mining claims can change on an annual basis and new claims can be recorded at any time throughout the year.

Any person proposing to conduct operations that might significantly disturb surface resources must submit a Notice of Intent. After evaluating the Notice of Intent, if it is determined that the operations will significantly disturb surface resources, a Plan of Operations and an environmental analysis will be required.

The Forest Service works with mining claimants to provide reasonable access to their claims, minimize adverse environmental impacts on surface resources, and ensure reasonable reclamation of lands affected by mining operations. To protect surface resources, the Forest Service reviews mining plans of operations submitted by the claimant; discloses impacts of the proposed mining operations in a site-specific environmental document; approves only those activities that are reasonably necessary for the proposed operation; monitors operations to ensure environmental standards are met; and ensures prompt and reasonable reclamation of disturbed areas.

Mineral Materials

Often referred to as saleable or common variety minerals, mineral materials are subject to the amended Materials Act of 1947. These minerals are disposed of by sale through issuance of free-use permits or under contracts for in-service needs. Mineral materials include petrified wood and common varieties of sand, rock, stone, cinders, gravel, pumice, clay, and other similar materials. Such common variety mineral materials include deposits that tend to be commonly available; although they have economic value, they do not have a distinct and special value. These minerals are most commonly used as building, landscaping, and construction materials. Management direction for mineral materials is found in 36 CFR 228, Subpart C, and Forest Service Manual 2850. The Forest Service mineral material policy states that the disposal of mineral material will occur only when the authorized officer determines that the disposal is not detrimental to the public interest and that the benefits to be derived from the proposed disposal will exceed the total cost and impacts of resource disturbance.

Surface management authority

Organic Administration Act of June 4, 1897 (30 Stat. 11, as amended; 16 U.S.C. § 473 et seq.): This act provides the Secretary of Agriculture the authority to regulate the occupancy and use of National Forest System lands. It provides for the continuing right to conduct mining activities under the general mining laws if the rules and regulations covering the National Forest are complied with. This act recognizes the rights of miners and prospectors to access National Forest System lands for all proper and lawful purposes, including prospecting, locating, and developing mineral resources.

Multiple-Use Sustained-Yield Act of June 12, 1960 (P.L. 86-517, 74 Stat. 215; 16 U.S.C. 528 et seq.): This act requires that National Forest System lands be administered in a manner that considers the values of the various resources when making management decisions and specifically provides that nothing in the act be construed to affect the use or administration of the mineral resources on National Forest System lands.

Wilderness Act of September 3, 1964 (P.L. 88-577, 78 Stat. 890; 16 U.S.C. § 1121, et seq.): Subject to valid rights existing prior to January 1, 1984, this act provides that wilderness areas are withdrawn from all forms of appropriation and disposition under the mining and mineral leasing laws. Subsequent acts designating additional National Forest System lands as wilderness may contain specific provisions concerning mineral activities. Patents issued under the mining laws for mining claims staked after passage of this act within wilderness areas shall reserve the surface rights to the United States. The act provides for reasonable access to valid mining claims and other valid occupancies inside wilderness areas. The act also requires the survey of wilderness areas by the United States Geological Survey on a planned, recurring basis consistent with the concept of wilderness preservation to determine the mineral values that may be present.

National Environmental Policy Act of 1969, January 1, 1970 (P.L.91-190, 83 Stat. 852; 42 U.S.C. § 4331 et seq.): This act requires federal agencies to use a systematic interdisciplinary approach to ensure the integrated use of natural and social sciences in planning and decision making. It also requires an analysis of probable environmental effects of proposed federal actions. Generally, decisions on mineral and energy development are subject to this law.

Forest and Rangeland Renewable Resources Planning Act of August 17, 1974 (P.L. 93-378, 88 Stat. 476; 16 U.S.C. § 1600 et seq.): This act directs the assessment of all resources on National Forest System lands to determine the desired level of future production from Forest Service programs. Once approved, the policy statement and recommended program serve as a guide to future Forest Service planning and a basis for future budget proposals.

National Forest Management Act of October 22, 1976 (P.L. 94-588, 90 Stat. 2949; 16 U.S.C. § 1600 et seq.): The act requires the Forest Service to establish a comprehensive system of land and resource planning, including the development and maintenance of a comprehensive and detailed inventory of lands and resources. The act also specifies the use of a systematic interdisciplinary approach to achieve integrated consideration of the physical sciences into planning for the management and use of National Forest System lands and resources.

The Clean Water Act (33 U.S.C. 1251 et seq.), as amended: This act sets goals to eliminate discharges of pollutants into navigable water, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment. Executive Order 12088 requires the Forest Service meet the requirements of the act. Refer to sections 303(d), 313, 401, 402, and 404 of the Clean Water Act.

The Endangered Species Act (16 U.S.C. 1531-1544): Section 7(a) of this act requires federal agencies to consult with the United States Fish and Wildlife Service and the National Marine Fisheries Service, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. As required under the Endangered Species Act, biological assessments and consultation under Section 7 would be completed for this decision. The action alternatives are not expected to result in a jeopardy biological opinion for any listed species.

Section 106 of the National Historic Preservation Act (16 U.S.C. 470): This act requires that federal agencies evaluate the effects of their actions on historical, archaeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking.

Leasable Minerals

The Mineral Leasing Act of 1920 established a comprehensive system for managing oil and gas and other leasable minerals on federal lands. Since then, numerous modifications have amended this law, including the Mining and Minerals Policy Act of 1970. Forest Service management direction for oil and gas resources is found in 36 CFR 228, Subpart E, and Forest Service Manual 2820.

Leasable minerals under federal ownership, including oil, gas, potassium, phosphate, sodium, and others, are available for development in accordance with the United States Department of the Interior Bureau of Land Management leasing program. The Forest Service role in managing leasable mineral resources is to consult with the Bureau of Land Management about proposals that involve National Forest System land and, in some cases, provide an opinion on whether leases for these commodities should be issued and to specify any required surface resource protections.

Mineral management authorities

U.S. Mining Laws Act of May 10, 1872 (17 Stat. 91, as amended, 30 U.S.C. § 22 et seq): This act, often referred to as the General Mining Law of 1872, sets forth the principles of discovery, right of possession, assessment work, and patent for hard-rock minerals on lands reserved from the public domain. The law applies to lode, placer, mill-site claims, and tunnel sites. Except as otherwise provided, all valuable mineral deposits and the lands in which they are found are free and open to exploration, occupation, and purchase under regulations prescribed by law.

Weeks Law Act of March 1, 1911 (P.L. 61-435, 72 Stat. 1571, as amended, 16 U.S.C. § 480 et seq): This act authorized the federal government to purchase lands for stream-flow protection and maintain the acquired lands as National Forests.

Mineral Resources on Weeks Law Lands Act of March 4, 1917 (P.L. 64-390, 39 Stat. 1149, 16 U.S.C. § 520): This act authorizes the Secretary of Agriculture to issue permits and leases for prospecting, developing, and using hard-rock minerals on lands acquired under the authority of the act. This authority was later transferred to the Secretary of the Interior.

Mineral Leasing Act of February 25, 1920 (P.L. 66-146, 41 Stat. 437 as amended, 30 U.S.C. § 181 et seq.): This act authorizes the Secretary of the Interior to issue leases for the disposal of certain minerals, including coal, phosphate, sodium, potassium, oil, oil shale, gilsonite, and gas. The act applies to National Forest System lands reserved from the public domain, including lands received in exchange for timber or other public domain lands and lands with minerals reserved under special authority.

Mining Claims Rights Restoration Act of August 11, 1955 (P.L. 359) (30 U.S.C. § 621 et seq.): This act authorizes the location of mining claims on public lands withdrawn for power purposes.

Clarke-McNary Act of June 7, 1924 (P.L. 68-270, 43 Stat. 653 as amended, 16 U.S.C. § 505 et seq.): All lands to which title is accepted under Section 7 of this act become National Forest lands subject to all laws applicable to the lands acquired under the Weeks Act of March 1, 1911.

Reorganization Plan No. 3 of 1946 (60 Stat. 1097; 5 U.S.C. Appendix): This plan transferred the functions of the Secretary of Agriculture with respect to permits and leases for hard-rock minerals on acquired Weeks Law land to the Secretary of the Interior. However, consent by the Secretary of Agriculture for the issuance of permits or leases is required.

Mineral Materials Act of July 31, 1947 (P.L. 80-291, 61 Stat. 681, as amended, 30 U.S.C. § 601 et seq.): This act provides for the disposal of mineral materials on the public lands through bidding, negotiated contracts, and free use.

Mineral Leasing Act for Acquired Lands of August 7, 1947 (P.L. 80-382, 61 Stat. 913, as amended, 30 U.S.C. § 351 et seq.): This act extends the provisions of the mineral leasing laws to federally owned mineral deposits on acquired National Forest System lands and requires the consent of the Secretary of Agriculture prior to leasing.

Multiple Use Mining Act of July 23, 1955 (P.L. 84-167, 69 Stat. 368, as amended, 30 U.S.C § 601 et seq.): This act requires the disposal of common varieties of sand, stone, gravel, pumice, pumicite, and cinders under the provisions of the Materials Act of July 31, 1947, and gives the Secretary of Agriculture the authority to dispose of these materials. It also provides that rights under any mining claim located under the mining laws are subject to the right of the United States to manage and dispose of surface resources.

Geothermal Steam Act of December 24, 1970 (P.L. 91-581, 84 Stat. 1566, 30 U.S.C. § 1001 et seq.): This act provides the Secretary of the Interior the authority to lease National Forest System lands for geothermal steam development, subject to the consent and conditions the Secretary of Agriculture may prescribe.

Mining and Minerals Policy Act of December 31, 1970 (P.L. 91-631, 84 Stat.1876, 30 U.S.C. § 21a): This act states that the continuing policy of the federal government is to foster and encourage private enterprise in the development of economically sound and stable domestic mining and minerals industries and the orderly and economic development of domestic mineral resources.

Federal Coal Leasing Amendments Act of August 4, 1976 (90 Stat. 1083; 30 U.S.C. § 201 et seq.): This act amended the Mineral Lands Leasing Act of February 25, 1920, by specifying that coal leases on National Forest System lands may be issued only after the consent of the Secretary of Agriculture and adherence to conditions the Secretary may prescribe. The act also provides that no lease shall be issued unless the lands involved in the lease have been included in a comprehensive forest land and resource management plan and the sale is compatible with said plan. The act authorizes the issuance of a license to conduct exploration for coal.

Federal Land Policy and Management Act of October 21, 1976 (P.L. 94-579, 90 Stat. 2743, 43 U.S.C. § 1701 et seq., 7 U.S.C. § 1212a, 16 U.S.C. § 478a, 1338a): This act defines procedures for the withdrawal of lands from mineral entry. It reserves to the United States the rights to prospect for, mine, and remove the minerals in lands conveyed to others and requires the recordation of claims with the Bureau of Land Management.

Surface Mining Control and Reclamation Act of August 3, 1977 (P.L. 95-87, 91 Stat. 445, 30 U.S.C. § 1201-1328): This act provides for cooperation between the Secretary of the Interior and each state when regulating surface coal mining. It also restricts or prohibits surface coal mining operations on National Forest System lands, subject to valid existing rights and compatibility determinations.

Energy Security Act of June 30, 1980 (P.L. 96-294, 94 Stat. 611, 42 U.S.C. § 8855): This act directs the Secretary of Agriculture to process applications for leases and permits to explore, drill, and develop resources on National Forest System lands, notwithstanding the current status of the forest land and resource management plan.

National Materials and Minerals Policy, Research and Development Act of October 2, 1980 (94 Stat. 2305; 30 U.S.C. §1601-1605): This act restates congressional intent to promote policies that provide for an adequate and stable supply of materials while considering long-term needs, a healthy environment, and natural resource conservation. The act also requires the Secretary of the Interior to improve the availability and analysis of mineral data in federal land use decision making.

Omnibus Parks and Public Lands Management Act of 1996 (P.L. 104-333, 110 Stat. 4093, 16 U.S.C. § 497c): This act automatically withdraws from all forms of appropriation under the mining laws, and from disposition under all laws pertaining to mineral and geothermal leasing, all lands located within the boundaries of ski area permits.

Federal Onshore Oil and Gas Leasing Reform Act of 1987 (30 U.S.C. § 181 et seq.): This act expands the authority of the Secretary of Agriculture in the management of oil and gas resources on

National Forest System lands. The Bureau of Land Management cannot issue leases for oil and gas on National Forest System lands over the objection of the Forest Service. The Forest Service must approve all surface disturbing activities on National Forest System lands before operations commence.

Federal Cave Resources Protection Act of 1988 (102 Stat. 4546; 16 U.S.C. § 4301 et seq.): This act provides for protection and preservation of caves on federal lands.

Energy Policy Act of 2005 (P.L. 109-58; 42 U.S.C 15801 et seq.): This act directs federal agencies to undertake efforts to ensure energy efficiency and the production of secure, affordable, and reliable domestic energy.

Mineral Withdrawals

The Secretary of the Interior has the authority to withdraw lands in federal ownership, effectively removing an area of federal land from settlement, sale, location, or entry for the purpose of limiting activities under those laws to maintain other public values in the area or reserving it for a particular public purpose or program. Withdrawals are also used to transfer jurisdiction over federal land from one department, bureau, or agency to another.

Public lands may also be withdrawn and reserved for military training and testing in support of national defense requirements. An Act of Congress authorizes military withdrawals and reservations of 5,000 or more acres; military withdrawals of less than 5,000 acres are by Secretarial Order.

There are four major categories of formal withdrawals:

- Administrative withdrawals are made by the President, Secretary of the Interior, or other authorized Executive Branch Officer. Examples include Executive Orders, Presidential Proclamations, Secretarial Orders, Public Land Orders, Departmental Orders, United States Geological Survey Orders, and Bureau of Land Management Orders. Currently, only public land orders signed by the Secretary or Assistant Secretary of the Interior are used for administrative withdrawals. However, the President still has authority to make emergency withdrawals.
- Presidential Proclamation withdrawals are made by the President pursuant to the authority under the Antiquities Act of 1906. The President may use this authority to designate landmarks, historic and prehistoric structures, and other objects of historic or scientific interest.
- Congressional withdrawals are legislative actions taken by Congress in the form of public laws. Examples include Wilderness designations, creation of National Parks, and Wild and Scenic River designations, among others.
- Federal Power Act or Federal Energy Regulatory Commission withdrawals are established under the authority of the Federal Power Act of June 10, 1920. Such withdrawals are automatically created upon filing an application for hydroelectric power development with the Federal Energy Regulatory Commission. Federal Energy Regulatory Commission power project withdrawals are different from power site reserves, power site classifications, waterpower designations, and reservoir site reserves; all of which are administrative withdrawals.
- **Gospel-Hump Wilderness**, Nez Perce National Forest, Idaho - Pub. L. 95–237, §4(a), Feb. 24, 1978, 92 Stat. 43.
- **Frank Church-River of No Return Wilderness**, Boise, Challis, Payette, Salmon, Bitterroot, and Nez Perce National Forests, Idaho.- Pub. L. 96–312, §3, July 23, 1980, 94 Stat. 948; Pub. L.

98–231, §1, Mar. 14, 1984, 98 Stat. 60; Pub. L. 111–11, title III, §3308, Mar. 30, 2009, 123 Stat. 1137.

- **Selway-Bitterroot Wilderness,** Bitterroot, Clearwater, Nez Perce, and Lolo National Forests, Idaho and Montana - Pub. L. 88–577, §3, Sept. 3, 1964, 78 Stat. 891; Pub. L. 96–312, §4, July 23, 1980, 94 Stat. 949.

Other Geologic Resources

Current guidelines relative to fossils are based largely on the Organic Act of 1897, the Preservation of American Antiquities Act of 1906, the Paleontological Resources Preservation Act, the Federal Land Policy and Management Act, the Surface Mining Control and Reclamation Act, and Forest Service regulations published at Chapter 36 Code of Federal Regulations Part 291 (36 CFR 291.10-13). Vertebrate fossils, such as bones, bone fragments, teeth, and tracks, are not available for collection by the public and commercial fossil collection is not permitted on any National Forest. Collection of vertebrates, invertebrates, plants, and trace fossils as part of scientific studies, mitigation, or conservation efforts is allowed only by qualified researchers that have been issued permits for specific projects or research (36 CFR 291.14).

Code of Federal Regulations

36 CFR 228 — Minerals: These regulations set forth rules and procedures governing use of the surface of National Forest System lands in conjunction with operations authorized by the general mining laws, mineral material disposal laws, and oil and gas leasing.

- Subpart A: Locatable Minerals
- Subpart B: Leasable Minerals (reserved)
- Subpart C: Disposal of Mineral Materials
- Subpart D: Miscellaneous Minerals Provisions
- Subpart E: Oil and Gas Resources

36 CFR 251 — Land Uses

43 CFR 2300 — Land Withdrawals

Executive Orders

Executive Order 13817 of December 20, 2017: This Executive Order titled “A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals” requires federal agencies to identify, reduce foreign dependence, develop recycling and reprocessing technologies, improve geologic mapping, and streamline the permitting process for critical minerals.

Executive Order 13211 issued May 18, 2001: This Executive Order titled “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use” requires federal agencies to prepare and submit a Statement of Energy Effects to the Office of Management and Budget describing the effects of certain regulatory actions on energy supply distribution or use.

Executive Order 13212 issued May 18, 2001: This Executive Order titled “Actions to Expedite Energy-Related Projects” requires federal agencies to take actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.

Policy

- Forest Service Manual 2800-Minerals and Geology
- Forest Service Manual 2760-Withdrawals
- Forest Service Handbook 2800
- Region 1 Supplement 2800-2011-1
- Region 1 Supplement 2800-94-1
- Region 1 Supplement 2800-2003-1
- Region 1 Supplement 2800-2004-2
- Region 1 Supplement 2800-2004-3
- Region 1 Clearwater Supplement 2800-2007-01
- Region 1 Clearwater Supplement 2800-2007-02

State and Local Laws

The Idaho Stream Channel Protection Act requires that the stream channels of the state and their environment be protected against alteration for the protection of fish and wildlife habitat, aquatic life, recreation, aesthetic beauty, and water quality. This means Idaho Department of Water Resources must approve in advance any work within the beds and banks of a continuously flowing stream.

Idaho State Water Quality Standards provide water quality for the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water (fishable and swimmable conditions), where attainable, and consider the use and value of state waters for public water supplies, propagation of fish and wildlife, recreation, agricultural and industrial purposes, and navigation.

Forest Service Agreement No. 18-MU-11015600-080 – Memorandum of Agreement and Memorandum of Understanding between the Idaho Department of Water Resources and the United States Department of Agriculture Forest Service Northern, Intermountain, and Pacific Northwest Regions: The purpose of this memorandum of agreement and memorandum of understanding is to document the cooperation between the parties to implement the Idaho Stream Channel Protection Act within Idaho on lands administered by the Forest Service.

Interagency agreements

The Forest Service has entered into interagency agreements with agencies within the U.S. Department of the Interior to cooperate and coordinate in the management of federally owned minerals within National Forest System lands. The principal agreements include:

- November 8, 1946, agreement with the Bureau of Land Management detailing procedures for mineral leases and permits administered under Section 402 of the President's Reorganization Plan No. 3 of 1946;
- May 18, 1957, memorandum of understanding with the Bureau of Land Management describing work procedures for land applications, mining claims, and patents;
- March 4, 1977, cooperative agreement with the United States Geological Survey concerning oil and gas operations;

- May 20, 1980, memorandum of understanding with the Bureau of Land Management describing the coordination of activities under the federal coal management program;
- November 26, 1980, cooperative agreement with the United States Geological Survey for operations under solid mineral leases and permits;
- December 3, 1981, memorandum of understanding with the United States Geological Survey and the Bureau of Land Management for the geothermal steam leasing program;
- July 31, 1990, memorandum of understanding with the Office of Surface Mining Reclamation and Enforcement describing the management of surface coal mining operations on National Forest System lands;
- November 11, 1991, interagency agreement with the Bureau of Land Management describing the procedures by which the Forest Service can authorize the Bureau of Land Management to offer National Forest System lands for oil and gas leasing; and
- November 19, 1991, interagency agreement with the Bureau of Land Management describing the procedures for coordinated administration of oil and gas operations on federal leases within the National Forest System.

Methodology

Spatial Scale

The acres available for locatable mineral resource development are determined by subtracting the number of acres withdrawn from mineral entry from the total number of Nez Perce-Clearwater acres. Acres that are withdrawn from mineral entry are a matter of record. By law, the Bureau of Land Management keeps official records in the General Land Office.

The number of acres that are available for disposal of mineral materials is determined by subtracting the number of acres where the Forest Service has exercised its discretion to refrain from authorizing the disposal of mineral materials from the total number of acres on the Nez Perce-Clearwater.

The number of acres that are available for leasing proposals is determined by subtracting the number of acres that are legally unavailable from the total number of acres on the Nez Perce-Clearwater.

Lands legally unavailable for leasing include:

- lands withdrawn from mineral leasing by an Act of Congress or by an order of the Secretary of the Interior;
- lands recommended for wilderness allocation by the Secretary of Agriculture;
- lands designated by statute as wilderness study areas, unless oil and gas leasing are specifically allowed by the statute designating the study area; and
- lands within areas allocated for wilderness or further planning in Executive Communication 1504.

Information Sources

The Bureau of Land Management keeps official records on active, closed, and pending mining claims on public lands. Current records are kept in the Land and Mineral System Reports database, known as LR2000. These records are the source for documentation of mining claims on the National Forest. Published and unpublished mineral resource assessments and maps produced by the Forest

Service, Bureau of Land Management, United States Geological Survey, and Idaho Geologic Survey were reviewed to determine the mineral potential for the National Forest.

Analysis Area

The analysis area is the National Forest lands within the Nez Perce-Clearwater.

Temporal Scale

The temporal scale considered in this analysis for indirect effects is the duration of the planning timeframe, or 15 years.

The temporal scale for cumulative effects would be the duration of the 1987 Plan and effects through the duration of the planning timeframe.

Affected Environment

Locatable

The Nez Perce-Clearwater has a historic connection to mining. Discovery of placer gold occurred in the late 1850s and these deposits were mined extensively in the early 1860s. Small-scale and medium-scale sized placer and dredging operations mined and then reworked the deposits in many locations on lands contained within the Nez Perce-Clearwater through the 1940s. Lode discoveries were mined by moderately sized surface and underground operations during this same period. Generally, growth in locatable exploration and mining development remained flat after the 1940s because of the closure of gold mines by the War Production Board in 1942. Higher gold prices renewed interest and mining development on the Nez Perce-Clearwater in the 1980s and then again in the early 2000s. Today, small-scale placer and dredging operations continue to be the dominate type of mining on the Nez Perce-Clearwater.

Past activities have included, and future activities may include, exploration for locatable minerals and underground or surface mining. In general, the geology of the Nez Perce-Clearwater possesses a low- to high-grade mineralization in many areas. Mineralized zones could include precious metals, such as gold and silver; strategic rare earth element deposits; and base metal deposits, such as copper, lead, zinc, molybdenum, and manganese. Although many types of minerals could be mined on the Nez Perce-Clearwater, gold is the only mineral tied to a significant trend. However, copper and other locatable deposits potentially exist in different locations on the Nez Perce-Clearwater and future development proposals are probable if the demand for these commodities continues to increase.

At present, the Nez Perce-Clearwater has approximately five approved Plans of Operations for small lode and placer mining and one approved exploration activity investigating larger deposits. Annually, the Nez Perce-Clearwater expects to administrate 40 to 50 Plans of Operation for suction dredging and receives 20 to 30 Notices of Intent. Notices of Intent generally propose small-scale mineral exploration activities that range from mineral prospecting with hand tools to small-scale placer operations. Currently, there are no large or medium sized mines operating on the Nez Perce-Clearwater. However, because of new technology in mineral exploration and mining techniques, mineral deposits once considered below grade could become in demand and the potential for mineral development would then increase.

Many claims were patented under the General Mining Law of 1872, as amended, whereby they became privately owned land within the National Forest boundaries. However, the amount and size of inactive or active mining operations on privately owned land is currently unknown.

Mineral Materials

Mineral materials, such as gravel, riprap, and crushed aggregate, for road maintenance, road construction, recreation sites, and trailheads has been and will continue to be in use on the Nez Perce-Clearwater. Other mineral material uses include contract work, culvert replacement, and repair of damage caused by fire, floods, and landslides. The mineral materials used are primarily derived from Forest Service pits and quarries located in the planning area. The type, volume, and source of locations for in-service use varies year by year and according to need. Current mineral material exploration and development on the Nez Perce-Clearwater is low and is expected to remain the same or slightly increase as in-service projects develop or as these nonrenewable resources are depleted.

Leasable

There is no leasable mineral exploration or mining activity for coal, oil, or gas on the Nez Perce-Clearwater at this time. Sources of nonrenewable energy are rated as having a very low mineral potential on the Nez Perce-Clearwater (National Energy Policy Development Group 2001). In general, interest in leasable mineral resources on the Nez Perce-Clearwater is low because of past unsuccessful attempts to locate and develop these resources. No exploration or development of other nonrenewable energy sources is expected during the planning period.

Renewable Energy

Renewable energy resources include biomass, wind, solar, geothermal, and hydroelectric energy. With the exception of biomass being used as a by-product of timber operations and an occasional solar panel being used to power a remote site, no renewable energy is being produced on the Nez Perce-Clearwater.

The continuous wilderness, wild and scenic river corridors, and recommended wilderness make it highly unlikely that a transmission corridor would be developed through the Nez Perce-Clearwater to support development of wind, solar, hydroelectric, or geothermal resources. Additionally, solar, wind, and geothermal renewable energy sources are rated as having a low potential across the Nez Perce-Clearwater (U.S. Department of Agriculture and U.S. Department of the Interior 2008, Zvolanek et al. 2013, Dansart et al. 1994, Ross 1971, U.S. Department of Agriculture and U.S. Department of Energy 2005). Development of these resources is not expected during the planning period.

Hydroelectric power has been considered and numerous power site withdrawals have been made on many of the major rivers within the Nez Perce-Clearwater. However, the trend is not to build dams on National Forest System lands because dams can impede fish migration and detract from the wild and scenic qualities of rivers. Hydroelectric renewable energy is rated as having a low potential across the Nez Perce-Clearwater (Conner et al. 1998). Development of hydroelectric power is not expected during the planning period.

Biomass used for the production of commercial energy has a moderate to high potential (O'laughlin et al. 2012). Biomass energy has been used for many years as a by-product of logging operations and continues to be in high demand at the personal level and an overall valuable public commodity. Biomass has the highest potential for future consumption of all the renewable resources on the Nez Perce-Clearwater.

Abandoned Mines

A complete field inventory of abandoned mining lands on the Nez Perce-Clearwater has not been compiled; however, over 700 surface and underground prospects were identified in the Mineral Resources Data System maintained by the United States Geological Survey and the Database of Mines and Prospects maintained by the Idaho Geological Survey. The historic prospects and mining sites on the Nez Perce-Clearwater range in size and level of disturbance from small-scale hardrock and placer exploration to larger surface and underground producing mines. Some of the abandoned mine sites could have significant safety and health hazards, or both, because of open shafts, emissions of toxic gases, falling debris, and environmental contamination.

Nine abandoned mining sites are scheduled for mitigation in 2020. Future abandoned mining lands remediation will be, in part, dependent on financial resources and other Forest Service priorities.

Methods and Assumptions

Mineral demand, exploration, and production vary dependent upon a number of external factors and most are highly unpredictable. An evaluation of historic production can provide context or a qualitative estimation of mineral needs and production, which are directly related to mineral exploration. However, both are dependent on the mineral being mined and the type of mining necessary to extract the resource profitably.

Measurement Indicators

Calculating the acres currently available for locatable, saleable, and leasable resources is accomplished by subtracting areas withdrawn from mineral entry from the total acres of the Nez Perce-Clearwater. The potential for mineral development is reflected in the number of mining claims or leases in a given area and the distribution of known mineral resources.

Energy and minerals measurement indicators include:

- Locatable minerals acres available for mineral entry
- Salable minerals acres available for disposal of mineral materials
- Leasable minerals acres available for leasing proposals

Environmental Consequences

Effects Common to All Alternatives

Energy and mineral development can have significant effects to physical and biological resources. These effects are discussed in other sections of this document. The alternatives vary in their influence on mineral, geological, and energy resources primarily through differences in management area designation.

The direction to protect forest resources from adverse impacts associated with access to exploration and extraction of mineral resources is derived from the laws, regulations, and policies described in the “Regulatory Framework” section. These are independent of Land Management Plan direction and are the same for each alternative evaluated. Therefore, the resources potentially at risk of the effects of mineral project activities will be managed similarly.

Common effects of mineral development include:

- vegetation stripping
- soil disturbance
- topsoil and vegetative matter stockpiling
- potential for erosion and sedimentation
- water consumption
- creation of access trails and roads
- waste rock, overburden and ore stockpiling
- tailings disposal
- noise
- fuel storage
- aircraft use
- tunneling
- blasting
- nonhazardous waste storage
- fugitive dusting
- atmospheric emissions
- facilities development
- vehicle and equipment operation
- wastewater treatment
- reclamation and restoration

Idaho Roadless Rule

The Idaho Roadless Rule does not restrict any authorized mineral activity prior to October 16, 2008.

Road construction or reconstruction associated with mining activities within Idaho Roadless Rule areas may only be approved after evaluating other access options.

Road construction or reconstruction associated with mining activities within Idaho Roadless Rule areas must be conducted in a manner that minimizes effects on surface resources and must be consistent with land management plan components.

Roads constructed or reconstructed within Idaho Roadless Rule areas must be decommissioned upon completion of the project or expiration of the lease, permit, or other authorization.

Locatable

The Idaho Roadless Rule does not affect mining activities conducted pursuant to the General Mining Law of 1872.

Mineral Materials

The Forest Service will not authorize the sale of common variety mineral materials in Idaho Roadless Areas designated as Wild Land Recreation, Special Areas of Historic or Tribal Significance, or other Primitive themes.

The Forest Service may authorize the use or sale of common variety mineral materials and associated road construction or reconstruction to access these mineral materials in Idaho Roadless Areas designated as Backcountry and Restoration only if the use of these mineral materials is incidental to an activity otherwise permissible in backcountry and restoration areas.

The Forest Service may authorize the use or sale of common variety mineral materials and associated road construction or reconstruction to access these mineral materials in Idaho Roadless Areas designated as General Forest, Rangeland, and Grassland only if the use of these mineral materials is incidental to an activity otherwise permissible in General Forest, Rangeland, and Grassland areas.

Leasable

The Forest Service will not recommend, authorize, or consent to road construction, road reconstruction, or surface occupancy associated with mineral leases in Idaho Roadless Areas designated as Wild Land Recreation, Special Areas of Historic or Tribal Significance, or Primitive themes.

The Forest Service will not recommend, authorize, or consent to road construction or road reconstruction associated with mineral leases in Idaho Roadless Areas designated as Backcountry or Restoration. Surface use or occupancy without road construction or reconstruction is permissible for all mineral leasing unless prohibited in the land management plan.

The Forest Service will not recommend, authorize, or consent to road construction or reconstruction associated with mineral leases in Idaho Roadless Areas designated as General Forest, Rangeland, and Grassland theme; except such road construction or reconstruction may be authorized by the responsible official in association with phosphate deposits as described in Figure 3-20 in section 3.15 Minerals and Energy in the Roadless Area Conservation; National Forest System Lands in Idaho Final Environmental Impact Statement. Surface use or occupancy without road construction or reconstruction is permissible for all mineral leasing unless prohibited in the land management plan components.

Designated Wilderness

The Frank Church-River of No Return, Selway Bitterroot, and Gospel Hump Wilderness areas have been withdrawn from mineral entry and are not available for new leases or claims for locatable minerals, mineral materials, or leasable minerals. Designated wilderness acreage does vary with each alternative but total acreage within Management Area 1A is equal across all alternatives. The acreage in Management Area 1A would be managed to be consistent with the legislation for which the area is designated and either withdrawn from mineral entry or mitigated at the project level. Mining activities may still occur in designated wilderness areas if the proponent has demonstrated a valid existing right.

Valid existing rights occur when unpatented mining claims on National Forest System lands are properly located prior to an area being designated as a wilderness area; properly maintained thereafter under the applicable law; supported by a discovery of a valuable mineral deposit within the meaning of the United States mining laws prior to an area being congressionally designated as a wilderness area and said discovery has been continuously maintained since that date; and continue to be valid.

Recommended Wilderness

Recommended wilderness acreage does vary with each alternative. However, recommended wilderness areas are not withdrawn from mineral entry and are available for new leases or claims if the social and ecological characteristics that provide a basis for wilderness designation are maintained and protected. Therefore, the effects of minerals management would be the same with all alternatives, and the social and ecological characteristics that form the basis of wilderness designation would be protected and maintained.

Wild and Scenic Rivers

Designated acreage for Wild and Scenic Rivers for all alternatives is 11,336 acres. Under all alternatives, designated rivers would be managed according to the Wild and Scenic River Act and Forest Service policy. Management Area 1B direction is that they be managed to protect their free-flowing condition and outstandingly remarkable values. Therefore, the management of designated wild and scenic rivers under Forest Service policy would be the same for all alternatives and the wild and scenic corridors are withdrawn from mineral entry.

National Historic Landmarks

Near identical acreage is selected for all alternatives to protect National Historic Landmarks. Mitigation measures would be identified at the project level to protect National Historic Landmarks and, therefore, has the same effects for all alternatives.

Research Natural Areas

Both proposed and established Research Natural Areas have the potential to be withdrawn from mineral entry. Designated Research Natural Areas total 6,169 acres for Alternatives W, X, and Z and Preferred Alternative, 5,388 acres for the No Action Alternative, and 5,549 acres for Alternative Y. Proposed Research Natural Areas total 965 acres for all alternatives. Research Natural Areas would be managed to meet regional standards and the Land Management Plan.

Mineral Withdrawals

The economic effect of mineral withdrawals on mineral resources would depend on the mineral resource potential of the area. If the potential is high, a withdrawal of the area would preclude the opportunity for future mining and development of a valuable economic resource. If the potential is low, the economic value of mineral resources would be low and a mineral withdrawal may not be necessary. Other available options for protecting sensitive resources, such as populations of special-status species and their habitat, should be explored before withdrawal is recommended for wilderness, research natural areas, and other areas having special designation.

Effects that Vary by Alternative

No Action Alternative

Direction for minerals resource management in the 1987 Plans is based on Forest Service policy and federal law and regulations applicable to locatable, salable, and leasable mineral resources. Together, the laws, regulations, and policies minimize the adverse effects of minerals projects on the Nez Perce-Clearwater while concurrently supporting sound energy and mineral exploration and development.

Future protection of surface resources under the No Action Alternative would be the same as current protection under the 1987 Plans. The 1987 Plans manage mineral operations with operating plans, bonds, and reclamation and provide for timely analysis and processing of mineral prospecting, exploration, and development proposals. Access to accomplish closures of abandoned mine features and to mitigate any other potential hazards would continue as guided by the 1987 Plans.

Overall, the No Action Alternative ranks behind Alternative X in acreage available for mineral entry and would have less effects to minerals management, exploration, development, and production than the Preferred Alternative and Alternatives Y, Z, and W, respectively.

Locatable Minerals

The No Action Alternative has 1,166,599 acres identified as Roadless, 26,269 acres identified as Gospel Hump MPA 2 lands and 1,217,683 acres identified in Management Area 3. Combining these acres totals 2,410,551 acres available for locatable mineral entry. However, within Roadless, 197,695 acres are identified as recommended wilderness. If designated and subject to valid and existing rights, these acres could be withdrawn from mineral entry; the remaining 2,180,863 acres would be open to mineral entry in the No Action Alternative.

Mineral Materials

Management Area 1 is not open for mineral materials entry under all alternatives. Mineral material development is possible in Management Area 2 if classified with a backcountry and restoration theme. Mineral material development can only occur to support projects that are consistent with the land management plan and if use of the materials is incidental to an authorized activity. It is impossible to predict mineral material development and production necessary to support future authorized activities within a backcountry and restoration theme. For this reason, 1,217,683 acres within Management Area 3 are open for discretionary disposal of mineral materials in the No Action Alternative.

Leasable Minerals

Management Areas 1 and 2 are not open for leasable mineral entry under all alternatives. Management Area 3 has 1,217,683 acres open for discretionary leasing in the No Action Alternative.

Alternative W

Alternative W has the least amount of acreage open to mineral entry of all alternatives analyzed. Alternative W would have the greatest impact of all the alternatives to minerals management, exploration, development, and production.

Locatable Minerals

Alternative W has 583,771 acres identified as Roadless, 26,710 acres identified as Gospel Hump MPA 2 lands and 1,238,907 acres identified in Management Area 3. Combining these acres totals 1,849,388 acres available for locatable mineral entry. However, within Roadless, 856,932 acres are identified as recommended wilderness and 5,424 acres are identified for a suitable wild and scenic river classification. If designated and subject to valid and existing rights, these acres could be withdrawn from mineral entry; the remaining 969,164 acres would be open to mineral entry in Alterative W.

Mineral Materials

Management Area 1 is not open for mineral materials entry under all alternatives. Mineral material development is possible in Management Area 2 if classified with a backcountry and restoration theme. Mineral material development can only occur to support projects that are consistent with the land management plan if use of the materials is incidental to an authorized activity. It is impossible to predict mineral material development and production necessary to support future authorized activities within a backcountry and restoration theme. For this reason, 1,238,907 acres within Management Area 3 are open for discretionary disposal of mineral materials in Alternative W.

Leasable Minerals

Management Areas 1 and 2 are not open for leasable mineral entry under all alternatives. Management Area 3 has 1,238,907 acres open for discretionary leasing in Alternative W.

Alternative X

Alternative X provides for the availability of the most acreage open to mineral entry of all the alternatives. Alternative X allows the Forest Service to meet the desired outcome of current directives and regulations for minerals management on National Forest System lands. The Forest Service minerals management mission is to encourage, facilitate, and administer the orderly exploration, development, and production of mineral and energy resources on National Forest System lands to help meet the present and future needs of the nation.

Locatable Minerals

Alternative X has 1,412,587 acres identified as Roadless, 28,498 acres identified as Gospel Hump MPA 2 lands and 1,244,331 acres identified within Management Area 3. Combining these acres totals 2,685,416 acres available for locatable mineral entry. Unlike the other alternatives, Alternative X has zero acres for potential designation. Minimizing mineral withdrawals provides the most favorable opportunity for locatable minerals management, exploration, development, and production.

Mineral Materials

Management Area 1 is not open for mineral materials entry under all alternatives. Mineral material development is possible in Management Area 2 if classified with a backcountry and restoration theme. Mineral material development can only occur to support projects that are consistent with the land management plan and if use of the materials is incidental to an authorized activity. It is impossible to predict mineral material development and production necessary to support future authorized activities within a Backcountry and Restoration theme. For this reason, 1,244,331 acres within Management Area 3 is open for discretionary disposal of mineral materials in Alternative X.

Leasable Minerals

Management Areas 1 and 2 are not open for leasable mineral entry under all alternatives. Management Area 3 has 1,244,331 acres open for discretionary leasing in Alternative X.

Alternative Y

Alternative Y follows the Preferred Alternative in acreage open to mineral entry and would have similar impacts to minerals management, exploration, development, and production as Alternative Z.

Locatable Minerals

Alternative Y has 1,056,894 acres identified as Roadless, 26,269 acres identified as Gospel Hump MPA 2 lands and 1,219,951 and acres identified in Management Area 3. Combining these acres totals 2,303,114 acres available for locatable mineral entry. However, within Roadless, 309,332 acres are identified as recommended wilderness and 22,687acres are identified for a suitable wild and scenic river classification. If designated and subject to valid and existing rights, these acres could be withdrawn from mineral entry; the remaining 1,912,167 acres would be open to mineral entry in Alternative Y.

Mineral Materials

Management Area 1 is not open for mineral materials entry under all alternatives. Mineral material development is possible in Management Area 2 if classified with a backcountry and restoration theme. Mineral material development can only occur to support projects that are consistent with the land management plan and if use of the materials is incidental to an authorized activity. It is impossible to predict mineral material development and production necessary to support future authorized activities within a Backcountry and Restoration theme. For this reason, 1,219,951 acres within Management Area 3 is open for discretionary disposal of mineral materials in Alternative Y.

Leasable Minerals

Management Areas 1 and 2 are not open for leasable mineral entry under all alternatives. Management Area 3 has 1,219,951 acres open for discretionary leasing in Alternative Y.

Alternative Z

Locatable Minerals

Alternative Z has 828,436 acres identified as Roadless, 26,687 acres identified as Gospel Hump MPA 2 lands and 1,233,180 acres identified for all other uses in Management Area 3. Combining these acres totals 2,088,303 acres available for locatable mineral entry. However, within Roadless, 569,755 acres are identified as recommended wilderness and 8,711 acres are identified for a suitable wild and scenic river classification. If designated and subject to valid and existing rights, these acres could be withdrawn from mineral entry; the remaining 1,477,093 acres would be open to mineral entry in Alterative Z.

Mineral Materials

Management Area 1 is not open for mineral materials entry under all alternatives. Mineral material development is possible in Management Area 2 if classified with a backcountry and restoration theme. Mineral material development can only occur to support projects that are consistent with the land management plan and if use of the materials is incidental to an authorized activity. It is impossible to predict mineral material development and production necessary to support future authorized activities within a backcountry and restoration theme. For this reason, 1,233,180 acres within Management Area 3 is open for discretionary disposal of mineral materials in Alternative Z.

Leasable Minerals

Management Areas 1 and 2 are not open for leasable mineral entry under all alternatives. Management Area 3 has 1,233,180 acres open for discretionary leasing in Alternative Z.

Preferred Alternative

Locatable Minerals

The Preferred Alternative has 1,114,736 acres identified as roadless, 28,498 acres identified as Gospel Hump MPA 2 lands and 1,240,340 acres identified for all other uses in Management Area 3. Combining these acres totals 2,383,574 acres available for locatable mineral entry. However, within roadless, 258,210 acres are identified as recommended wilderness and 1,319 acres are identified for a suitable wild and scenic river classification. If designated and subject to valid and existing rights, these acres could be withdrawn from mineral entry; the remaining 2,073,807 acres would be open to mineral entry in the Preferred Alternative.

Overall, the Preferred Alternative ranks behind Alternative X and the No Action Alternative in acreage available for mineral entry and would have less effects to minerals management, exploration, development, and production than Alternatives Y, Z, and W, respectably.

Mineral Materials

Management Area 1 is not open for mineral materials entry under all alternatives. Mineral material development is possible in Management Area 2 if classified with a backcountry and restoration theme. Mineral material development can only occur to support projects that are consistent with the land management plan and if use of the materials is incidental to an authorized activity. It is impossible to predict mineral material development and production necessary to support future authorized activities within a backcountry and restoration theme. For this reason, 1,240,340 acres within Management Area 3 is open for discretionary disposal of mineral materials in the Preferred Alternative.

Leasable Minerals

Management Areas 1 and 2 are not open for leasable mineral entry under all alternatives. Management Area 3 has 1,240,340 acres open for discretionary leasing in the Preferred Alternative.

Cumulative Effects

No cumulative effects are expected to occur from the development of renewable or nonrenewable leasable resources because of a low suitability potential for development on the Nez Perce-Clearwater, lack of transmission lines, and low occurrence of those resources. Leasing of National Forest System lands is possible but not expected during the planning period.

The development of locatable minerals, primarily gold, could continue in the planning area that are available to mineral entry under the mining laws of the United States. The direct, indirect, and cumulative effects of mineral development of individual plans of operation will be addressed in separate environmental analyses. The Forest Service retains the authority to determine the measures needed to protect surface resources.

No indirect or cumulative effects from the development of wind or solar energy on the Nez Perce-Clearwater will occur until the feasibility of development on a specific site is determined and a project is permitted. Although the capability of wind generation exists on the Nez Perce-Clearwater, the feasibility of wind tower placement is currently unknown and not likely to occur during the planning period.

Groundwater resources on the Nez Perce-Clearwater could be affected by any of the activities in this section but are more likely to occur in response to development of geothermal or oil and gas resources. No effect to groundwater is expected from these activities until completion of an appropriate environmental analysis of an individual project and application for permit to drill is granted. The effects to groundwater and surface water from the mining of locatable minerals are addressed through analysis of the effects of individual or grouped plans of operation.

Requests for approval of small lode and placer mining operations may occur but it is not possible to predict how many may be submitted in any given year or how many may be approved. Since Congress has imposed a moratorium on the patenting of mining claims, there would be no change in the acres of patented lands unless Congress lifts the moratorium.

Mineral material use can be expected to continue for in-service needs and as a salable commodity that would result in the further depletion of this non-renewable mineral resource on the Nez Perce-Clearwater.

Reclamation is anticipated to increase on the Nez Perce-Clearwater as more mine adits and shafts are identified and prioritized for closure or gating. Similar efforts are underway on other state, tribal, and federal lands. This would be a beneficial cumulative effect in combination with efforts on other lands.

Effects to Resource from Other Resources

Minerals Management

No large-scale mineral projects are anticipated during the planning period. Mineral proposals undergo site-specific National Environmental Policy Act analysis to determine required mitigation measures and effects to other resources.

Patented mining lands could contribute to the effects for many resources but the status or number of active or inactive mining operations or mineral production on privately held land is unknown.

Other Resources

There is no effect that would result in any change in the lands available for locatable minerals, mineral materials, or leasable minerals development from the following resources: air quality; climate change; carbon storage; designated wild and scenic rivers; ecology; economic sustainability; fire management; forest products; infrastructure; invasive species; lands and special uses; livestock grazing; rare plants; scenery; social sustainability; soils; sustainable recreation; timber; tribal trust responsibilities; watershed; designated wilderness; vegetation; or wildlife.

Fire Management

Fire and fuels management direction under any of the alternatives could temporarily displace mining operations or exploration activities but the effects would be short term and virtually negligible. No cumulative effects are anticipated.

Indirect effects to minerals management by designated wilderness, recommended wilderness, wild and scenic rivers, national historic landmarks, and research natural areas is discussed in the Effects Common to All Alternatives section.

Effects to Other Resources from Mineral Management

There will be no indirect or cumulative effect to the following resources from locatable minerals, leasable minerals, or salable minerals management: climate change; heritage; designated wild and scenic rivers; ecology; economic sustainability; fire management; forest products; infrastructure; invasive species; lands and special uses; livestock grazing; social sustainability; soils; timber; tribal treaty rights; watershed; designated wilderness; and vegetation.

At Risk Plant Species

Development of energy and mineral resources has the potential to adversely impact special status species through all phases of development. Impacts include mortality to individual at-risk plants or entire populations, as well as habitat loss and fragmentation. Under plan components, at-risk species habitat quality would remain similar between the action and no action alternatives. Threats would be reduced for at-risk plants by the action alternatives plan components including FW-STD-AREM-01, which calls for avoidance of wetlands and riparian areas in mineral operations and requires the use of native revegetation efforts as part of operations to reduce invasive species.

Air Quality

Vehicle and heavy equipment operations, including on and off-road travel and recreational vehicle use, release combustion gases and particulates to the air, both of which contribute to concentrations of pollutants. Most emissions are confined locally and are temporary. Large road or facility construction projects and sizeable mining operations could contribute enough particulates over time to affect local air quality. Concentrations of pollutant emissions would be calculated during every site-specific environmental review of future proposed large-scale mineral actions. Regardless of which alternative is implemented, large-scale mining operations will be managed to mitigate or avoid adverse impacts to air quality. No cumulative effects are anticipated for minerals management on air quality because no large-scale mineral operations are anticipated during the planning period.

Carbon Storage

Carbon sequestration would be affected by vegetation stripping for large-scale mining operations. However, at the end of mine life, the project area would be reclaimed and allowed to revegetate. No cumulative effects from large-scale mining are expected to occur during the planning period.

Small-scale mineral exploration projects are typically short-term and reclaimed annually. At the forestwide scale, no cumulative effects are expected.

Cultural and Heritage

The effects of mineral management to known areas of cultural significance will be addressed in separate environmental analyses and mitigated at the project level. No cumulative effects to known areas of cultural significance are expected.

Fisheries

The effects of mineral management to fisheries and fisheries habitat will be addressed in separate environmental analyses and mitigated at the project level.

Infrastructure

Access and road development, whether long-term or temporary, are often associated with mineral exploration and development, but a site-specific analysis is required prior to any approval of exploration or development activities. Any mine reclamation activities would likely use existing roads. These may be roads that are not currently designated for motor vehicle use. They would probably be used for the duration of the reclamation work and then returned to their previous status. No cumulative effects are expected.

Minerals

Indirect effects to minerals are described in the alternatives section of this document. Cumulative effects vary with each alternative and are dependent on the amount and availability of access and acreage withdrawn from mineral entry. Common environmental effects from mineral exploration or mining are described in the environmental effects section of this document.

Scenery

Mining activities can involve major landform alteration, as well as form, line, color, and texture contrasts, resulting in adverse scenic impacts. The majority of lands outside of Management Area 1 would be suitable for locatable minerals in all alternatives. Therefore, the impacts from minerals management would be similar in all alternatives. No cumulative effects to scenery are expected during the planning period because no large-scale mining operations are anticipated.

Recreation

Recreation could be affected by abandoned mine closures, mineral exploration, and extraction in all alternatives. Short-term effects might include noise and visual impacts from open-pit or underground mining operations. Over the long-term, effects might include development from a more naturally appearing landscape; new underground or open-pit mines and physical structures; and new roads and road corridors constructed for mining or drilling operations that might change the recreation setting. Mineral facilities could affect visitors, depending on the location of development and the setting affected.

Watershed

The use of best management practices to improve or maintain water quality and quantity and to minimize negative effects to watershed condition, such as channel damage, would be implemented in accordance with law, regulation, and policy. This will result in incremental improvements to existing watershed conditions because of the use of current science and technology to minimize negative effects from approved projects. Historic surface and underground mining are a ground-disturbing activity by definition and cause many effects, some irreversible, to the environment. Historic mining activity can have adverse effects on water quality caused by excess sediment and pollutants from areas of waste rock dumps or processed ore. Water quantities may also be impacted since large volumes of water are generally necessary for present day commercial mining activities. However, because the Nez Perce-Clearwater has numerous historic mining districts with historic mineral production, there is a potential that within the next few decades renewed exploration and extraction could occur. In combination with off-forest mining activity, mining on the Nez Perce-Clearwater may have cumulative adverse effects on water quality, water quantity, and watersheds.

To protect water quality, riparian areas, and stream channels, the Nez Perce-Clearwater proposes standards and guidelines that include the requirement of a reclamation plan and bond for mining activities in riparian management zones (FW-STD-AREM-01); limiting mine waste in riparian management zones (FW-STD-AREM-02); limiting mineral operation in riparian management zones unless strict adherence to guidance is followed (FW-GDL-AREM-01, FW-GDL-AREM-02); controlling water flow paths to maintain water quality and to prevent biological, chemical, or industrial pollutants from being delivered to water bodies (FW-GDL-AREM-03); and the guidelines for use of best management practices (FW-GDL-AREM-04).

Vegetation

Generally, the impacts to terrestrial vegetation from mineral operations are localized and, at the forestwide scale, they would be insignificant and not have a cumulative effect.

Wildlife

Impacts to wildlife from minerals and energy activities could include the potential alteration or removal of habitat, increased fragmentation, and the potential for human-caused mortality from high-speed traffic or high traffic levels on roads. Mining activities could impact habitats for aquatic furbearers and waterfowl locally. The overall threat impact is low for the Nez Perce-Clearwater for multiple use wildlife.

Summary of Consequences

Table 375 provides a summary of potential consequences on energy and minerals, by alternative. Alternative X provides the highest available acres; Alternative W provides the smallest number of acres for mineral development.

Table 375. Summary of potential changes to acres available for mineral development, by alternative (Alt)

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Acres Available for Locatable	2,410,551	1,849,388	2,685,416	2,303,114	2,088,303	2,383,574
Acres Available for Locatable with Designated Areas	2,180,863	969,164	2,677,624	1,912,167	1,477,093	2,073,807
Acres Available for Saleable and Leasable	1,217,683	1,238,907	1,244,331	1,219,951	1,233,180	1,240,340

3.5.3 Livestock Grazing

Livestock grazing has been, and continues to be, an important multiple use of National Forest System lands within the Nez Perce-Clearwater. Livestock grazing has been a legitimate use of public lands since the inception of the National Forest System and has become an import part of the culture of the rural western United States. The term rangeland refers to areas where natural vegetation consists principally of grasses, forbs, grass-like plants, and shrubs that are suitable for grazing or browsing (U.S. Department of Agriculture 2012d). The objectives for Forest Service management of rangelands include managing range vegetation to provide ecosystem diversity and environmental quality, while also maintaining relationships with allotment permittees, meeting the public's needs for rangeland uses, providing for livestock forage, maintaining wildlife food and habitat, and providing opportunities for economic diversity.

Rangeland management is an essential part of the Forest Service multiple-use strategy. Livestock grazing on National Forest System lands contributes to the social and economic importance of rural communities and to the associated traditional cultural landscapes. Although rangelands provide a variety of ecosystem services, such as wildlife habitat, recreation, watershed functions, carbon sequestration, and biodiversity conservation, these lands have primarily been managed for forage production and livestock grazing.

Forage is a provisionary ecosystem service in that it is a tangible product from the ecosystem that humans use for nutrition, materials, or energy. Forage is managed by the Forest Service to be sustainable, ensuring that it will be available for future generations while still providing the other rangeland ecosystem services. To accomplish this, the Nez Perce-Clearwater has delineated livestock grazing areas into allotments. Each grazing allotment is managed and monitored to be responsive to current Federal and State environmental laws and regulations and to be consistent with land management plans. In addition to natural grasslands and meadows, allotments within the Nez Perce-Clearwater contain forage producing areas called transitory range. Transitory range is defined as forested lands that are suitable for grazing by livestock for a limited time following a timber harvest, fire, or other landscape event (Spreitzer 1985).

Grazing permits for each allotment are issued to eligible commercial livestock owners. Livestock grazing management is established through land management plans, Forest Service grazing guidance, and individual allotment management plans. Allotment management plans are revised and updated to ensure that livestock grazing management decisions are based on existing and future ecological, social, cultural, and economic conditions.

The successful management of livestock grazing use on the Nez Perce-Clearwater relies upon the maintenance of healthy, functioning rangelands. Refer to the discussions for non-forested vegetation in the Forestlands section that focus on the health of those plant communities utilized for grazing purposes, and how revised plan components would affect the plant communities upon which livestock grazing depend for forage.

Changes Between Draft and Final

Comments received since the proposed action and draft environmental impact statement were published have been used where appropriate to improve the Land Management Plan and have helped inform this final environmental impact statement. Comments centered on providing for grazing opportunities on suitable rangelands, balancing forage use by domestic livestock with ecosystem functions, and regulating grazing activities by implementing more stringent standards and guidelines or enforcing compliance with existing grazing permit requirements.

Multiple minor changes were made for the final environmental impact statement; all changes are within the scope of the draft environmental impact statement analysis and address issues that the public had an opportunity to comment on. With respect to livestock grazing, there were changes to the livestock grazing (GRZ) and aquatic and riparian livestock grazing (ARGRZ) plan components that were driven from commenters and internal Forest Service suggestions. As a result of public input, an additional alternative was developed called the Preferred Alternative; its analysis was the same as other action alternatives. An objective was added to state the annual animal unit months the Forests intend to make available (FW-OBJ-GRZ-01). Allotment boundary lines and riparian management zones were updated in the Nez Perce-Clearwater geographic information system database and acres were adjusted in the analysis.

Relevant Laws, Regulations, and Policy

The Nez Perce-Clearwater will follow all laws, regulations, and policies that relate to managing National Forest System land. The Land Management Plan is designed to supplement, not replace, direction from these sources. Other Forest Service direction, including laws, regulations, policies, executive orders, and Forest Service directives (manual and handbook), are not repeated in the Land Management Plan.

Federal Laws

Organic Administration Act of 1897: This act provides the main statutory basis for the management of forest reserves. The act states that no National Forest may be established except to improve and protect the forest within its boundaries, for the purpose of securing favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States. It also authorizes the Secretary of Agriculture to promulgate rules and regulations to control the use and occupancy of the National Forests.

Bankhead-Jones Farm Tenant Act of 1937: This act directs the Secretary of Agriculture to develop a program of land conservation and use to correct maladjustments in land use and to assist such things as control of soil erosion, reforestation, preservation of natural resources, and protection of fish and wildlife.

Granger-Thye Act of 1950: This act provides for issuance of grazing permits for a term of up to 10 years. It also provides for the use of grazing receipts for range improvement work.

Multiple-Use Sustained-Yield Act of 1960: This act provides that National Forests are established and administered for several purposes, including livestock grazing. This act also authorizes the Secretary of Agriculture to develop the surface renewable resources of National Forests for multiple use and sustained yield of the services and products to be obtained from these lands without impairment of the productivity of the land.

Wilderness Act of 1964: This act provides that livestock grazing, and the activities and facilities needed to support grazing, are allowed to continue in wilderness areas when such grazing was established before the wilderness was designated.

National Environmental Policy Act of 1970: This act directs all federal agencies to consider and report the potential environmental impacts of proposed federal actions. The act also established the Council on Environmental Quality.

Clean Water Act of 1972: This act sets the basic structure for regulating discharges of pollutants to the waters of the United States.

Endangered Species Act of 1973: This act protects animal and plant species currently in danger of extinction, labeled as endangered, and those that may become endangered in the foreseeable future, referred to as threatened. The act provides for the conservation of ecosystems upon which threatened and endangered species of fish, wildlife, and plants depend, both through federal action and by encouraging the establishment of state programs.

Forest and Rangeland Renewable Resource Planning Act of 1974: This act directs the Secretary of Agriculture to develop a process for the revision of National Forest System lands resource management plans. This includes the identification of the suitability of lands for resource management.

Federal Land Policy and Management Act of 1976: This act states that public lands will be managed in a manner that will provide food and habitat for fish, wildlife, and domestic animals.

Public Rangelands Improvement Act of 1978: This act recognizes the need to correct unsatisfactory conditions on public rangelands by increasing funding for maintenance and management of these lands. The act also commits to inventory rangeland conditions and trends and management to maintain and improve conditions.

Rescission Act of 1995: This act directs the Forest Service to complete site-specific National Environmental Policy Act analyses and decisions for grazing allotments on a regularly scheduled basis based on permit requirements.

Agency Regulation

36 CFR 222, subparts A and C: provides the authority to administer the grazing and livestock use permit system.

36 CFR 219.10: requires land management plans developed under the 2012 Planning Rule must include plan components for integrated resource management to provide for ecosystem services and multiple uses including forage for grazing.

Policy

Forest Service Manual 2200: This manual provides direction for rangeland administration on National Forest System lands.

Forest Service Manual 1920 Section 1921.02: This manual includes references to rangeland management in terms of sustaining multiple use and maintaining long-term health and productivity of the land consistent with the Multiple-Use Sustained-Yield Act.

Forest Service Handbook 2209.13: This handbook supplies direction for permit administration on National Forest System lands.

USDA Environmental Compliance, Policy on Range, Departmental Regulation, Number 9500-5, April 21, 1988: This regulation sets forth Departmental Policy relating to range services and coordination of range activities among agencies of the U.S. Department of Agriculture and other executive agencies, organizations, and individuals.

Other Agreements and Plans

The following agreements and plans support the Forest Service's rangeland management program:

Memoranda of understanding for forage reserves: Forage reserves are allotments under a term grazing permit but may be used by other permittees that have been temporarily displaced due to wildland fire, drought, or other situations that have made forage unavailable.

Non-use for resource protection agreements: These agreements may be established to provide long-term non-use to allow rangelands to recover, provide forage on a temporary basis to allow resource recovery on other grazing units, provide temporary resolution of conflicts created by predation on livestock, or provide supplemental forage in times of drought to assist area livestock operators and lessen the resource impacts of grazing.

Allotment management plans: Developed through site-specific environmental analysis, an allotment management plan uses Land Management Plan direction and current issues to determine desired conditions and a broad strategy for meeting desired conditions. These plans describe site-specific grazing strategies, stocking, structural and non-structural range improvement needs, and coordination with other resources.

Treaty with the Nez Perce 1855 ARTICLE 3: "The exclusive right of taking fish in all the streams were running through or bordering said reservation is further secured to said Indians: as also the right of taking fish at all usual and accustomed places in common with citizens of the territory, and of erecting temporary buildings for curing, together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land."

Methodology

Analysis Area

The spatial scale of this analysis is the entire Nez Perce-Clearwater plan area, focusing on the range allotments located within the National Forests. All lands within the Nez Perce-Clearwater National Forest boundary and other lands that are jointly used in allotment grazing systems form the geographic scope for cumulative effects. Areas outside existing allotments may be analyzed for livestock grazing through future site specific National Environmental Policy Act analyses. The timeframe for considering livestock grazing related effects is the anticipated life of the plan, about 15 to 20 years.

Methods and Assumptions

The livestock grazing section includes both quantitative and qualitative analysis. Animal unit month (AUM)[26] objectives were based on currently permitted animal unit months on active allotments from the Natural Resource Manager database and historic grazing data for vacant allotments.

A geographic information system analysis to calculate acres was used to quantify a particular impact. For example, alternatives may vary by the extent of forest canopy reduction each year by timber harvest or wildland fire. Forest canopy openings within allotments may equate to an increase in transitory forage available to livestock in the near future.

The following assumptions are used to determine the degree of impacts on livestock grazing. These assumptions are based on previous assessments, professional judgment, and Forest Service rangeland management and planning directives.

- Current active and vacant allotments are suitable for livestock grazing. Although an area may be deemed suitable for use by livestock in the land management plan, a project-level analysis for allotment management planning would evaluate the site-specific impacts of the grazing activity in order to authorize and dictate the management of livestock grazing in a specific allotment. Smaller inclusions of specially allocated lands within allotments, such as developed recreation sites or research natural areas, may not be suitable for livestock grazing.
- Grazing use would be managed similarly in all alternatives. The land management plan does not make changes to allotment boundaries, active or vacant allotment status, or the amount or type of grazing that may be permitted in the future, however, the plan does provide guidance for future grazing authorizations, including standards and guidelines that must be adhered to in future planning.
- The grazing system in each allotment would remain the same as it is currently, and permitted animal unit months for each active allotment is not expected to increase or decrease unless changed through a site-specific analysis, allotment management plan updates, or permit modifications. Plan components applicable to livestock grazing (including the end of season stubble height guideline) would be incorporated through permit modification(s), reissuance of existing term permits, issuance of new term grazing permits, or as allotment management plan revisions and sufficiency reviews occur.
- Past livestock grazing was more extensive than present authorized livestock grazing. Some areas of past resource degradation may be evident because of past grazing practices.
- Additional effort on the part of the grazing permittee may be necessary to ensure land management plan standards and guidelines are implemented.
- Mitigations for impacts to, or from, livestock use would be addressed in a site-specific analysis for allotments.

[26] An animal unit month or AUM is the amount of oven-dry forage (forage demand) required by one animal unit for a standardized period of 30 animal-unit-days. This would be 780 pounds dry weight forage for a 1,000-pound cow for one month (using 26 pounds per day per cow). AUM is not synonymous with animal month or head month. A head month is defined as one month's use and occupancy of the range by one animal. For grazing fee purposes, it is a month's use and occupancy of range by one weaned or adult cow (with or without calf), bull, yearling steer or heifer, horse, mule, or other applicable permitted animal.

Limitations

The livestock grazing analysis is limited to cattle grazing in active and vacant allotments within the Nez Perce-Clearwater. It does not discuss permitted horse grazing or grazing by pack stock, such as horses and mules, which are used primarily in conjunction with recreational activities.

Information Sources

The science of assessing rangelands is evolving as certain concepts and ecological processes are becoming better understood (Pellant et al. 2020). General concepts for maintaining or moving towards desired rangeland condition focus on aspects of ground cover, species composition, vegetation utilization, and the presence or absence of invasive species as indicators.

Information sources include current scientific literature, Forest Service reports and databases, the forest plan monitoring reports, allotment administration summaries, and other documentation. Data used to summarize the existing condition for livestock grazing came from completed livestock grazing analyses and the Forest Service Natural Resource Manager database, which includes grazing allotment, permitted use, and range improvement data.

Measurement Indicators

This analysis focuses on the sustainability of permitted livestock grazing on the Nez Perce-Clearwater as an economic contributor to local communities. The amount of permitted grazing, notable influences on forage production and availability, and allotment management complexity are key factors in determining permitted livestock grazing sustainability. Table 376 outlines the livestock grazing indicators and measures used to compare differences between alternatives.

Table 376. Livestock grazing indicators and measures.

Indicator	Measures
Permitted use that contributes to economic and social sustainability	Animal Unit Months Acres and percentage of National Forest System land in active grazing allotments
Forage production and availability that provides an ecosystem service	Acres of early seral openings created within allotments, primarily through timber harvest and prescribed fire treatment, to potentially increase transitory range Acres of invasive species infestations treated within allotments Acres of conifer encroachment reduced with allotments
Allotment management complexity due to potential added difficulty for livestock management from proposed plan components and land allocations	Acres and percent of Riparian Management Zones within allotments Acres of recommended wilderness within allotments Acres of eligible and suitable wild and scenic rivers corridors[1] within allotments Number of allotments with low gradient streams Miles of low gradient streams within allotments Number of allotments having streams with potential for Endangered Species Act and Species of Conservation Concern redds Number of allotments within Conservation Watershed Network

[1]Wild and scenic rivers are bounded by a corridor that extends one-quarter mile on each side of the river segment, measured from the high-water mark.

Affected Environment

The Forest Service has undergone many changes in its management of rangelands. In the early 1800s, free forage on unclaimed public domain lands allowed the building of cattle and sheep empires. The ranges soon became over-grazed, overstocked, and overcrowded. Congress stepped in the early 1900s and designated the Forest Service as a grazing control agency. By 1907, the Forest Service had established its system of range regulation. This includes permits, limits on herd size, grazing seasons, allotments, and rental fees.

Livestock grazing has occurred on the Nez Perce-Clearwater for over a hundred years and prior to the establishment of the National Forest System in 1905. The Nez Perce Tribe had a grazing program predating the Treaty of 1855.

Records indicate livestock grazing has been authorized by the Nez Perce National Forest since 1911 ((U.S. Department of Agriculture 1943)), although domestic livestock grazing dated back to the 1860s. It reached its peak when 70,456 head of sheep were permitted in 1918 and 13,992 head of cattle were permitted in 1919 ((U.S. Department of Agriculture 1987b)). Sheep grazing declined rapidly during World War II. Grazing on the Clearwater National Forest dates back to the early 1900s. This early use was mainly sheep grazing which took advantage of the high forage production resulting from large wildfires. Use peaked in 1934 and then rapidly decreased as brush and forest canopy increased and falling snags rendered the burn acres unusable ((Space 1981)).

Many rural communities continue to be dependent upon ranching for their economic livelihood and many of these ranches rely on federal land grazing for a portion of the season. As discussed in the Economic Sustainability section, the direct employee contribution to local communities from livestock grazing is 56 average annual jobs. These jobs are dependent on Forest Service resource programs and agency operations.

The Nez Perce-Clearwater contributes to the economic and social well-being of people by providing opportunities for economic diversity and by promoting stability for communities that depends on range resources for their livelihood. Although the grazing program on the Nez Perce-Clearwater is relatively small compared to some other Forests in the Northern Region, access to public lands for forage is central to many producers in the area. According to the Interior Columbia Basin Ecosystem Management Project Economic and Social Conditions of Communities report, Grangeville, Orofino, White Bird, Riggins, Elk City, Kamiah, Kooskia, and other communities in the region relied on forage produced on Nez Perce-Clearwater Forests lands for approximately 4 to 6 percent of the total forage base of their respective counties ((U.S. Department of Agriculture 2014f)). Continuance of livestock grazing can help to sustain businesses and employment opportunities.

In general, the grazing management program helps to ensure a reliable and consistent level of native rangeland forage for permitted commercial livestock production. This resource helps local ranches maintain an economical operation. A properly managed grazing program on the Nez Perce-Clearwater is integral to meeting desired resource conditions and maintaining the economic and social sustainability of local communities.

Permitted Livestock and Grazing Use

Of the approximately 4 million National Forest System acres within the Nez Perce-Clearwater, 612,766 acres, or about 15 percent, are within active grazing allotments. Grazing allotments occur along the western boundary (Figure 150) and southwest portion (Figure 151) of the Nez Perce-Clearwater. Allotments are a designated area of land available for permitted livestock grazing (36 CFR 222). A grazing allotment can include National Forest System and non-National Forest System lands. Permits are issued for the use of allotments or portions of allotments. Allotments are in active status when grazing permits have been issued, allotments are in vacant status when they do not have a grazing permit issued, and allotments are in closed status when they have been closed to livestock grazing by an administrative decision or action (Forest Service Manual 2205).

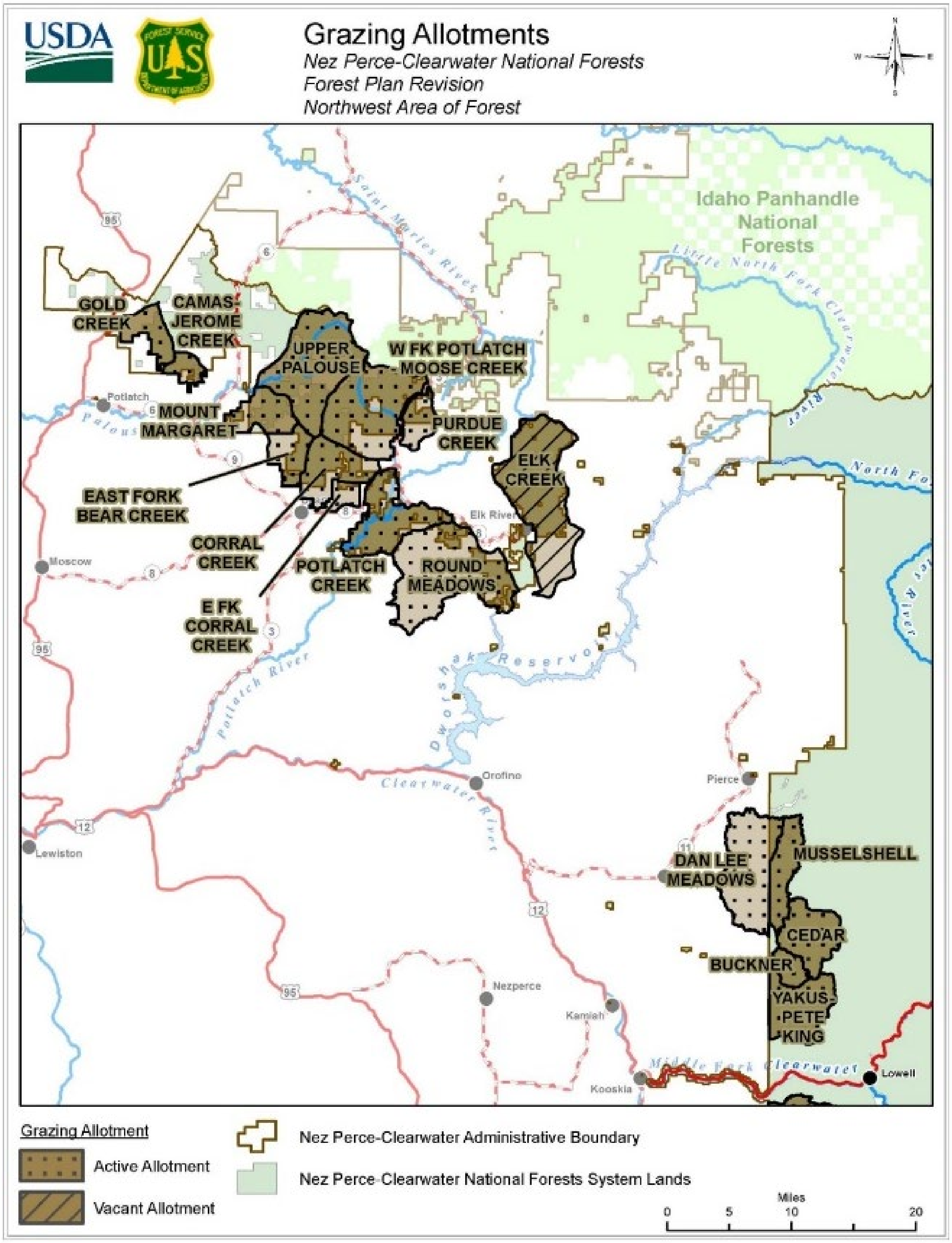


Figure 150. Grazing allotments in the northwest portion of the plan area.

Data Source: Nez Perce-Clearwater Geographic Information System.

*Beginning May 2024, the Cedar Allotment will become vacant, and the Musselshell Allotment will be administratively closed.

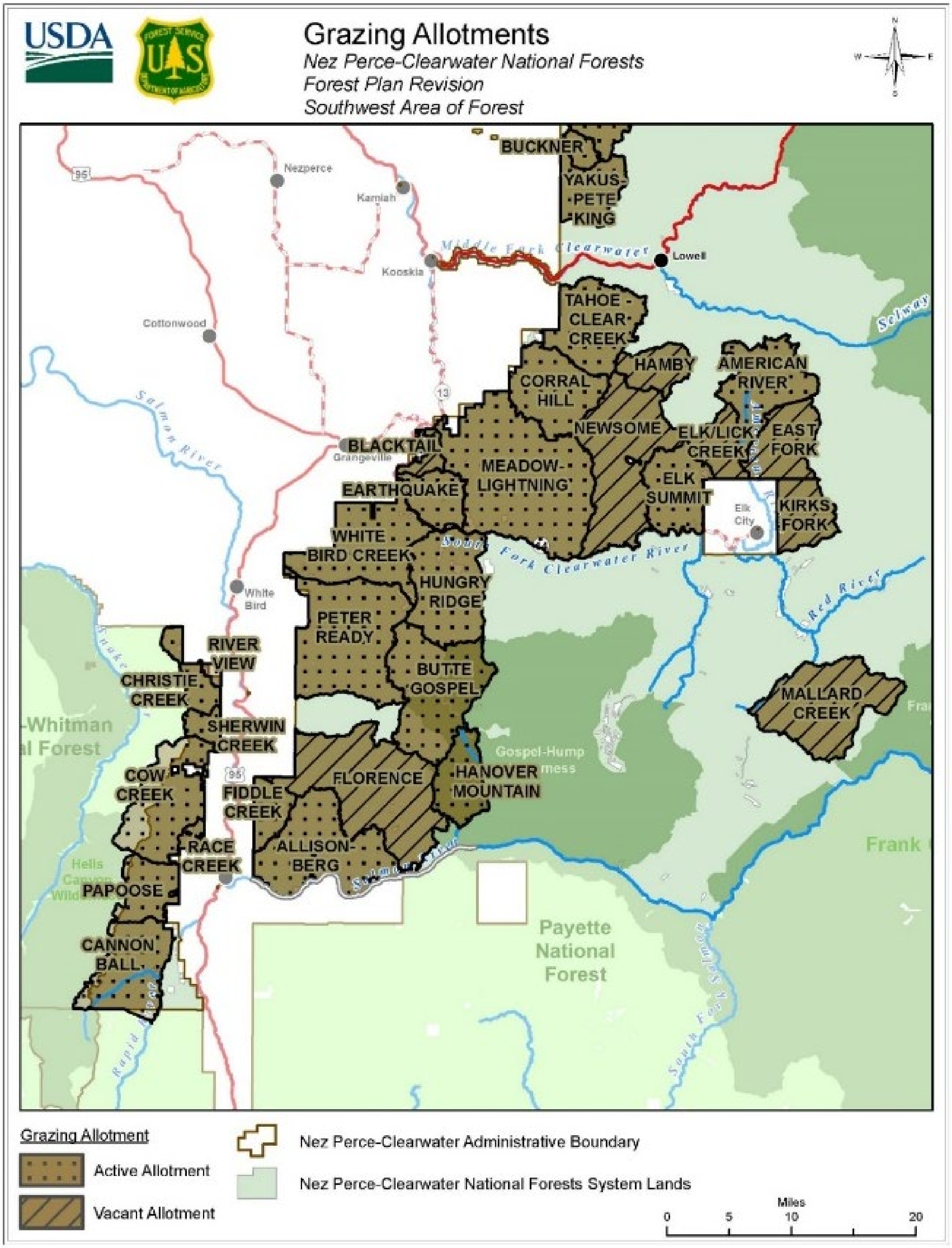


Figure 151. Grazing allotments in the southwest portion of the planning area.

Data Source: Nez Perce-Clearwater Geographic Information System.

Within the Nez Perce-Clearwater, there are currently 34 permittees authorized to graze livestock on 36 active range allotments. The number of permittees vary as term permits expire and become activated. All active grazing allotments are permitted for cattle grazing. Current grazing information for the Nez Perce-Clearwater is summarized in Table 377. Beginning May 2024, the Cedar Allotment will become vacant, and the Musselshell Allotment will be administratively closed.

Table 377. Livestock grazing statistics for the Nez Perce-Clearwater.

Grazing Information	Number
Permitted Cattle[1]	4,590
Permitted Cattle Animal Unit Months (Active Allotments)	29,861
Grazing Permittees (Permit Entities)	34
Active Allotments	36
Active Allotment Acres on Nez Perce-Clearwater lands	612,766
Vacant Allotments	9
Vacant Allotment Acres on Nez Perce-Clearwater lands	647,296

[1]One cattle number is equal to 1 cow and calf pair or 1 steer or 1 bull; calves greater than 6 months old are counted as cattle.
Data Source: Forest Service INFRA database, 2020; Nez Perce-Clearwater geographical information system data.

Permitted season of use varies by allotment, with some seasons starting as early as May 1 and some ending as late as October 31. The quantity of authorized livestock grazing is generally referred to in terms of an animal unit month. An animal unit month is defined as the amount of dry forage required by one mature cow of approximately 1,000 pounds, or its equivalent, with a grazing duration of 30 days.

Nez Perce-Clearwater livestock grazing records for 2020 show 4,590 head of cattle or cow and calf pair were permitted to graze at various times throughout the year, with a primary grazing season of June 1 through September 30. A total of 29,861 animal unit months for cattle were authorized to graze under a term grazing permit on National Forest System lands. Table 378 provides acres, number of permitted cattle, and animal unit month amounts for each active grazing allotment by Nez Perce-Clearwater ranger district. There are currently no designated forage reserve allotments on the Nez Perce-Clearwater that could be used by permittees that have been temporarily displaced due to wildland fire, drought, or other situations that have made forage unavailable.

Table 378. Summary of ranger district, allotment acres, livestock numbers, and animal unit months by active grazing allotment.

Allotment Name	Ranger District	Total Allotment Acres	Allotment Acres on Nez Perce-Clearwater Lands	Livestock Numbers	Permitted Animal Unit Months
Buckner	Lochsa	4,054	4,054	25	132
Cedar[1]	Lochsa	12,834	12,834	48	254
Dan Lee Meadows	Lochsa	22,029	1,531	23	152
Musselshell[2]	Lochsa	9,708	9,703	90	475
Yakus-Pete King	Lochsa	14,594	14,594	65	343
Corral Hill	Moose Creek	24,929	24,929	125	851
Tahoe - Clear Creek	Moose Creek	26,975	26,975	70	591
Camas-Jerome Creek[3]	Palouse	3,519	2,716	20	120

Allotment Name	Ranger District	Total Allotment Acres	Allotment Acres on Nez Perce-Clearwater Lands	Livestock Numbers	Permitted Animal Unit Months
Corral Creek[3]	Palouse	13,185	8,747	246	1633
East Fork Bear Creek[3]	Palouse	7,529	3,798	35	210
East Fork Corral Creek[3]	Palouse	2,653	444	25	166
Gold Creek[3]	Palouse	6,951	6,951	25	166
Mount Margaret[3]	Palouse	9,753	7,859	17	114
Potlatch Creek	Palouse	17,763	14,026	161	1,069
Purdue Creek	Palouse	3,235	2,335	12	73
Round Meadows	Palouse	34,486	7,404	75	433
Upper Palouse[3]	Palouse	36,362	35,530	11	66
West Fork Potlatch - Moose Creek	Palouse	26,404	21,045	188	1,249
American River	Red River	24,977	24,977	115	546
Elk Summit	Red River	19,306	19,306	100	806
Allison-Berg	Salmon River	37,359	37,359	60	479
Butte Gospel	Salmon River	38,895	38,895	215	766
Cannon Ball	Salmon River	25,583	21,796	170	1,145
Christie Creek[3]	Salmon River	8,232	8,112	173	1,156
Cow Creek	Salmon River	29524	18,556	599	4,847
Earthquake	Salmon River	11,928	11,928	185	1,148
Fiddle Creek[3]	Salmon River	8,477	8,477	100	405
Hanover Mountain	Salmon River	15,473	15,473	145	293
Hungry Ridge	Salmon River	31,505	31,505	210	1,386
Meadow-Lightning	Salmon River	70,340	70,340	234	1,720
Papoose	Salmon River	13,156	12,189	160	1,233
Peter Ready	Salmon River	47,552	47,363	368	2,627
Race Creek[3]	Salmon River	2,350	2,350	35	234
Riverview[3]	Salmon River	1,274	628	11	22
Sherwin Creek[3]	Salmon River	4,512	4,498	49	393
White Bird Creek	Salmon River	33,539	33,539	400	2,558
Total	n/a	700,945	612,766	4,590	29,861

[1]Cedar Allotment will become vacant in May 2024.
[2]Musselshell Allotment will be administratively closed in May 2024.
[3]Allotments do not contain streams with Endangered Species Act listed fish.
Data Source: Forest Service INFRA database, 2020; Nez Perce-Clearwater geographical information system data.

There are nine vacant grazing allotments on the Nez Perce-Clearwater totaling 217,172 acres (Table 379). Based on historic grazing records, approximately 940 head of cattle were permitted, and 4,476 animal unit months were authorized to graze on these vacant allotments. Current vacant allotments would need allotment level National Environmental Policy Act analyses and the development of an allotment management plan before being designated as active allotments.

Table 379. Summary of ranger district, allotment acres, livestock numbers, and animal unit months by vacant grazing allotment.

Allotment Name	Ranger District	Total Allotment Acres	Allotment Acres on Nez Perce-Clearwater Lands	Livestock Numbers	Permitted Animal Unit Months
Florence	Salmon River	53,428	53,428	300	1,200
Blacktail	Salmon River	4,057	4,057	31	206
East Fork	Red River	17,936	17,936	80	424
Kirks Fork	Red River	14,341	14,341	30	120
Newsome	Red River	44,301	44,301	155	828
Elk-Lick Creek	Red River	10,679	10,679	101	543
Mallard Creek	Red River	37,211	37,211	100	399
Hamby	Moose Creek	10,953	10,953	25	132
Elk Creek	Palouse	35,842	24,266	117	624
Total	n/a	228,748	217,172	939	4,476

Data Source: Forest Service INFRA database, 2020; Nez Perce-Clearwater geographical information system data.

As noted in Table 378 and Table 379, allotment acres on Nez Perce-Clearwater lands are different than the total allotment acres for particular allotments. These allotments have allotment boundaries that extend onto other national forests, state land, or private land. There are approximately 14,900 acres of Wallowa-Whitman, 900 acres of Payette, and 83,950 acres of non-Forest Service lands occurring within active and vacant allotments.

The Allison-Berg Allotment is the only domestic sheep allotment on the Nez Perce-Clearwater. Approximately 2,875 animal unit months were previously authorized to graze under a term grazing permit. The permit allowed for 1,483 ewe and lamb pair in the spring and summer grazing season and 2,301 mature sheep or goat in the fall and winter grazing season. In 2009, the term grazing permit was modified due to potential conflicts between domestic sheep grazing and native bighorn sheep. The permit modification states that domestic sheep grazing would not be authorized until an appropriate National Forest Management Act and National Environmental Policy Act analysis examines this potential conflict. Domestic sheep have not grazed on the allotment since 2007.

At the time the Nez Perce and Clearwater forest plans were developed in 1987, there was permitted grazing use of 58,000 animal unit months and 112 livestock grazing allotments (Table 380). Animal unit months permitted on the Nez Perce-Clearwater have decreased by approximately 48 percent since 1987 (Table 380).

Over the past several years, many allotments have been vacated and closed for a variety of reasons. Reduced transitory range, diminished range conditions, poor or nonexistent access, and economic considerations have forced permittees to discontinue use on some of the Forest's more remote and short-season allotments. Although the number of allotments have decreased since 1987, it is not all due to closures. Several allotment boundary delineations have been altered, and allotments have been combined.

Table 380. Permitted grazing in 1987 Nez Perce and Clearwater forest plans compared to current permitted use on active allotments.

Indicator	Nez Perce 1987 Forest Plan	Clearwater 1987 Forest Plan	Combined 1987 Forest Plan Total	Current Permitted Use on Active Allotments
Animal Unit Months	42,000	16,000	58,000	29,861
Cattle (Number)	6,600	1,700	8,300	4,590
Sheep (Number)	3,400	0	3,400	0
Permittees (Number)[1]	65	65	130	34
Allotments (Number)	59	53	112	36

[1]Number is an overestimate because a single permittee could have permits on both Forests.

Data Source: 1987 Nez Perce and Clearwater Forest Plans ((U.S. Department of Agriculture 1987b, a))

Livestock Grazing Management

Commercial livestock grazing on National Forest System lands are generally authorized through the issuance of a term grazing permit. Typically, grazing permits are issued to qualifying entities, referred to as permittees, for a period of 10 years and are generally re-issued upon expiration to the existing permittee. Permits include terms and conditions for grazing use and describe the responsibilities of the permit holder. Permitted livestock numbers and seasons of use are often based on past actual and permitted use levels but are also based on the site conditions.

Site-specific National Environmental Policy Act (NEPA) analysis for each allotment or set of allotments is completed during the allotment management planning process. The analysis evaluates potential impacts caused by permitted livestock grazing on a variety of resources, including rangeland resources, soils, federally listed threatened and endangered species, species of conservation concern, riparian habitat, and water quality. Allotment management plans contain the pertinent livestock management direction from the project-level NEPA decisions and include a general monitoring plan. Once approved, the allotment management plan becomes a part of the permit.

The allotment management plan establishes site-specific goals and objectives and provides management strategies to maintain or move towards desired condition and address resource issues and concerns. These strategies may include allowable use levels for riparian and upland vegetation, seasons of use, pasture rotations, thresholds for stream bank disturbance caused by livestock, and a schedule for implementing range-improvement projects, such as fences and water developments. This plan also includes requirements for monitoring and inspections, payment of grazing fees, ownership of livestock and base property, livestock management, range improvement maintenance and construction, and other terms as appropriate.

Annual operating instructions state the specific requirements and actions for the current year that are necessary to implement the project-level decision, allotment management plan, and term grazing permit. The annual operating instructions identify the obligations of the permittee and the Forest Service and articulates annual grazing management requirements, standards, and monitoring necessary to document compliance. Annual operating instructions are typically issued to allotment permittees during annual meetings prior to the grazing season. The instructions outline the number of permitted livestock, timing and duration of use, allowable use for riparian areas and uplands, applicable forest plan standards, permittee management requirements and practices, monitoring requirements, and site-specific mitigation measures.

Allotments are inspected throughout the season and are documented in allotment management summaries. Inspections determine if annual operating instructions are being followed, including timing, intensity, and location of stock. It also includes such items as maintenance of range improvements per permit terms and conditions. Compliance problems with the terms and conditions of grazing permits are documented and follow-up actions are initiated in the following year's annual operating instructions. Generally, if compliance issues occur on an allotment, range inspections are done jointly with permittees in order to try and jointly resolve the issues where possible.

Allotment management plans are revised periodically to ensure resource issues and concerns are adequately addressed and to ensure consistency with Forest Service regulatory guidance. Site-specific National Environmental Policy Act (NEPA) analysis for each allotment or set of allotments is completed at the time of the allotment management plan revision. The Nez Perce-Clearwater is operating under a schedule to revise and update allotment management plans tied to the Rescissions Act of 1995 (Public Law 104-19), Section 504(a), which requires each National Forest System unit to identify all allotments for which NEPA analysis is needed. These allotments must be included in a schedule that sets a timeline for the completion of the required environmental analysis.

Livestock must be managed properly to ensure the long-term sustainability of the resource base. Proper grazing management depends in part on determining correct livestock numbers per area of land, known as the stocking rate. Stocking rate is often expressed as acres per animal unit month. Animal unit months authorized by permit are allotment specific, thus they can be highly variable and need to be evaluated at the allotment planning level and not the at the forest plan level. Key factors influencing proper stocking on any given parcel of land include, but are not limited to, permittee management knowledge and effectiveness, topography, water availability, plant communities and their distribution, aspect, slope, forage palatability, current year's precipitation and seasonal distribution, wildland fire, drought, wildlife effects, recreational activities, and livestock age and size. Stocking rate adjustments can be and have been made through permit modifications where sufficient information indicates that a change is needed to achieve healthy range conditions.

Allotment management integrity relies heavily upon the maintenance of the related infrastructure such as fences, corrals, and water developments. There are approximately 240 miles of fence and about 160 water developments related to the management of allotments.

Rangeland Capability

Capability is an ecological assessment and is the initial step in the determination of suitability. Capability is defined as the ability of a unit of land, based on defined physical and biological attributes, to support a particular use or suite of products while maintaining ecosystem sustainability (Forest Service Manual 1905). Capability depends upon current resource conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease. It is not a determination of grazing capacity.

Capable rangelands produce forage or have inherent forage producing capabilities, and if accessible, can be grazed on a sustained yield basis. On the Nez Perce-Clearwater, livestock tend to congregate on more gentle terrain such as valley bottoms, riparian areas, meadows, and ridgetops.

Capability on the Nez Perce-Clearwater has been assessed periodically, both across the forest and within allotments. Examples of information utilized in capability assessments are forage production at a certain pounds per acre, slope, distance to water, and soil erosion potential. Range forage capability is not static, especially where factors such as timber encroachment, weed invasion, and natural wildland fire occur. Utilizing the Forest Service VMap existing vegetation geospatial database, approximately 2,055,439 capable range acres occur on the Nez Perce-Clearwater. In addition to vegetation type, aspect, slope, and elevation were used to assess capability. Within the active grazing allotments, there are 220,090 capable range acres, or 36 percent of active allotments. Livestock are not precluded from lands that may be modeled as not capable.

Rangeland productivity is an estimate of the annual production of rangeland vegetation in non-forested areas. Using the Normalized Difference Vegetation Index, an estimated 27,686 productive acres were identified in 2021 in active allotments. The highest productive acres occurred in the Allison-Berg, Cannon Ball, and Cow Creek allotments. The acres have remained fairly consistent since 1987 with slight variances in the level of forage resource productivity from year to year.

Rangeland Suitability

As noted in 36 CFR 291.7(e)(1)(v), specific lands within a plan area will be identified as suitable for various multiple uses or activities based on the desired conditions applicable to those lands. The plan will also identify lands within the plan area as not suitable for uses that are not compatible with desired conditions for those lands. The suitability of lands need not be identified for every use or activity. Suitability identifications may be made after consideration of historic uses and of issues that have arisen in the planning process.

Determining the suitability of a specific land area for a particular use or activity is usually based upon the desired condition for that area and the inherent capability of the land to support the use or activity. The National Forest Management Act does not impose a requirement to make suitability determinations for all multiple uses.

At the land management plan level, the suitability determination provides basic information regarding the potential of the land to produce resources and supply goods and services in a sustainable manner, as well as the appropriateness of using that land in a given manner. The 1987 Nez Perce and Clearwater forest plans are supported by a grazing suitability analysis that was done in the mid-1980s. Identified allotments were deemed suitable for permitted livestock grazing. Current active and vacant allotments are a subset of those allotments and therefore, suitable for livestock grazing.

Although an area may be deemed suitable for use by livestock in a land management plan, a project-level analysis evaluating the site-specific impacts of the grazing activity, in conformance with the National Environmental Policy Act (NEPA), is required in order to authorize livestock grazing on specific allotment(s). Broad suitability determinations are made across the livestock grazing allotments and more site-specific suitability determinations are applied for particular areas. Livestock grazing allotments may include smaller inclusions that are not appropriate for domestic livestock grazing when analyzed at the site-specific level, for example developed recreation sites. In these instances, livestock grazing may be found to be not suitable or suitable, but with restrictions.

Rangeland Conditions - Forage Productivity and Availability

Based on Forest Inventory and Analysis (FIA) plots non-forested vegetation types occur on only 5 percent of the Nez Perce-Clearwater. As discussed in the non-forested vegetation portion of the Forestlands section, the Nez Perce-Clearwater contains approximately 31,800 acres of grassland and 14,900 acres of meadow. An additional 3,000 acres of possible meadow have been encroached by conifers.

Specific information regarding the condition of the non-forest vegetation within the planning area or livestock grazing allotments is limited. Sampling and evaluation of grassland vegetation is generally conducted as a component of allotment NEPA analysis, but current allotment analysis information is relatively sparse on the Nez Perce-Clearwater. Forage is considered grassland vegetation, riparian and meadow vegetation, palatable grass and herbaceous vegetation produced under a timber canopy, and, to a lesser extent, shrub foliage.

Grasses dominate the xeric and mesic grassland broad potential vegetation groups and some dry forest types. Native plant communities include forb mixes of Idaho fescue, bluebunch wheatgrass, prairie junegrass, tufted hairgrass, mountain brome, needlegrass, and mixed grass. Common non-native species include timothy, orchard grass, Kentucky bluegrass, and annual brome. In some places, grass, forb, and shrub communities occur as a transitional type in the earliest stages of forest succession. For information on non-forested vegetation, see the Forestlands section pertaining to xeric and mesic grasslands, xeric shrubland or woodlands, riparian or wetland vegetation, and xeric ecotones and savannas.

Forest Service VMap data estimates that within the active allotments, 9 percent of the acres are categorized as herb, 4 percent as shrub, and 87 percent as tree. Based on Northern Region Broad potential vegetation type (PVT) group delineations, within active allotments, there is only 1 percent categorized as grassland, 1 percent as mesic shrubland, and the other 98 percent as forested vegetation types.

Rangeland forage is an important ecosystem service. Ecosystem services act as the primary bridge between ecological and social and economic systems. In Idaho and other western states, it is estimated that the majority of beef cows are produced on ranches that have at least 5 percent of their grazing capacity on federal rangeland (Torell et al. 1996). Cattle grazing on federal lands rarely spend the entire year on those lands. Rather, federal lands complement the forage resources of western ranches, that use state- or privately-owned lands other parts of the year. Approximately 40 percent of the beef cows in the western states have spent time on federal lands (Torell et al. 1996).

Forage is defined as the plants or parts of plants consumed by grazing or browsing animals. The amount of forage available for consumption varies according to a number of factors. Some plant species are unpalatable. Certain parts of many plants are not consumed. Moreover, only parts of plants can be consumed if they are to maintain vigor and keep their place in the plant community. Some areas of rangeland are not appropriate for grazing by livestock because of steep slopes, fragile soils, distance to water, poisonous plants, etc.

Key stressors that could affect the ability of the plan area to sustain domestic livestock that depend on the forage produced on the Nez Perce-Clearwater are uncharacteristic wildfires, invasive plant species, tree succession that lessens transitory range, conifer encroachment in grasslands and meadows, drought, and changing climate. These stressors are intensified by climate change, although conditions can vary substantially from year to year.

Conifer encroachment into meadows, shrublands, and grasslands has resulted in the loss of useable forage throughout the Nez Perce-Clearwater. Conifer encroachment is primarily a result of wildfire exclusion over the last 100 years. For example, timber canopy closure and encroachment has reduced forage production by at least 20 percent over the past 60 years on the Christie Creek Allotment on the Nez Perce National Forest (U.S. Department of Agriculture 2011c). There is approximately 4,080 acres of conifer encroachment in grasslands and shrublands in the active livestock grazing allotments.

Invasive plant species have greatly increased from historical levels and contribute to changes in vegetation composition and structure. For instance, biological diversity has changed in the Salmon and Selway River canyons as a result of noxious weed infestations and resultant loss of native grasslands. In some areas, perennial grassland vegetation has declined as annual grasses, such as cheatgrass, have expanded. More recently, exotic annual grasses are being replaced by even more aggressive invasive plant species. This decline in vegetation from native perennial grasses to exotic annual grass to invasive plant species has resulted in the significant decline in native plant production. For example, in the Christie and Sherwin allotments, usable forage in some areas has dropped from roughly 250 to 25 pounds per acre (U.S. Department of Agriculture 2011c). Allotment grazing capacities decline as forage production declines. Approximately 30 percent of the Christie and Sherwin allotments have converted to conditions undesirable for grazing, resulting in a loss of 74 animal unit months of forage capacity (U.S. Department of Agriculture 2011c).

Invasive forage species can substantially affect the structure and diversity of plant communities, as well as the seasonal palatability on some grazing allotments. Maintaining intact native bunchgrass communities can be the effective biotic resistance and reduce the magnitude invasive plants (Chambers et al. 2007, Prevey et al. 2010). As of 2022, there were 99,135 acres of inventoried invasive species occurring within grazing allotments and 83,824 acres occurring in active allotments. The dominant species are spotted knapweed, meadow and orange hawkweed, oxeye daisy, gypsy flower, Canada thistle, yellow star-thistle, common crupina, and rush skeletonweed. Climate change stressors, such as increased temperature and drought, are likely to increase the risks of and extent of invasive species on the Nez Perce-Clearwater.

Increased air temperatures influence soil moisture and cause gradual changes in the abundance and distribution of tree, shrub, and grass species, with more drought tolerant species becoming more competitive. Drought can generally be defined as a deficiency from the average or expected precipitation over a given period of time. Drought is different than other natural disasters, such as hurricanes and tornadoes, which have a clear start and end time and clearly defined impacts. Instead, drought creeps up slowly and is difficult to predict. Therefore, managers face constant uncertainty about how droughts will develop. Drought can impact livestock operations by altering rangeland conditions, such as diminished forage production or decreased drinking water that may not be well dispersed. The concentration of livestock around remaining water sources that have not dried out could lead to overuse and degradation of rangeland resources.

Watershed Condition

The watershed condition classification (WCC) process (Potyondy and Geier 2011) is one of the steps included in the Watershed Condition Framework and is a methodology that characterizes watershed condition based on indicators and attributes related to watershed processes. Subwatersheds are ranked in one of three discrete classes that reflect the level of watershed health or integrity — functioning properly, functioning at risk, and impaired function.

In 2011, the Nez Perce-Clearwater completed the watershed condition classification for 220 HUC12 subwatersheds. All or portions of 81 HUC12 subwatersheds occur within livestock grazing allotments. For subwatersheds located within allotments, the overall watershed condition classification was 21 percent rated as functioning properly, 67 percent rated as functioning at risk, and 7 percent rated as impaired (Table 381). Individual watershed condition class indicators directly related to livestock grazing and rangeland health are rangeland vegetation, riparian and wetland vegetation, invasive species, and water quality. Table 381 displays the percent of subwatersheds within livestock grazing allotments by condition class for these indicators. Although many of the subwatersheds had indicators rated as functioning at risk or impaired function, livestock grazing is only one of the many activities or factors affecting those indicators. These ratings will be reassessed in the future to assess change.

Table 381. Percent of subwatersheds within livestock grazing allotments by watershed condition class.

Indicator	Percent of Allotment Acres Functioning Properly	Percent of Allotment Acres Functioning at Risk	Percent of Allotment Acres Impaired Function
Overall WCC classification	21	67	12
Rangeland vegetation condition	50	23	27
Riparian and wetland vegetation condition	17	42	41
Invasive species condition	55	37	8
Water quality	46	18	36

Data Source: 2011 Nez Perce-Clearwater Watershed Condition Class Assessment.

Livestock Management Complexity

The 1987 Nez Perce and Clearwater forest plans contain general forestwide direction that was developed for range management and standards for livestock grazing specific to particular management areas. Items that make livestock grazing management more complex include designated wilderness, wild and scenic rivers, research natural areas, special areas, and national historic landmarks; protecting habitats for threatened, endangered, and sensitive fish, plants, and animals; and adhering to State of Idaho water quality standards. These items often require intensive livestock management and may necessitate fewer permitted livestock or a shortened season of use to mitigate impacts. Reducing permitted grazing could have substantial, negative local economic impacts. Some permittees may operate with limited financial resources, constraining their ability to change practices, make new investments, and absorb animal unit month cutbacks.

Designated Wilderness

The Nez Perce-Clearwater manages the entire Gospel-Hump Wilderness and portions of the Selway-Bitterroot and Frank Church-River of No Return Wilderness areas. Although 59,000 acres of the Hells Canyon Wilderness are located on the Nez Perce-Clearwater, the area is administratively managed by the Wallowa-Whitman National Forest.

Portions of eight livestock grazing allotments occur within three designated wilderness areas (Table 382). The Mallard Creek vacant allotment has a one percent portion located within the Frank Church-River of No Return wilderness. There are four grazing allotments that at least partially lie within the Gospel-Hump Wilderness, with almost all of Hanover Mountain Allotment and about half of the Butte Gospel Allotment occurring within the wilderness area. Pieces of three active allotments occur within the Hells Canyon wilderness on the Wallow-Whitman portion of the allotments. No allotments occur within the Selway-Bitterroot wilderness.

Each wilderness area is managed according to its own designating legislation and management plans specific to that wilderness area. Livestock grazing is suitable in the wilderness areas, although forage utilization is more restrictive. Livestock grazing management is expected to administer existing range allotments in accordance with wilderness values, maintain natural vegetative composition, and not exceed historical level of livestock (U.S. Department of Agriculture 1987b).

Table 382. Grazing allotments within designated wilderness.

Allotment Name	Allotment Status	Designated Wilderness Area	Wilderness Acres on Nez Perce-Clearwater	Wilderness Acres on Wallowa-Whitman	Percent of Total Allotment Acres within wilderness
Mallard Creek	Vacant	Frank Church-River of No Return	400	0	1
Butte Gospel	Active	Gospel-Hump	19,074	0	49
Florence	Vacant	Gospel-Hump	346	0	1
Hanover Mountain	Active	Gospel-Hump	15,327	0	99
Hungry Ridge	Active	Gospel-Hump	47	0	Less than 1
Cannon Ball	Active	Hells Canyon	0	2,749	11
Cow Creek	Active	Hells Canyon	0	4,497	15
Papoose	Active	Hells Canyon	0	969	7

Data Source: Nez Perce-Clearwater Geographic Information System

Designated Wild and Scenic Rivers

The Nez Perce-Clearwater administers all or part of three designated wild and scenic rivers. Approximately 3,760 acres, or 15 percent, of the Cannon Ball active allotment occur within the Designated Rapid River Wild and Scenic River. The segment of Rapid River located on the Nez Perce-Clearwater is classified as wild. Management direction for designated rivers is found in the Wild and Scenic Rivers Act and the Act that designated the river if not designated under the Wild and Scenic Rivers Act. Rapid River was designated in 1975 by the Hells Canyon National Recreation Area Act.

Livestock grazing is allowed within the designated river area provided it does not substantially interfere with public use or detract from the values which caused the river to be included in the National Wild and Scenic River System. Structures and improvements within a wild river area are accepted, if they are necessary to support the range activities, provided the area retains a natural appearance and the structures harmonize with the environment.

The Nez Perce 1987 Forest Plan direction for range management in the Rapid River Wild and Scenic River specifies that non-structural distribution control methods and biological methods to control noxious weeds are emphasized and native species of grasses are favored (U.S. Department of Agriculture 1987b).

Water Quality

The Idaho Department of Environmental Quality uses water quality standards (IDAPA 58.01.02) to determine if Idaho's waters are being adequately protected. The Idaho Department of Environmental Quality 303(d)/305(b) Integrated Report is a compilation of information about the water quality status of all Idaho waters and is a requirement of the Clean Water Act. The most current U.S. Environmental Protection Agency approved report is the 2022 Idaho Department of Environmental Quality 303(d)/305(b) Integrated Report (State of Idaho Department of Environmental Quality 2022a). There are 24 active allotments and seven vacant allotments containing streams not meeting State of Idaho water quality standards and not supporting beneficial uses (State of Idaho Department of Environmental Quality 2022b). Fifty percent of the streams in allotments are water quality limited: 725 miles in active allotments and 266 miles in vacant allotments. Impairments include temperature, sedimentation, *Escherichia coli* (E. coli), and fecal coliform.

At-Risk Native Species and Habitat

In some of the allotments there are potential adverse interactions between domestic livestock and native species. Actions to avoid or mitigate these risks can create additional allotment management complexity. Emphasis on protecting habitats for threatened endangered, and sensitive fish, plants, and animals can require more rigorous livestock oversight.

Twelve livestock grazing allotments, all located on the Nez Perce half of the plan area, include lynx habitat. No lynx habitat is located within livestock grazing allotments on the Clearwater. The Northern Rockies Lynx Management Direction (U.S. Department of Agriculture 2007e) contains management guidance pertaining to livestock grazing management in lynx habitat. The management direction only applies to occupied lynx habitat. Because the Nez Perce currently has unoccupied lynx habitat, the direction should be “considered,” recognizing that lynx may be present but would not have to be followed until such time as lynx occupy the unit. Any authorization or re-authorization of grazing allotments are supposed to consider the management direction.

Spalding’s catchfly (*Silene spaldingii*) is a perennial herb that is listed as threatened under the Endangered Species Act by the U.S. Fish and Wildlife Service. Livestock grazing is an identified management activity that can potentially threaten Spalding’s catchfly habitat or populations. As noted in the At-Risk Plant Species section, the three known occurrences of Spalding’s catchfly on the Nez Perce-Clearwater occur within livestock grazing allotments. Although some effects have been noted, livestock use generally does not appear to be a major impact due to managed livestock distribution in relation to population locations, fencing around sites, and low stocking levels in the allotments involved.

Protection of threatened or endangered species fish habitat may have the largest influence on livestock grazing on federal lands. Some permittees could be economically affected if conditions on their federal allotment require more intensive management actions or a reduction in stocking in order to manage for improved riparian and at-risk aquatic species habitat.

In 1995, the Nez Perce and Clearwater National Forest Plans were amended to implement an interim strategy for managing anadromous fish-producing watersheds on National Forest System lands. The direction included standards that protect or minimize effects to listed fish from livestock grazing, primarily in riparian areas. These include modifying grazing practices, locating new facilities outside of riparian areas, relocating or closing facilities, and limiting livestock handling efforts (Standards GM-1, 2, and 3). Federally listed fish occupy streams within or adjacent to 24 out of 36 allotments, approximately 67 percent of the active allotments on the Nez Perce-Clearwater.

Most livestock grazing pastures or allotments include some riparian areas, and managing livestock in those areas is one of the most contentious issues facing rangeland managers. This issue is complex because livestock operators and land managers most resolve conflicting economic and environmental issues as well as other concerns. Riparian areas are often the primary, and sometimes the only, watering places for livestock grazing on allotments. Traditional management strategies, practices, and thinking are often inadequate and difficult to change (Leonard et al. 1997).

Livestock grazing tends to have the greatest impact on low-gradient riparian and wetland areas; fine-textured soils with a minimal amount of rocks, cobbles, or boulders; and areas with naturally available water (Kauffman and Krueger 1984). The magnitude of impacts depends on the timing of use; the kind and class of livestock; the intensity, duration, and frequency of grazing; and the associated management practices, including the level of active permittee management and involvement.

Funding available to national forests to monitor livestock grazing implementation can be limited and monitoring methods are varied. While no one method works everywhere, stubble height has been extensively studied, and is widely put in practice as a trigger for cattle movement or an end of season monitoring indicator (Clary and Webster 1990, Clary and Leininger 2000, Goss and Roper 2018).

Riparian stubble height measurements within Nez Perce-Clearwater grazing allotments are conducted by range specialists periodically during the grazing season. Most of the data is collected along lower gradient stream reaches. Table 383 displays the existing riparian stubble height objectives as documented in Annual Operating Instructions and the range of measured riparian stubble heights at the end of growing season within pastures for years 2015 to 2020. Overall, stubble height objectives are generally achieved. Because measurements are taken at different locations within the pastures it is difficult to establish trend.

Table 383. Annual Operating Instruction (AOI) riparian stubble height objectives for active allotments on the Nez Perce-Clearwater and range of stubble heights* within allotments by monitoring year.

Allotment Name	AOI Stubble Height Objective[1] (inches or percent)	2015 (inches)	2016 (inches)	2017 (inches)	2018 (inches)	2019 (inches)	2020 (inches)
Buckner	4.5 inches	no data	no data	12–14	no data	no data	4–7
Cedar	4.5 inches	no data	3–12	no data	no data	7	2–5
Dan Lee Meadows	4.5 inches	no data	no data	10.5	17	7	13
Musselshell	4.5 inches	24	4–12	12–15	11.6–20	12–16	8.4–10
Yakus-Pete King	4.5 inches	no data	8–12	25–30	no data	7	7
Corral Hill	6 inches	12	5–6	5–10	18.4	no data	10–12
Tahoe - Clear Creek	6 inches	no data	no data	10–35	7.8	8	6–10
Camas-Jerome Creek	4 inches	10.45	7.39	4.9	9.83	15.38	10.5
Corral Creek	4.5 inches	3.8–10	5.5–9.4	3.3–10.1	4.6–9.8	7.4–13	14.3–15
East Fork Bear Creek	4.5 inches	8.8	7.3	12.3	9.2	10.59	17.5
East Fork Corral Creek	4.5 inches	10	8.64	10.06	8.08	no data	15.25
Gold Creek	4.5 inches	12.7	8.18	6.43	10.73	8.58	no data
Mount Margaret	4.5 inches	12.8	7.9	7.9	12.7	8.17	15.5
Potlatch Creek	4.5 inches	3–6	6.8–12	4.9–21	5.4–9.7	6.3–19	11.5
Purdue Creek	4.5 inches	16.0	15.8	1.7	2.2	3.61	14.5
Round Meadows	4.5 inches	10.1	12.6	13.3	15.3	23.26	21.0
Upper Palouse	4.5 inches	No data	No data	No data	No data	No data	No data
West Fork Potlatch - Moose Creek	4.5 inches	No data	No data	No data	No data	6.2–16.8	14.5–22.5
American River	6 inches	11	no data	20–30	no data	no data	6–14

Allotment Name	AOI Stubble Height Objective[1] (inches or percent)	2015 (inches)	2016 (inches)	2017 (inches)	2018 (inches)	2019 (inches)	2020 (inches)
Elk Summit	6 inches	non–use	non–use	non–use	vacant	vacant	6–8
Allison-Berg	65 percent	18	8–12	6–22	10	7.2–24	8–18
Butte Gospel	4 inches	6	3–8	6–10	6–12	8.5–9	7–11
Cannon Ball	4 inches	3–15	3	16–24	no data	13	2–10
Christie Creek	6 inches for bluebunch wheatgrass, 3 inches for Idaho fescue	4–8	3–8	6–13	3.7–10	2–20	4–11
Cow Creek	4 inches	2–6	2–4	2–15	6.6–6.7	2–14.4	4–10
Earthquake	6 inches	14	no data	non–use	6.7–16	no data	3–16
Fiddle Creek	6 inches	10	3–12	3–12	no data	3.3	8–9
Hanover Mountain	4 inches	2–4	3–10	non–use	4.6	no data	12
Hungry Ridge	6 inches	18	2–3	4–36	6.3–24	6–8	6–12
Meadow-Lightning	4 inches	4–12	3–12	6–28	6.7–12	4–10	4–12
Papoose	65 percent	6	4–10	4–7.6	no data	4–14.5	7–10
Peter Ready	65 percent	2–3	3–5	5–18	3.7–7.9	3.5–7	4–7
Race Creek	4 inches	no data	6–18	6–12	6.8	no data	no data
Riverview	6 inches	18	4–6	no data	4.3	no data	no data
Sherwin Creek	6 inches for bluebunch wheatgrass, 3 inches for Idaho fescue	no data	2–12	2–12	5.9	9.4–24	9–11
White Bird Creek	6 inches	4–11	1–9	3–18	4.8–14	3.8–11	3–11

[1]Height or percent-maintained objective for utilization of all herbaceous vegetation remaining along the greenline or floodplain at the end of the growing season.

Data Source: Nez Perce-Clearwater range allotment monitoring summary.

Other factors or land designations occuring within allotments can also make livestock management more complex. For example, the inclusion of research natural areas, special areas, national historic landmarks, or cultural resource sites can require require more intensive livestock management or fencing to mitigate impacts.

Environmental Consequences

This section describes the effects of implementing the Action Alternatives on livestock grazing. The Action Alternatives are described in Chapter 2. Effects are analyzed in relation to the No Action alternative. In conjunction with this analysis, a discussion of the social and economic impacts related to livestock grazing can be found in section 3.8 Economic Sustainability and 3.9 Social Sustainability.

Effects Common to All Alternatives

Effects from the management of sustainable recreation, cultural resources, minerals, system roads and motorized trails, wildfire, designated wilderness, designated wild and scenic rivers, research natural areas, and special areas would be the same for all alternatives. All alternatives retain the

Northern Rockies Lynx Management Direction for managing Canada lynx habitat. Emphasis on managing livestock grazing to maintain and improve riparian conditions is expected to continue under all alternatives. See the Effects to Livestock Grazing from Other Resources section below for more information on each of these resources.

Permitted Livestock Use

Livestock grazing is likely to be sustained within the planning area over the next 15 to 20 years under all alternatives. Figure 150 and Figure 151 delineate the grazing allotments on the Nez Perce-Clearwater. None of the alternatives close any allotments, change the existing allotment boundaries, convert status, or alter permitted animal unit months. Existing suitable acres would not change between any of the alternatives. None of the alternatives stipulate any direction regarding allotment specific administration, such as pasture on and off dates and rotations. Under all alternatives, changes to livestock management and allowable forage use levels at the site-specific scale would be made during the allotment management planning process.

Under all alternatives, the permitted use of the existing active grazing allotments would continue. However, animal unit month levels may be reduced as site-specific allotment changes are needed. Based on current rangeland and riparian conditions and the need to revise or review allotment management plans for allotments, changes in the amount of permitted animal unit months are difficult to predict. Project-level analysis and allotment-specific monitoring will continue to determine site-specific prescriptions, future stocking rates, and other management adjustments to meet desired conditions under all alternatives. Permitted animal unit months over the long term could possibly decrease under all alternatives due to more intensive management of riparian areas or habitats for threatened, endangered, or at-risk species. Should additional allotments become vacant in the future, they could be considered for use as forage reserves, opportunities to enhance management or improve resource conditions through combination with adjacent allotment(s), retention of vacant allotment status for potential use demands in the future, or allotment closure based on resource conflicts, conservation opportunities, or economic considerations.

Forage Production and Availability

Management direction under all alternatives allows for some level of vegetation treatments, such as timber harvest, prescribed fire, and to allow wildfire to provide resource benefits where feasible. Vegetation should move towards a desired mix of conditions from these treatments and thus provide a secondary benefit of improving forage conditions and transitory range in the future.

Conifer canopy closure, conifer and shrub encroachment into grasslands and meadows, and the spread of invasive plant species all can reduce available forage for livestock. The degree to which future management actions address each of these ecological processes would influence the potential loss or increase in available forage. For the foreseeable future, management under any of the alternatives would continue to provide forage production and productive livestock grazing. Acres available for livestock grazing would be the same under all alternatives. Grazing use would be managed similarly in all alternatives.

Climate Change

Over the life of the plan, certain environmental influences may negatively impact rangeland health and forage production. If climatic temperatures significantly increase, there may be changes in vegetation resulting in a shift from more mesic, moist plant associations to more xeric, dry communities. As a result, it is expected that bare ground may increase within these plant communities as rangeland sites become drier during extended periods of drought (Pellant et al. 2004). Invasive plant species would likely continue to spread and increase in abundance and density. Timber canopy may continue to close in areas where wildfires or other disturbances do not occur, and some grasslands and shrublands may see additional conifer encroachment and conversion to a conifer-dominated community. Conversely, there is potential that wildfire may play a larger role in shaping vegetation in some areas, perhaps promoting non-forested vegetation communities, particularly given warmer climate regimes. Transitory range acreage may fluctuate as forested stands become more open due to timber harvest, fuels treatments, insects, disease, and wildland fire. Over time and through succession, forest canopies would likely close in once again until the next disturbance.

Climate change may affect vegetation, which in turn could affect livestock grazing. Potential effects include, but are not limited to, changes in type, amount, and distribution of precipitation, which directly affects type, abundance, and distribution of vegetation. Lower-elevation grassland and shrubland habitats are expected to become drier and habitat zones shift upward in elevation (Finch 2012). The result of these potential changes could be an increase in suitable forage for cattle grazing at higher elevations within an allotment. On the other hand, lower elevation rangeland communities may mature earlier in the season, resulting in reduced palatability earlier in the grazing season. Reduced palatability, combined with warmer temperatures, could affect livestock distribution and potentially increase livestock concentrations in riparian and meadow areas. Additional livestock management may be necessary to avoid riparian use levels being reached earlier than anticipated, increasing the risk of removal of livestock from the pasture or allotment earlier than the permitted off date.

Increases in atmospheric carbon levels and higher temperatures would likely make invasive species, especially annual grasses, more competitive and adaptable, which may allow some species to expand to higher elevations as well as become more difficult to control due to reduced chemical efficacy (Ziska et al. 2004). Not only will some species become more invasive, but the array of species would continue to change (Scott et al. 2013).

It is possible for climate change to impact resource use within a short timeframe, which could change the suitability and utilization of forage. For example, there have been periods of increased summer temperature and decreased summer precipitation over a 15- to 20-year planning period which would indicate that the potential for changes in the suitability and utilization of forage within a grazing allotment may change within a planning period. This could cause beneficial or negative impacts to the permitted use of a grazing allotment for suitability and utilization. Annual fluctuations of temperatures and precipitation would affect forage palatability under all alternatives.

Temperature is projected to increase 5 to 10 degrees Fahrenheit by 2100 in the Western Rockies subregion, including increases in both the annual mean monthly minimum and annual mean monthly maximum (Halofsky, Peterson, et al. 2018a, b). Heat stress inflicts heavy economic losses on livestock production through reduced feed consumption, reduced production efficiency in terms of weight gain, and reduced reproductive efficiency.

Although rangeland managers and permittees are already experienced with harsh and variable conditions, they may not be prepared for the accelerating and exacerbating impacts under future climate change (Ash et al. 2012). The impacts to livestock grazing from climate change remain to be fully understood. However, the Forest Service has a variety of administrative tools to help adapt to unexpected situations, as well as short- and long-term changes in resource conditions. Examples of administrative changes include stocking adjustments and adjusting management practices. The impact of climate change to livestock grazing could include limited use of allotments due to less available forage or rapid seasonal changes in palatability. Livestock grazing operations will most likely need to increase flexibility for uncertainty, variability, and increasing stress from individual factors in the face of changing climate. See section 3.2.3 Climate Change and Carbon for more discussion.

The effects from climate change on livestock grazing would be the same for all alternatives, although the Action Alternatives speak to and incorporate climate change adaptation and offer potential adaptation strategies in Appendix G.

Effects of the No Action Alternative

Management Direction under the Current Plans

The existing 1987 Nez Perce Forest Plan (U.S. Department of Agriculture 1987b) and the Clearwater Forest Plan (U.S. Department of Agriculture 1987a) provide the current direction being used by the Nez Perce-Clearwater to address livestock grazing. Both the Nez Perce and Clearwater forest plans projected increases in animal unit months due to increases in transitory range from increased early seral openings created by timber harvest.

The Clearwater Forest Plan goal for rangelands is to manage livestock grazing land consistent with the protection and management of other resources. The Clearwater Forest Plan contains the following standards for range:

1. Coordinate livestock grazing on timber cutting units as necessary to provide for tree regeneration. Livestock grazing on lands designated for timber production may be permitted if the silvicultural prescription and allotment management plan are specifically designed to meet regeneration goals.
2. Construct roads across permanent range meadows only if no other feasible alternative exists.
3. Control noxious weeds on a case-by-case basis if their presence may conflict with the range resource or become detrimental to other resources and uses.
4. Develop water sources outside riparian areas to obtain livestock distribution.

The Nez Perce Forest Plan goal for rangelands is to provide a sustained yield of resource outputs at a level that will help support the economic structure of local communities and provide for regional and national needs. The Nez Perce Forest Plan contains the following standards for range:

1. Coordinate livestock grazing on timber harvest units as necessary to provide for tree regeneration. Livestock grazing on lands designated for timber production may be permitted under one of the following conditions: a) Regeneration is established and is of adequate size or b) the silvicultural prescription and allotment management plan are specifically designed to meet regeneration goals.
2. In areas with poor or fair range conditions, intensive grazing systems, range improvements, and reductions of stock will be implemented to improve conditions.
3. Implement a weed control program to confine present infestations and prevent establishment of new areas of noxious weeds. The Nez Perce will favor biological control for noxious weeds that have effective host insects. Where biological control is not effective, a combination of hand grubbing and spot application of herbicides will be used. This program will be coordinated with

county, state, and other federal agencies. All National Environmental Policy Act requirements will be completed prior to using any herbicides.

4. Extend or build fences to maintain control of livestock when management activities, such as timber harvest, remove natural allotment boundaries.
5. Complete range analysis and allotment management plans every decade for all allotments.
6. Provide forage for elk needs in allotment management plans on all allotments that include elk winter range. The assumption is made that available forage is not a limiting factor on summer habitat.
7. Use grazing systems and cultural practices to reduce erosion by maintaining, improving, or reestablishing vegetative cover.
8. Minimize adverse impacts on riparian areas by maintaining or developing intensive grazing systems.

Both the Nez Perce and Clearwater forest plans included goals and standards for livestock grazing in specific management areas, such as administrative sites, developed recreation sites, timber production ground, big game summer and winter range, high fishery areas, the Lolo Trail, designated wild and scenic rivers, designated wilderness, research natural areas, and riparian areas. Standards ranged from not allowing livestock grazing to allowing, but with certain restrictions.

In 1995 the Nez Perce and Clearwater national forest plans were amended to implement an interim strategy for managing anadromous fish-producing watersheds on National Forest System lands. The following standards protect or minimize effects to listed fish from livestock grazing, primarily in riparian areas:

1. GM-1: Grazing practices, such as accessibility of riparian areas, length of grazing season, stocking levels, or timing of entry shall be modified if the practice retards or prevents attainment of Riparian Management Objectives or are likely to adversely affect listed anadromous fish. Grazing may be suspended if modified practices are not effective in meeting Riparian Management Objectives and avoiding adverse effects on listed anadromous fish.
2. GM-2: New livestock handling or management facilities will be located outside of Riparian Habitat Conservation Areas. Assure existing livestock handling or management facilities inside Riparian Habitat Conservation Areas do not prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish. Facilities will be relocated or closed where Riparian Management Objectives cannot be met.
3. GM-3: Livestock trailing, bedding, watering, salting, loading, and other handling activities will be limited to areas and times that will not retard or prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish.

Effects of the No Action Alternative

Under the current plans, grazing management as outlined in the affected environment section would continue, with revisions of allotment management plans and associated protections for other resources following direction from the existing plans. Grazing management would continue to provide the livestock animal unit months authorized in term Forest Service grazing permits. The current plans allowed for increasing the amount of animal unit months across the national forests, mainly from the transitory range being created from timber harvest. However, riparian and aquatic concerns would most likely keep permitted animal unit months stable or slightly reduced as more allotment management plans are updated and management prescriptions are improved to move riparian areas toward desired conditions.

Permitted Livestock Use

Under the No Action Alternative, permitted animal unit months for cattle would remain at current levels. Approximately 29,861 animal unit months are authorized to graze under term grazing permits on 36 active allotments. There is also a term permit for domestic sheep grazing on the Allison-Berg Allotment, authorizing 2,875 animal unit months. The permit was modified to non-use for domestic sheep grazing in 2009 due to potential conflicts with native bighorn sheep. Under the No Action Alternative, the non-use agreement for the Allison-Berg Allotment for domestic sheep grazing would remain in effect until site specific National Environmental Policy Act analysis examines the compatibility of domestic sheep grazing in core bighorn sheep habitat. A subsequent record of decision would be made regarding suitability of domestic sheep grazing and would describe any appropriate conditions and constraints necessary to mitigate conflicts.

Forage Production and Availability

Transitory forage is produced each year within the forested habitat types in those areas where canopy cover allows adequate sunlight for grass and browse production. The total production of forage from transitory range is generally consistent from one year to the next; as the forest canopy on some sites begins to close, the forested canopy on other sites is opening due to timber harvest, wildland fire, or insect and disease. Under the No Action Alternative, the present forested canopy may be closing at a rate faster than in past decades due to reduced annual timber harvest and prescribed fire acres. This could result in a gradual reduction in transitory forage. The current level of timber harvest of approximately 4,300 average annual acres and prescribed fire of approximately 5,560 average annual acres will form the baseline for comparison of transitory forage production with the proposed Action Alternatives.

Allotment Management Complexity

Presently, grazing allotments are managed to achieve protection and enhancement of a variety of resources. Each grazing allotment has its own unique set of management requirements to address the resources within its boundaries. Most grazing allotments have some comparable management requirements associated with common resources, such as riparian and upland forage. Some allotments have management requirements associated with a less common resource element, such as wilderness, wild and scenic rivers, and rare plant habitat. Under current management, grazing permittees understand and anticipate the amount of time and money it would require to adequately manage livestock within their allotment. The current level of allotment management under the No Action Alternative forms the baseline for comparison with the Action Alternatives.

In summary, under the No Action Alternative grazing management as outlined in the affected environment section would continue, with revisions of allotment management plans and associated protections for other resources following guidance from the 1987 plans. Grazing management would continue to provide the livestock annual unit months authorized in term grazing permits. The 1987 plans allowed for increasing the amount of animal unit months, mainly from the transitory range being created from timber harvest, although riparian and aquatic concerns would most likely keep permitted numbers stable.

Effects Common to Action Alternatives

The plan components that support permitted livestock grazing and use are common for all Action Alternatives. Most of the plan components associated with forage production and availability and rangeland health are also the same for all Action Alternatives. The complexity of allotment management that could result from aquatic ecosystems plan components are the same for all Action Alternatives.

Permitted Livestock and Grazing Use

Many rural communities continue to be dependent upon ranching for their economic livelihood and many of these ranches rely on federal land grazing for a portion of the season. Continuance of livestock grazing could help to sustain businesses and employment opportunities.

The Land Management Plan Action Alternatives acknowledge the contribution of livestock grazing to the social and economic sustainability of local communities (FSH 1909.12 23.23(d)(2)(a)) by including desired condition FW-DC-GRZ-03, which affirms that livestock grazing on the Nez Perce-Clearwater contributes to agricultural businesses and local employment opportunities, as well as supporting traditional lifestyles. The Action Alternatives also include an objective to annually provide conditions which support approximately 29,800 to 34,400 animal unit months, recognizing that allotment site-specific conditions may require adjustments in permitted or annually authorized animal unit months (FW-OBJ-GRZ-01). Examples of conditions that may result in adjustments include wildland fire, drought, vacant allotment conversions, vacant allotment closures, or increases in transitory forage within grazing allotments.

Forage Production and Availability

The 2012 Planning Rule requires that Land Management Plans must include plan components for integrated resource management to provide for ecosystem services and multiple uses, such as forage for grazing (36 CFR 219.10(a)). The Action Alternatives include desired conditions for the Nez Perce-Clearwater to provide forage for domestic livestock grazing consistent with the capacity of the land to produce sustained forage for multiple uses (FW-DC-GRZ-01) and that transitory forage within grazing allotments is available for livestock grazing following the reduction in conifer overstory from fire and timber harvest (FW-DC-GRZ-02).

To allow forage plants to maintain vigor, root development, and soil cover, guideline FW-GDL-GRZ-03 specifies that general upland forage utilization should not exceed 35 to 55 percent. Specific utilization guidelines should be applied during grazing allotment authorization or reauthorization, which consider variables such as ecological condition of the vegetation, timing and duration of use, and other resource values in the area. Forage utilization values should be adapted over time based on long-term monitoring and evaluation of conditions and trends.

Allowable use in current term grazing permits are within the ranges required by the FW-GDL-GRZ-03, so grazing permits would not need to be modified in the short-term. As allotment management plans are revised, the appropriate level of utilization would be determined for the specific allotment, but within the ranges proposed in the revised forest plan. Factors that would be considered for utilization during allotment management plan development, include site-specific ecological conditions, vegetative health, timing and duration of use, and other resource values in the area.

The Nez Perce-Clearwater contains a mosaic of forest, grassland, meadows, and shrubland vegetation. Meadows, grasslands, and shrublands support native plant communities and forage for livestock and other animals within the planning area. These non-forested areas provide the bulk of the forage capacity on many grazing allotments within the Nez Perce-Clearwater. Livestock have a natural tendency to graze these areas as they are generally accessible and provide palatable and nutritious forage. The Land Management Plan includes six desired conditions that promote meadows, grasslands, and shrublands health (FW-DC-GS-01 to 06). These desired conditions cover bluebunch wheatgrass habitat type groups, fescue habitat type groups, xeric shrubland habitat type groups, wetland graminoid and riparian shrub habitat type groups, and vegetation occurring on Mollisol soils. The desired conditions also emphasize invasive plant species either are not present or occur with low cover, and conifers are absent or occur as scattered individuals. The Land Management Plan includes an objective to maintain existing meadows and grasslands by reducing conifer encroachment into meadows and grasslands on a minimum of 500 acres every 5 years (FW-OBJ-GS-01).

Invasive plant species have the potential to substantially decrease livestock forage by displacing native plants, especially in the grasslands and the warm dry forested vegetation types. The prevention, detection, control, and restoration program for invasive species is the same for all alternatives as described in the Invasive Species section. Although the No Action Alternative includes direction for noxious weed control, the scope and objectives were limited. The Action Alternatives include a desired condition promoting invasive species either are not present or occur at low levels to allow watersheds, vegetation communities, and aquatic ecosystems to retain their inherent resilience and resistance to respond and adjust to disturbances. Plant communities retain their historic diversity and provision of values to fauna (FW-DC-INV-01).

To reduce the probability of establishment or expansion of invasive weeds, guideline FW-GDL-INV-01 requires management activities prone to significant soil disturbance or exposure to be planned and implemented with design features to address the potential spread of invasive weeds. All Action Alternatives have the same objective of treating 6,000 acres annually to contain or reduce non-native invasive plant density, infestation area, or occurrence (FW-OBJ-INV-01). Despite aggressive invasive species treatments, invasive plant species may continue to persist and possibly expand in some remote areas. Forage production for livestock may decline in future years, but overall forage capacity should remain adequate for current levels of permitted grazing animal unit months for the next 15 years.

Allotment Management Complexity

Protection of threatened or endangered species habitat and associated riparian areas may have the largest influence on livestock grazing on federal lands. The Land Management Plan recognize potential adverse interactions between domestic livestock and native species and provides appropriate plan components to avoid or mitigate these risks. (FSH 1909.12 23.23(d)(1)(e). The aquatic ecosystems plan components have the potential to increase allotment management complexity.

Some permittees could be economically affected if conditions on their allotment require more intensive management actions or a reduction in stocking in order to manage for improved riparian and at-risk aquatic species habitat. To address protection of threatened or endangered species habitat and riparian and stream habitat improvement needs, changes in livestock management may require constructing additional range infrastructure and water developments, adjusting forage use levels, or increasing herding efforts in addition to routine management practices. All these actions cumulatively increase the overall permit administration cost for a grazing permittee.

Riparian Areas

Management and protection of aquatic ecosystems, including riparian and wetland communities, are emphasized under all alternatives. Standard FW-STD-WTR-04 specifies that where aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. Where aquatic and riparian desired conditions are not yet achieved, and to the degree that project activities would contribute to those conditions, projects shall restore or not retard attainment of desired conditions. The phrase "do not retard" is described as not disrupting or setting back natural rates of recovery.

Standard FW-STD-ARGRZ-01 necessitates livestock grazing to be authorized or reauthorized only when measures are included in the authorization to avoid or mitigate adverse effects to fish and riparian habitat that may result from grazing practices. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, grazing practices shall be modified by practices such as adjusting accessibility of riparian areas to livestock, length of grazing season, stocking levels, or timing of grazing. Additionally, where livestock trailing, bedding, watering, salting, loading, off road vehicle use for managing or gathering livestock, and other related activities in riparian management zones are adversely affecting aquatic resources, annual operating instructions shall include measures to mitigate or relocate to other areas or times (FW-STD-ARGRZ-02). To reduce localized impacts resulting from concentrated livestock use and associated trampling, guideline FW-GDL-GRZ-01 specifies that livestock salting should be excluded from riparian areas, meadows, designated sensitive plant habitat, seedling conifer regeneration areas, aspen restoration areas, and prescribed restoration areas.

Table 384 provides acres of riparian management zone within active allotments and the percent of riparian areas within each active allotment. Approximately 13 percent of active grazing allotments on the Nez Perce-Clearwater are located within riparian management zones.

Table 384. Aquatic attributes[1] by active grazing allotment.

Active Allotment	ESA[2] Listed Fish	CWN[3]	RMZ[4] Acres	Percent Allotment Acres in RMZ[4]	Stream Miles with Gradient Less Than 3 Percent	Stream Miles with Gradient Greater Than 3 Percent
Allison-Berg	Yes	Yes	5,117	14	12.4	143.7
American River	Yes	Yes	2,831	11	10.0	77.8
Buckner	Yes	No	572	14	5.5	14.1
Butte Gospel	Yes	Yes	4,551	12	8.8	76.0
Camas-Jerome Creek	No	No	385	11	1.1	15.7
Cannon Ball	Yes	Yes	2,707	11	6.7	83.9
Cedar[5]	Yes	Yes	1,722	13	19.2	27.7
Christie Creek	No	No	805	10	0.0	26.4
Corral Creek	No	Yes	1,949	15	36.3	83.6
Corral Hill	Yes	Yes	3,753	15	2.9	94.8
Cow Creek	Yes	No	1,936	7	0.2	171.1
Dan Lee Meadows	Yes	No	140	1	46.6	26.4
Earthquake	Yes	Yes	1,307	11	10.5	35.9

Active Allotment	ESA[2] Listed Fish	CWN[3]	RMZ[4] Acres	Percent Allotment Acres in RMZ[4]	Stream Miles with Gradient Less Than 3 Percent	Stream Miles with Gradient Greater Than 3 Percent
East Fork Bear Creek	No	No	1,116	15	7.5	53.7
East Fork Corral Creek	No	Yes	71	3	6.1	7.5
Elk Summit	Yes	Yes	3,001	16	14.3	82.3
Fiddle Creek	No	No	705	8	0.0	22.9
Gold Creek	No	No	714	10	2.7	25.8
Hanover Mountain	Yes	Yes	2,169	14	1.7	52.5
Hungry Ridge	Yes	Yes	4,527	14	15.9	94.6
Meadow-Lightning	Yes	Yes	9,476	13	18.0	275.5
Mount Margaret	No	No	876	9	3.1	39.6
Musselshell[6]	Yes	Yes	1,284	13	17.9	12.6
Papoose	Yes	Yes	1,211	9	0.1	43.3
Peter Ready	Yes	Yes	5,914	12	10.5	156.3
Potlatch Creek	Yes	Yes	3,022	17	31.9	77.6
Purdue Creek	Yes	No	466	14	2.3	20.6
Race Creek	No	No	254	11	0.0	9.1
Riverview	No	No	96	8	0.0	6.0
Round Meadows	Yes	No	707	2	35.2	113.8
Sherwin Creek	No	No	534	12	0.1	19.9
Tahoe - Clear Creek	Yes	Yes	3,535	13	0.7	77.8
Upper Palouse	No	No	5,094	14	25.3	121.6
West Fork Potlatch - Moose Creek	Yes	Yes	3,639	14	51.1	111.4
White Bird Creek	Yes	Yes	3,809	11	7.7	88.4
Yakus-Pete King	Yes	No	1,853	13	3.4	46.4
Total	na	na	81,847	na	415.8	2,436.3

[1]All attribute acres and miles occur within the Nez Perce-Clearwater administrative boundary.

[2]Presence of Endangered Species Act (ESA) listed fish within streams located within livestock grazing allotments.

[3]Conservation Watershed Network

[4]Riparian Management Zone

[5]Cedar Allotment will become vacant in May 2024.

[6]Musselshell Allotment will be administratively closed in May 2024.

Data Source: Nez Perce-Clearwater geographical information system; fish distribution spatial data was obtained from Pacific States Marine Fisheries Commission (PSMFC) Stream Net website, http://www.streamnet.org, version 01/31/2019.

Table 385 outlines the acres of riparian management zone within vacant allotments and the percent of riparian areas within each vacant allotment. Approximately 16 percent of vacant grazing allotment on the Nez Perce-Clearwater are located within riparian management zones.

Table 385. Aquatic attributes[1] by vacant grazing allotment.

Allotment Name	ESA[2] Listed Fish	CWN[3]	RMZ[4] Acres	Percent Allotment Acres in RMZ[4]	Stream Miles with Gradient Less Than 3 Percent	Stream Miles with Gradient Greater Than 3 Percent
Blacktail	Yes	Yes	498	12	1.9	12.8
East Fork	Yes	Yes	2,501	14	4.9	61.1
Elk Creek	No	No	3,285	9	22	125.6
Elk-Lick Creek	Yes	Yes	2,093	20	6.4	35.3
Florence	Yes	Yes	8,625	16	50.5	158.7
Hamby	No	Yes	1,177	11	4.4	35.3
Kirks Fork	Yes	Yes	2,400	17	5.7	54.7
Mallard Creek	Yes	Yes	4,325	12	26.4	94
Newsome	Yes	Yes	8,943	20	27.2	186.3
Total	na	na	33,847	na	149.4	763.8

[1]All attribute acres and miles occur within the Nez Perce-Clearwater administrative boundary.

[2]Presence of Endangered Species Act (ESA) listed fish within streams located within livestock grazing allotments.

[3]Conservation Watershed Network

[4]Riparian Management Zone

Data Source: Nez Perce-Clearwater geographical information system; Fish distribution spatial data was obtained from Pacific States Marine Fisheries Commission (PSMFC) Stream Net website, http://www.streamnet.org, version 01/31/2019.

Over the last 20 years, much has been accomplished to protect aquatic resources through altering grazing practices. This has occurred on active allotments through implementation of PACFISH and INFISH standards incorporated into the 1987 forest plans and through revision of allotment management plans. The existing direction for anadromous fish and riparian management in the No Action Alternative and the proposed plan components for aquatics ecosystems in the Action Alternatives specify stringent management requirements for livestock grazing. Allotments with greater amounts of riparian areas, especially those with salmon, steelhead, or bull trout habitats, necessitate a higher level of management.

Although riparian management does not vary appreciably between the No Action and Action Alternatives, it is a notable consequence to the livestock grazing program on the Nez Perce-Clearwater and to permittees. Implementing and adhering to proposed aquatic ecosystems plan components would add a higher complexity to managing livestock. Impacts to permittees might include increased time, labor, and capital investments in order to consistently meet grazing use levels. Some permittees would be able to meet livestock grazing plan components in the Action Alternatives and as a result be able to graze their permitted season and numbers. Other permittees may not be able to meet standards and may have to reduce livestock use to comply with utilization levels and new management strategies. Over time, some permittees may elect to vacate their allotments due to the workload and financial impacts associated with adhering to aquatic ecosystems plan components.

Low Gradient Streams and Stubble Height

Streams with lower gradients are the most sensitive to grazing impacts (Rosgen 1996). Proposed guideline FW-GDL-ARGRZ-01 establishes minimum end of season stubble heights of 4 to 6 inches along the greenline for low gradient streams. Alternative use and disturbance indicators and values may be used if they are based on site capability, relevant science, monitoring data, and meet the purpose of this guideline.

Stubble height is a meaningful and relatively easily determined metric related to riparian vegetation, has been found to correlate with instream habitat quality (Roper 2020), and has been widely used as an end-of-season monitoring indicator (U.S. Department of Agriculture 2022e). End of season stubble height (greenline vegetation height) has been shown to be a good indicator of two primary factors: 1) the effect of grazing on the physiological health of herbaceous, hydrophytic plants, and 2) the ability of the vegetation to provide streambank protection and bank building function. Stubble height criteria should be used where streambank stability is dependent upon herbaceous plants.

Clary and Webster(1990) recommended that in the Intermountain West, a minimum stubble height of approximately 4 to 6 inches should remain at the end of the grazing season to maintain plant vigor and provide for bank protection and for sediments to be deposited. However, 8 inch stubble height was the optimal length to retain sediment deposits (Abt et al. 1994, Thornton et al. 1997). Similarly, Clary and Leininger (2000) indicated that 4 to 6 inch stubble height would be necessary to protect willow and vulnerable streambanks. Clary (1999) found that 3.9 inches protected most of the stream attributes while 5.6 inches was needed to protect all stream attributes. Higher average stubble height at the end of season is more likely to provide plants with enough growth during the season to retain vigor in the following season (Clary 1995, Boyd and Svejcar 2012). While height at the end of the growing season still needs more study, positive relationships between higher stubble height at the end of the season and stream habitat conditions have been found (Goss 2013).

Table 383 displays the current stubble height objectives directed in annual operating instructions by allotment as established by specific allotment National Environmental Policy Act (NEPA) or allotment management plans. Of the 36 active allotments, 33 allotments have stubble height objectives between 4 and 6 inches, so already meet the guideline. These allotment specific stubble height objectives would be retained until new objectives are established through site specific NEPA, as guided by FW-GDL-ARGRZ-01. Three allotments have a stubble height objective of 65 percent, or 35 percent utilization. Once the revised Land Management Plan is in place, the term grazing permits for these allotments will be modified to meet FW-GDL-ARGRZ-01 with the appropriate level of utilization for each allotment.

As shown in Table 384, there are approximately 416 miles of streams of low gradient streams (based on average of 3 percent gradient) that occur within active allotments, about 15 percent of the total stream miles within active livestock grazing allotments.

Depending on stubble height requirements, some Annual Operating Instructions may require more strict guidance and the transition may necessitate more active management on the part of the permittee. However, oftentimes livestock movement has been triggered by other resource constraints, including herbaceous forage utilization, shrub utilization, or stream bank disturbance. The effect of possibly more restrictive green line stubble heights may be more burdensome to those permittees with more accessible stream reaches within their allotments.

Fish Redds

Proposed standard FW-STD-ARGR-03 states during livestock grazing authorizations, re-authorizations, or updates to annual operating instructions, measures should be included to prevent livestock trampling of fish redds (that is, spawning nests) of federally listed fish species and species of conservation concern. This standard is a refinement of grazing standards GM-1 and GM-3 in current forest plans, as amended by PACFISH and INFISH, highlighting the importance of redd protection. The federally listed fish species on the Nez Perce-Clearwater are Snake River spring and summer Chinook salmon in the Salmon River Basin, Snake River fall Chinook salmon, Snake River sockeye salmon, Snake River steelhead trout, and Columbia River bull trout. As shown in Table 384 and Table 385, federally listed fish occur in 24 out of 36 active allotments and seven out of nine vacant allotments, which accounts for approximately 70 percent of all allotments.

Mitigation measures to protect fish redds from trampling have been implemented on the Nez Perce-Clearwater for federally listed fish species since consultation with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration Fisheries Service was completed on the PACFISH and INFISH amendments to the 1987 forest plans in 1998 (U.S. Department of the Interior 1998, U.S. Department of Commerce 1998). Additionally, allotment management plans for allotments with federally listed fish species also contain project design measures to restrict trampling of redds from livestock. Annual operating instructions for those allotments containing streams with federally listed species provide specific direction and mitigation measures for protection of redds. These measures include identifying redd locations through redd surveys conducted by Forest Service fisheries biologists. If fish redds are identified, mitigation measures, such as changing the date for livestock entry into a pasture containing active spawning, temporary or permanent fencing of identified redds or areas of redd concentrations, or use of herding by the grazing permittee to keep cattle away from spawning areas, would be implemented. Implementation of proposed plan direction would continue to move resource conditions within allotments toward desired conditions.

Pacific lamprey and Snake River spring and summer Chinook salmon in the Clearwater River Basin were identified as a species of conservation concern in the Regional Forester's Species of Conservation Concern list (Marten 2019). These species are also included in Standard FW-STD-ARGR-03 requiring measures to be included in annual operating instructions to prevent livestock trampling of fish redds. Species of conservation concern fish occur in 19 out of 36 allotments, approximately 56 percent of allotments. No known impacts to lamprey and spring and summer Chinook salmon fish redds from livestock trampling have been documented on the Nez Perce-Clearwater.

As with the protection measures associated with federally listed fish redds, surveys by Forest Service fisheries biologists would be necessary to determine where species of conservation concern fish redds are located. It can be assumed that mitigation measures would be like those agreed to by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration Fisheries Service for protection of Endangered Species Act listed fish redds. Although these fish species, for the most part, occupy the same rivers as federally listed fish, there would be additional time, funding, and personnel needed to conduct surveys, perform evaluations, and coordinate with other resource specialists. The capacity to conduct surveys and evaluations would be dictated by fiscal year budgets. There is no legal mandate to protect species of conservation concern redds from livestock trampling. As a result, protection measures would be implemented throughout the life of the plan as fish redds are located and prioritized based on vulnerability.

Conservation Watershed Network

The Conservation Watershed Network is intended to provide a pattern of protection across the landscape in which the habitat of Endangered Species Act listed fish and species of conservation concern receives special attention and treatment. Conservation Watershed Networks are the highest priority for restoration actions for the aquatic environment. Twenty of 36 active livestock grazing allotments are located within watersheds included in the Conservation Watershed Network (Table 384). This designation and associated plan components could cause increased allotment management complexity, potentially requiring more time, labor, and funds to administer allotments.

Standard FW-STD-CWN-01 requires that in Conservation Network Watersheds not meeting aquatic and riparian desired conditions, activities shall be designed and implemented in a manner that supports or contributes towards the recovery of federally listed species and the achievement of these desired conditions and does not retard them when evaluated at the HUC12 subwatershed scale. The phrase “do not retard” is described as not disrupting or setting back natural rates of recovery.

Standard FW-STD-CWN-01 is very similar to existing PACFISH standard GM-1, which requires modification of grazing practices that retard attainment of riparian management objectives or adversely affect listed anadromous fish. The Nez Perce-Clearwater has interpreted and implemented PACHFISH standard GM-1 for over 20 years in a manner that allows permitted livestock grazing and riparian and stream habitat recovery to occur at the same time. Permitted livestock grazing and improving riparian and stream habitat conditions are not exclusive. The rate of improvement in the riparian zone may be slower to some degree with the presence of livestock grazing and other multiple uses authorized by the Multiple Use Sustained Yield Act.

Effects that Vary by Action Alternative

The potential change in available transitory forage resulting from the modification of forest canopy cover varies by Action Alternative. The complexity of allotment management that could result from the designation of recommended wilderness and proposed eligible and suitable wild and scenic rivers also varies by Action Alternative.

Forage Production and Availability

The 2012 Planning Rule requires that land management plans must include plan components for integrated resource management to provide for ecosystem services and multiple uses, such as forage for grazing (36 CFR 219.10(a)). Forage is an ecosystem service that provides an important benefit to local communities. Vegetation management, such as timber harvest, prescribed fire, and wildfire can provide transitory forage that would be available for livestock and wildlife grazing. Transitional forage capacity decreases over time as the forest canopy grows back and shades out the herbaceous understory. In general, permitted livestock grazing on the Nez Perce-Clearwater is dependent upon transitory forage within the active allotments. As more transitory forage becomes available, livestock have the tendency to distribute themselves throughout the allotment and reduce their reliance on sensitive areas, such as meadows and riparian areas. With increased availability of transitory forage and improved livestock distribution, grazing permittees may experience less need for persistent management of the allotment and gain a financial advantage.

Timber harvest could also open grazing areas that were previously inaccessible to livestock because of natural barriers. This could result in livestock control and management conflicts. If this were to occur, additional range improvements may be needed to control or influence livestock movements. In addition, if livestock use is inhibiting regeneration of trees through trampling or grazing, livestock may need to be temporarily excluded from these areas, which would offset potential gains in transitory range for a time. FW-GDL-GRZ-01 requires that salting for livestock not be placed in conifer seedling regeneration areas.

The acres suitable for timber production are the most likely to be harvested, although harvest may occur in other areas as well. As noted in Table 370 in the Timber section, only about 70 percent of the livestock grazing allotment acres are suitable for timber production. A mix of silvicultural prescriptions would be used in the harvested areas, including even-aged regeneration, such as clearcut, seed-tree, and shelterwood, and non-regeneration harvest, such as commercial thinning. Transitory forage is available in the openings created by even-aged regeneration harvest. Of the projected timber harvest levels identified in Table 386, about 50 to 70 percent is expected to be even-aged regeneration harvest. Similarly, only a portion of the acres burned through prescribed fire or wildfire would create transitory forage.

Vegetation treatments would need to be within an existing allotment to affect the amount of forage for livestock grazing. Because the locations of treatments cannot be predicted, the projected forestwide acres of timber harvest and prescribed burning shown in Table 386 are used to compare the relative probability of creating transitory range across alternatives. The differences between alternatives are mainly a function of the level of active vegetation management proposed that is expected to maintain and enhance transitory forage. Alternative X proposes the most acres of vegetation treatment, which would correspond to the highest opportunity for transitory forage. Alternative W, the Preferred Alternative, and Alternative Y, in descending order, also propose high amounts of timber harvest and prescribed fire, corresponding to a high potential for transitory forage creation. The No Action Alternative and Alternative Z propose the least amount of vegetation treatment and therefore, a moderate possibility for transitory forage production. There is a high degree of variation, spatially and temporally, in the amount and location of wildfire, therefore calculating the amount of transitory forage created by wildfire is difficult to predict.

Table 386. Projected Vegetation treatments that could create potential transitory forage for livestock grazing.

Management Action	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Timber harvest average annual acres	4,300	12,600	14,000	7,500	3,700	8,825–10,000
Prescribed burning average annual acres	5,560	7,345	8,330	8,020	6,450	6,800
Potential for transitory forage	Low	High	Highest	Moderate	Low	High

Data Source: Overview of alternatives in Chapter 2.

Transitory rangeland is considered as capable range, but conifer regeneration would slowly come back into the harvest units or burn areas within approximately 10 to 20 years. Transitory rangeland would therefore only provide increased forage for approximately a 10- to 20-year timeframe. However, transitory range would improve livestock grazing by providing increased forage and additional foraging areas which would have been inaccessible or void of herbaceous forage prior to vegetation treatment.

Allotments that occur in designated wilderness, such as Butte Gospel and Hanover Mountain, would have no increase in transitory range from timber harvest but instead would rely on wildfire to create openings and maintain grasslands.

Allotment Management Complexity

The complexity of allotment management may vary by alternative due to changes in land designation within allotments, such as recommended wilderness and proposed eligible and suitable wild and scenic rivers. These management designations have the potential to affect access to and within allotments and require more intensive livestock management.

Recommended Wilderness

Recommended wilderness areas are lands that have wilderness characteristics and may be suitable for inclusion in the National Wilderness Preservation System. Recommendation of wilderness through this Land Management Plan is a preliminary administrative determination. Livestock grazing was determined suitable in the recommended wilderness areas in the Land Management Plan action alternatives (MA2-SUIT-RWILD-05). Although recommended wilderness allocation would primarily be administrative in scope for administration of livestock grazing allotments, some of the on-the-ground management practices, especially concerning motorized travel, may be subject to increased review for authorization.

As shown in Table 387, Action Alternatives W, Y, and Z propose 18,251 acres of recommended wilderness in the Cannon Ball Allotment, which comprises approximately 84 percent of the allotment on Nez Perce-Clearwater lands. Currently, 2,750 acres of the total acres within the Cannon Ball Allotment occur in the designated Hells Canyon wilderness area on the Wallowa-Whitman National Forest (Table 382). Action Alternative Z proposes 1,720 acres of recommended wilderness in the American River Allotment, approximately 7 percent of the allotment. Alternative X does not propose any recommended wilderness. There is no recommended wilderness within livestock grazing allotments under the No Action or Preferred Alternatives.

Permittees that have allotments within portions of recommended wilderness, could potentially have increased administrative terms and conditions that make it more difficult to operate as compared to alternatives with less recommended wilderness allocation. Alternative Z has the most recommended wilderness overlap with allotments and would have the most potential for increased allotment complexity, possibly increasing labor and operating expenses and time to manage the allotment. Since these recommended wilderness areas already occur in Idaho Roadless areas, change in access to and within allotments is expected to be minor.

Table 387. Recommended wilderness within active allotments by alternative.

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Number of active allotments containing recommended wilderness	0	1	0	1	2	0
Acres of recommended wilderness within active allotments	0	18,251	0	18,251	19,973	0
Allotment Name	na	Cannon Ball	na	Cannon Ball	Cannon Ball, American River	na

Data Source: Data Source: Nez Perce-Clearwater Geospatial Information System database.

As in existing designated wilderness, if recommended wilderness were to become designated wilderness through an Act of Congress, livestock grazing and the activities and facilities necessary to support a livestock grazing program could potentially continue in accordance with Congressional

Grazing Guidelines if deemed suitable. Although permitted livestock grazing is authorized in designated wilderness areas, it is recognized that allotment administration within wilderness areas is often more restrictive, time consuming, and expensive to the permittee.

Eligible and Suitable Wild and Scenic Rivers

Rivers identified as eligible or suitable for inclusion as part of the Wild and Scenic Rivers system will be managed to protect the river-related outstandingly remarkable values identified for the river and protect the free-flowing nature and quality of the water. They will also be managed to maintain their preliminary classifications of wild, scenic, or recreational. These protection measures will be maintained until a decision is made on the future use of the river and adjacent lands through an Act of Congress or a determination that the river is not suitable for inclusion. Livestock grazing is suitable in proposed wild and scenic rivers (MA2-SUIT-E&SWSR-05), although management is required to protect identified river values. Livestock grazing in eligible wild and scenic rivers is also suitable in the No Action Alternative.

Wild and scenic rivers are bounded by a corridor that extends one-quarter mile on each side of the river segment, measured from the high-water mark. Although livestock grazing is allowed in eligible and suitable wild and scenic rivers, due to the importance of the areas, there is added scrutiny. Livestock management may become more time and labor intensive, and livestock grazing impacts may need to be evaluated more often.

Error! Reference source not found. displays the number of active allotments with proposed eligible or suitable wild and scenic rivers and the amount of allotment acres that would occur within the wild and scenic river corridor. The No Action Alternative has the most eligible wild and scenic river acres occurring within active livestock grazing allotments and the most active allotments. This is followed by Alternative Y, W, and Z in respective descending order. There is no recommended eligible and suitable wild and scenic river proposed in Alternative X.

Table 388. Eligible and suitable wild and scenic rivers within active allotments by alternative.

Indicator	No Action[1]	Alt W[2]	Alt X	Alt Y[3]	Alt Z[4]	Preferred[5]
Number of active allotments with eligible and suitable wild and scenic rivers	8	3	0	7	5	1
Acres of eligible and suitable wild and scenic rivers within active allotments	12,382	3,235	0	8,375	6,914	1,733

[1]No Action – Allison-Berg, Butte Gospel, Earthquake, Elk Summit, Hungry Ridge, Meadow-Lightening, Peter Ready, and White Bird Creek allotments.

[2]Alternative W – Allison-Berg, Butte Gospel, and Hungry Ridge allotments.

[3]Alternative Y – Allison-Berg, Butte Gospel, Earthquake, Elk Summit, Hungry Ridge, Meadow-Lightening, and White Bird Creek allotments.

[4]Alternative Z – Allison-Berg, Butte Gospel, Corral Hill, Hungry Ridge, and Meadow-Lightening allotments.

[5]Preferred Alternative – Allison-Berg Allotment.

Data Source: Nez Perce-Clearwater Geospatial Information System database.

If eligible or suitable wild and scenic rivers were to become designated wild and scenic rivers in the future, permitted livestock grazing could continue, but livestock grazing, and associated activities, would have to maintain and not degrade the outstandingly remarkable values for which the river was designated. It is recognized that allotment administration is often more restrictive, time consuming, and expensive to the permittee within areas designated as a wild and scenic river due to the added scrutiny.

Cumulative Effects

Portions of the Nez Perce-Clearwater adjoin other national forests, each having its own land management plan. The Nez Perce-Clearwater is also intermixed with lands of other ownerships, including private lands, other federal lands, and state lands. Management of grazing allotments on adjacent national forests, Bureau of Land Management, and Idaho Department of Lands is generally similar to livestock management on the Nez Perce-Clearwater. Livestock management on private lands can vary widely depending upon the individual resource and financial objectives of the landowner. No integrated ranch plans involving private ranches and Nez Perce-Clearwater allotments exist.

Livestock grazing, timber harvest, or conversion of rangeland or forests on adjacent lands could affect vegetation conditions at the landscape level. Such changes in vegetation composition and structures could potentially affect the land's capability to be grazed. Most public rangelands, including both Idaho Department of Lands and Bureau of Land Management lands, are expected to remain undeveloped and suitable for livestock grazing in the foreseeable future. Private lands surrounding the plan area could potentially be affected by a conversion to agricultural lands or residential development. Development of these private lands could affect wildlife connectivity and overall landscape function of National Forest System lands within the plan area. Future development of private lands adjacent to the Nez Perce-Clearwater boundary could also affect the spread of invasive plant species, increase fire protection responsibilities and costs, as well as increasing the complexity of grazing livestock on the Nez Perce-Clearwater in some areas.

Some adjacent lands are subject to their own resource management plans. The cumulative effects of these plans in conjunction with the Nez Perce-Clearwater Land Management Plan are summarized in Table 389 for those plans applicable to the livestock grazing resource.

Table 389. Summary of cumulative effects to livestock grazing from other resource management plans.

Resource Plan	Description and Summary of Effects
Adjacent National Forest Land Management Plans (U.S. Department of Agriculture 2010d, 2018h, 1987d, 1986a, 2015c)	The forest plans for National Forest System lands adjacent to the Nez Perce-Clearwater include the Payette, Wallowa-Whitman, Bitterroot, Lolo, and Idaho Panhandle National Forests. All plans address terrestrial vegetation. Management of vegetation is generally consistent across all national forests due to conformance with law, regulation, and policy. The cumulative effect would be that the management of vegetation and grazing would be generally complementary. This includes specific landscapes and features that cross Nez Perce-Clearwater boundaries, such as the Snake River canyon, Salmon River canyon, and the Continental Divide.
Bureau of Land Management Resource Management Plans (U.S. Department of the Interior 2009)	Bureau of Land Management lands adjoining the Nez Perce-Clearwater are managed by the Cottonwood field offices. The Cottonwood Bureau of Land Management resource management plan was recently revised. This management plan contains components related to resilient terrestrial vegetation and livestock grazing and would likely be complementary to the plan components for the Nez Perce-Clearwater.
State of Idaho	Lands owned by the State of Idaho and administered by the Idaho Department of Lands and Idaho Department of Agriculture are managed for sustainability of rangeland resources. Grazing systems may be season long or employ a form of pasture rotation.

Resource Plan	Description and Summary of Effects
Idaho's State Wildlife Action Plan (Idaho Department of Fish and Game 2017b)	This plan describes a variety of vegetation conditions related to habitat for specific wildlife species. This plan would likely result in the preservation of these habitats on state lands, specifically wildlife management areas. This plan would interact with forest plans and be complementary to the efforts to manage grasslands and other grazing areas.
County resource management plans	Counties within and adjacent to the plan area have developed resource management plans that describe the desires and objectives of the particular county regarding management of the natural resources located on public lands located within the county. Goals and objectives for livestock management and rangeland health are compatible with the revised Nez Perce-Clearwater Land Management Plan. For example, plans emphasize the desire for continuation of public land grazing while promoting rangeland health. County plans advocate for protecting of traditional economic structures, including agriculture. There is also a shared desire for rangeland plant communities to be dominated by native grasses and forbs.
Soil and Water Conservation Districts	Resource Conservation Plans stress proper grazing management, appropriate livestock stocking levels, and promote vegetation improvement practices.

Based on the predicted increase in public use, it is expected that the impact of recreational uses could increase as the population of local communities increases, and as more people nationwide continue to look for places to recreate. Increased public use, changing values, and potential desire for other uses from National Forest System lands may make grazing on these lands more time consuming and expensive for permittees. Vegetation management and the use of prescribed fire would likely increase to address vegetative health, fuel loads, and public safety. These trends could result in short-term expenses and long-term benefits to livestock grazing.

Livestock grazing, especially for cattle, would continue to be a major component of local economies within the plan area for the foreseeable future. Cattle, and to a lesser extent, horses that graze the national forests during the spring, summer, and fall months, are provided forage from private lands during late fall, winter, and early spring. Forage from private lands during this period is in the form of native grass pasture and irrigated or dry land hay. The availability of private lands in the surrounding area that can provide summer forage is somewhat limited. This demand for grazed forage, especially during the months of June through October, is greater than National Forest System lands can supply. Productive lands associated with the lands surrounding the plan area are generally used for crops, including spring and winter wheat and canola. Demand for grazing on National Forest System lands is expected to remain high, especially for livestock operators whose private lands are adjacent to the Nez Perce-Clearwater.

Native grassland or forest lands converted to grassland near the plan area are generally obligated to cattle grazing. Some of these grasslands may produce forage at less than their full potential due to the abundance of exotic annual grasses and other invasive plant species. Livestock production from the Idaho Department of Lands is expected to stay relatively stable in the plan area for the foreseeable future. Grazing on private lands fluctuates with the market values of beef and the landowner's economic and land management objectives. Grazing on non-federal lands is expected to remain in high demand. Possible future reductions in grazing on Nez Perce-Clearwater lands due to reduced forage capacity from increases in invasive plant species and forest canopy closure, or tighter administrative constraints could put added grazing pressure and demand on private land and Idaho Department of Lands land leases.

Livestock grazing is influenced by the multiple effects described throughout this analysis. These include effects that impact the allocation of forage resources between livestock and wildlife, and adjustments to protect tribal trust responsibilities, riparian areas, fisheries, threatened and endangered species, cultural and historical resources, and water quality. Livestock management must also take into consideration potential adjustments due to drought, wildland fire, and timber harvest. All of these factors add to the complexity and expense for the ranching operations that are permitted to graze livestock on the national forest (Rimbey and Torell 2011).

Livestock management is generally considered more difficult on National Forest System lands than on private lands for many of the reasons previously presented. In addition, the business of livestock management is subject to factors often not under the control of livestock operators, such as tourism; land values and potential subdivision of ranches; labor prices and availability; domestic and foreign demand for livestock products; markets and meat prices; Forest Service budgets and farm programs; fuel prices; predator control; social values; and federal policy. Because of, and in many cases despite of, the effects and unpredictability described above, livestock grazing is expected to continue at, or below, the current permitted level into the future.

Effects to Livestock Grazing from Other Resources

Timber Harvest and Fuels Treatments Management

Timber harvest and fuels treatments activities can create ground disturbance. Any ground-disturbing activity has the potential to expose a site to invasive plant species, leading to a decline of biodiversity and changes in organic matter composition and nutrients. Invasive species have the potential to substantially decrease livestock forage. To reduce the probability of establishment or expansion of invasive weeds, guideline FW-GDL-INV-01 requires management activities prone to significant soil disturbance or exposure to be planned and implemented with design features to address the potential spread of invasive weeds.

Livestock are attracted to forage created by timber harvest openings. If livestock use is inhibiting regeneration of trees through trampling or grazing, livestock may need to be temporarily excluded from these areas. Allotment management could become for time and labor intensive. In addition, guideline FW-GDL-GRZ-01 requires that salting for livestock not be placed in conifer seedling regeneration areas.

Timber harvest could provide beneficial effects to livestock grazing. Timber harvest, primarily even-aged regeneration, and some fuels treatments could provide transitory forage that would be available for livestock grazing. The effects to livestock grazing from timber harvest varies by Action Alternatives. See the forage production and availability in the Effects that Vary by Action Alternative discussion for more information.

Wildland Fire Management

Disruption of historical fire patterns and proliferation of invasive plant species have caused a widespread reduction in rangeland condition and productivity. Wildland fire may act as a natural disturbance factor as well as a valuable management tool for allotment management. It is a key ecological driver in many ecosystems, facilitating nutrient cycling and promoting the growth of grasses and forbs over woody species. Periodic fire maintains a number of major grasslands, shrub steppe, and savanna ecosystems (Maczko and Hidinger 2008).

The land management plan includes a desired condition that expresses the full range of fire management activities, including both prescribed fire and natural wildfire, are recognized and used by Nez Perce-Clearwater administrators as an integral part of achieving ecosystem sustainability, including interrelated ecological, economic, and social components, such as improved ecosystem resilience and wildlife habitat, protection of property, other values at risk, and public safety (FW-DC-FIRE-02).

Prescribed fire is a tool to emulate natural processes and manipulate forested vegetation. It is a management tool often preferred in roadless areas. As with timber harvest, prescribed fire can open existing forest canopies and allow for an increase in herbaceous forage and understory shrub production. All Action Alternatives propose similar levels of prescribed fire, ranging between 6,450 to 8,330 average annual acres, depending on alternative. There is a high degree of variation, spatially and temporally, in the amount and location of wildfire, therefore calculating the amount of transitory forage created by wildfire is difficult to predict.

Prescribed fire and wildfire suppression activities could increase the potential for invasive species introduction and establishment. Guideline FW-GDL-FIRE-02 requires design features to address the spread of invasive species during planned ignitions and direction to follow national and regional guidelines to prevent invasive species transport on wildland fire mobile equipment. To reduce the probability of establishment or expansion of invasive plant species guideline FW-GDL-INV-03 specifies when rehabilitating areas burned by wildfire and affected by wildfire suppression, measures should address invasive species management as part of post-fire habitat restoration.

Wildland fire management can have different short-term and long-term effects on livestock grazing. Effects depend upon burning conditions and burn type, and the results and timing of a wildfire are much less predictable compared to a prescribed fire. Prescribed burning, depending on vegetation type, can often result in an increase in forage production and availability. Areas that are typically grazed may need to defer use prior to a prescribed burn to ensure there is sufficient fine fuels to meet the burn objectives and possibly defer use following a prescribed burn to allow for vegetation recovery, depending upon local conditions. This deferment requires that the permittee be flexible in management and involved in considerable advance planning and coordination. Application of prescribed fire may be more difficult in livestock grazing allotments due to the need to protect fences and water developments.

A wildfire can have similar effects as prescribed fire but is likely to have unplanned adverse effects as well. Wildfire may result in the entirety of an allotment being burned, resulting in forage unavailability, with permittees being forced to move livestock to other lands in their operation (such as private or state). On rare occasions, large, quick-moving wildfires may also overrun livestock that cannot escape, which results in direct financial loss for a permittee. Wildfire may remove allotment infrastructure, which results in direct financial loss for the Forest Service and permittees. Wildfire may remove trees and open forest understories to a flush of grass and forb production for many years. Similar to prescribed fire, wildfire can have the effect of recycling nutrients and improving the quality and quantity of forage for livestock and wildlife. However, since timing, location, and burn conditions are not controllable, wildfires are less likely to provide the same amount of positive effects as prescribed burns. The effects to livestock grazing from wildfire would be similar for all alternatives.

Meadows, Grasslands, and Shrublands Management

The Nez Perce-Clearwater contains a mosaic of forest, grassland, meadows, and shrubland vegetation. Meadows, grasslands, and shrublands support native plant communities and forage for livestock and other animals within the planning area. The land management plan includes six desired conditions that promote meadows, grasslands, and shrublands health (FW-DC-GS-01 to 06). The desired conditions emphasize invasive plant species either are not present or occur with low cover.

The Land Management Plan includes an objective to maintain existing meadows and grasslands by reducing conifer encroachment into meadows and grasslands on a minimum of 500 acres every 5 years (FW-OBJ-GS-01). The beneficial effects from meadows, grasslands, and shrublands management would be the same under all Action Alternatives.

At-Risk Plants Management

Protection of federally listed threatened and endangered plants and other at-risk plants and their habitats has had, and would continue to have, an impact to some grazing allotments. Currently, management direction is in place to protect threatened, endangered, and sensitive plants when potential impacts are determined. As an example, a population of Spalding's catchfly located on Center Ridge within the Christie Sherwin Allotment has been excluded from livestock by fencing for several years.

To ensure adequate protection is given to threatened, endangered, and at-risk plants, proposed guideline FW-GDL-GRZ-02 addresses the need for evaluation and protection of plants and their habitats from livestock grazing. Most grazing allotments on the Nez Perce-Clearwater would not be impacted by the need for protection of threatened, endangered, and at-risk plants. Mitigation measures identified to protect threatened, endangered, and at-risk plants would have relatively minor impacts to grazing allotments and permittees. Protection measures may include small enclosure fencing or minor changes to the grazing system. FW-GDL-GRZ-03 directs that utilization occurs at levels that would maintain vegetative vigor and community health and planning considers the condition, timing, and use of the resource along with other values of the area. This guideline promotes the maintenance of overall health of grassland habitats to prevent habitat degradation which harms at-risk species. The effects from at-risk plant management would be the same for all action alternatives.

Invasive Species Management

Invasive plant species are a serious threat to a variety of plant communities within the Nez Perce-Clearwater. Invasive species have the potential to substantially decrease livestock forage when left unchecked. Impacts are similar between all alternatives, including the current plans. Infestation levels of invasive plants would likely remain steady to slightly increasing over time. Some species may contract in density as new treatment and biological options become available, while other invasive species could expand in range and density.

To reduce the probability of establishment or expansion of invasive weeds, guideline FW-GDL-INV-01 requires management activities prone to significant soil disturbance or exposure to be planned and implemented with design features to address the potential spread of invasive weeds.

Invasive plant species may spread and become established in a number of ways. Pathways are the means and routes by which invasive species are introduced into new environments. Pathways for invasive plant spread can include wind, water, wildlife, humans, pack and saddle stock, motorized and non-motorized vehicles and equipment, and permitted livestock. Invasive plant species spread is occurring both within and outside of active grazing allotments. Since livestock grazing on the Nez Perce-Clearwater is one of several potential pathways influencing invasive plant species spread, permittees would be encouraged to implement invasive plant prevention measures associated with livestock grazing. This may include confining livestock to a weed-free pasture before entering allotments on National Forest System lands, washing vehicles or equipment entering National Forest System lands, restricting off-road travel as part of the grazing permit, and feeding saddle horses weed-free hay during allotment authorized use periods. Access to areas may be temporarily closed or delayed for invasive species management activities. Although these actions may be more labor and time intensive, it could have positive effects for rangeland vegetation and livestock forage under all alternatives.

All action alternatives have the same objective of treating 6,000 acres annually to contain or reduce non-native invasive plant density, infestation area, or occurrence (FW-OBJ-INV-01). Early detection and rapid response to new invaders will be a priority. Protection or enhancement for other resource concerns will be considered when developing invasive weed treatment priorities. Invasive species treatments and prioritization would need to continue to evolve in order to manage new weed species, expanding infestations, and possible herbicide resistance under all alternatives.

Soil Resource Management

Maintenance or restoration of soil productivity or function is emphasized under all Action Alternatives. Desired conditions for soil resources focus on maintaining or restoring soil productivity and function to contribute to the long-term resilience of ecosystems (FW-DC-SOIL-01), maintaining soil organic matter and down woody material (FW-DC-SOIL-02), and retaining the unique properties of volcanic ash-influenced soils (FW-DC-SOIL-03). In addition, standard FW-STD-SOIL-01 specifies that land management activities shall be designed and implemented in a manner that maintains soil function and productivity, and standard FW-STD-SOIL-02 requires that impaired soil function created through management activities shall be rehabilitated to reestablish soil function to the appropriate site potential.

While these proposed plan components provide constraints to the permittees, they are not extensively more restrictive than measures found in the 1987 forest plans and in current allotment direction. Although some soil restoration activities have occurred within allotments over the last 30 years, primarily regarding road decommissioning, soil restoration activities are expected to increase under all Action Alternatives (FW-OBJ-WTR-05). Soil restoration areas could be enclosed by fencing in the short- or long-term depending on site condition.

Management approaches for soil resources in Appendix 4 of the Land Management Plan reference the methods most applicable to determining effects to soils. These include biologic integrity, soil stability, and hydrologic function, which are the main groups of indicators used in the multi-agency technical reference Interpreting Indicators of Rangeland Health (Pellant et al. 2020) compiled by the Bureau of Land Management.

Water Resources Management

The Idaho Department of Environmental Quality uses water quality standards (IDAPA 58.01.02) to determine if Idaho's waters are being adequately protected. The Idaho Department of Environmental Quality 303(d)/305(b) Integrated Report is a compilation of information about the water quality status of all Idaho waters and is a requirement of the Clean Water Act. The most current U.S. Environmental Protection Agency approved report is the 2022 Idaho Department of Environmental Quality 303(d)/305(b) Integrated Report (State of Idaho Department of Environmental Quality

2022b). There are 24 active allotments and seven vacant allotments containing streams not meeting State of Idaho water quality standards and not supporting beneficial uses. Fifty percent of the streams in allotments are water quality limited: 725 miles in active allotments and 266 miles in vacant allotments. Impairments include temperature, sedimentation, *Escherichia coli* (E. coli), and fecal coliform.

Livestock grazing has the potential to increase temperature, sedimentation, *Escherichia coli* (E. coli), and fecal coliform. The proposed Land Management Plan components for protecting water resources are designed to ensure that activities, including livestock grazing, do not impede attainment of desired conditions. Desired condition FW-DC-WTR-05 emphasizes that water quality meets or exceeds applicable state water quality standards, fully supports designated beneficial uses, and is of sufficient quality to support surrounding communities, municipal water supplies, and natural resources. The national forest has no documented lands or areas that are delivering water, sediment, nutrients, or chemical pollutants that would result in conditions that violate the State of Idaho's water quality standards.

To restore watersheds with streams not meeting State of Idaho's water quality standards, the Land Management Plan requires management activities in watersheds with approved total maximum daily loads to be designed to comply with the total maximum daily load allocations following project implementation (FW-STD-WTR-06). To maintain water quality and minimize the sediment that is generated and delivered to watercourses from active livestock trailing, guideline FW-GLD-ARGRZ-02 requires new grazing authorizations and re-authorizations to include measures to relocate or "harden" livestock trail stream crossings and approaches when necessary to achieve aquatic desired conditions. To maintain quality and quantity of water flows to, within, or between groundwater dependent ecosystems, guideline FW-GLD-ARGRZ-03 requires new or reconstructed spring developments be protected from livestock trampling. While these proposed plan components provide constraints to the grazing program and permittees, they are not extensively more restrictive than measures found in current allotment direction, which include the amended 1987 forest plan PACFISH and INFISH standards.

Additionally, project-specific best management practices (BMPs), including both federal and state BMPs, shall be incorporated into project planning as a principal mechanism for controlling non-point pollution sources, to meet water quality desired conditions, and to protect beneficial uses (FW-STD-WTR-02). Best management practices for livestock grazing management can be found in the Soil and Water Conservation Practices handbook (U.S. Department of Agriculture 1988a) and the National Best Management Practices for Water Quality Management on National Forest System Lands Technical Guide (U.S. Department of Agriculture 2012b). Controlling livestock distribution within a pasture or allotment, adjusting season of use to maintain and protect soil and water resources, and moving livestock when prescribed utilization levels are reached are a few examples of best management practices.

Effects of water resources management on livestock grazing are the same for all Action Alternatives. Managing allotments to not increase water temperature, sedimentation, *Escherichia coli* (E. coli), and fecal coliform could become more time and labor intensive for range allotment managers and permittees.

Aquatic and Riparian Ecosystem Management

Management and protection of aquatic ecosystems, including riparian and wetland communities, are emphasized under all alternatives. Standard FW-STD-WTR-04 specifies that where aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. Where aquatic and riparian desired conditions are not yet achieved, and to the degree that project activities would contribute to those conditions, projects shall restore or not retard attainment of desired conditions.

Livestock management in riparian areas may become more time and labor intensive under the revised Land Management Plan compared to the 1987 forest plans. The proposed Land Management Plan components for protecting aquatic ecosystems are designed to ensure activities, including livestock grazing, do not impede attainment of desired conditions. Standards and guidelines FW-GDL-GRZ-01, FW-STD-ARGRZ-01, FW-STD-ARGRZ-02, FW-STD-ARGRZ-03, and FW-GLD-ARGRZ-01 require new grazing authorizations and re-authorizations to include measures to avoid or mitigate adverse effects to aquatic resources, which may include monitoring and adjustment of grazing practices as necessary to promote healthy aquatic ecosystems. FW-GLD-ARGRZ-02 requires new grazing authorizations and re-authorizations to include measures to relocate or "harden" livestock trail stream crossings and approaches when necessary to achieve aquatic desired conditions. FW-GLD-ARGRZ-03 requires new or reconstructed spring developments be protected from livestock trampling. While these proposed plan components provide constraints to the grazing program and permittees, they are not extensively more restrictive than measures found in current allotment direction, which include the amended 1987 Forest Plan PACFISH and INFISH standards.

Livestock grazing has the potential to create impacts to riparian areas and meadows. These areas are usually grazed first before livestock move to other areas. Riparian areas provide shade and escape from flies, in addition to water and forage. Excessive or concentrated use by livestock in riparian zones can reduce bank stability through vegetation removal and bank trampling, increase soil compaction and erosion, cause stream widening or down cutting, and can change vegetation composition (Platt 1991). Recommendations by Clary and Webster (1990) called for residual stubble or regrowth of at least 4 to 6 inches in height to provide plant vigor maintenance, bank protection and sediment entrapment. Low gradient streams are more sensitive to grazing than are steeper gradient streams. Streams with gradients less than 2 percent, and to a lesser extent, less than 4 percent, are the most sensitive to grazing impacts (Rosgen 1996) because their banks are unconfined by topography (Montgomery and Buffington 1997) and depend upon vegetation to secure streambanks. Proposed guideline FW-GDL-ARGRZ-01 establishes minimum end of season stubble heights of 4 to 6 inches along the greenline for low gradient streams. Alternative use and disturbance indicators and values may be used if they are based on site capability, relevant science, monitoring data, and meet the purpose of this guideline. Stubble height guidelines may place limitations on grazing but would help provide for better vegetation and streambank conditions.

The Land Management Plan also includes objectives to restore 50 to 100 miles of stream and riparian habitat every 5 years (FW-OBJ-WTR-02) and improve soil and watershed conditions on 3,000 to 4,000 acres every 5 years (FW-OBJ-WTR-05). To protect restored areas, enclosures may be used for period of time to exclude livestock from the area. This could mean less forage and more intensive management.

Overall, riparian conditions in grazing allotments are expected to be maintained where they currently meet desired conditions and improve where they do not. When degraded conditions are documented at specific sites, changes to annual operating instructions would be developed to guide attainment of desired conditions. The effect to livestock grazing permittees regarding aquatic and riparian management would be consistent among Action Alternatives.

Wildlife Management

Grazing livestock share habitat resources with big game and other wildlife. There is a 40 to 80 percent dietary overlap between elk and cattle and a similar, though smaller, dietary overlap with deer (Hansen and Reid 1975, Wallmo et al. 1973). Elk grazing patterns have been shown to be strongly influenced by livestock grazing, as they seek areas of forage regrowth following grazing by livestock (Crane et al. 2001). On the other hand, livestock grazing, and associated permit administration, may temporarily displace wildlife, especially elk, from choice foraging areas within an allotment. Competing use for forage and wildlife displacement would be considered and possibly mitigated when developing an allotment management plan, especially in elk calving areas or areas popular for wildlife viewing or big game hunting.

Upland and riparian forage utilization standards found in existing allotment management plans and annual operating instructions are intended to ensure adequate forage remains for wildlife following grazing by livestock. Proposed Land Management Plan guideline FW-GDL-GRZ-03 places limits on the extent of forage utilization by livestock. This proposed guideline is similar to existing utilization standards and should not result in a substantial change to existing management on current livestock allotments. One notable change may be the amount of monitoring may need to increase to demonstrate that guidelines are being met. Upland use levels are rarely exceeded, let alone approached on most Nez Perce-Clearwater allotments, as riparian areas primarily drive livestock management actions.

Livestock management structures, such as fencing, can harm or deter the natural movement of wildlife. To help mitigate the potential risk, guideline FW-GDL-WLMU-02 specifies that new fencing installation or reconstruction should be designed to reduce barriers to wildlife movement, except when fencing is for the purpose of restricting wildlife movement. Water developments are primarily used to help disperse livestock grazing to avoid overgrazing near other watering places. These water developments are also used by wildlife. Although a benefit to wildlife, there is the potential for animals to be become trapped. To reduce the potential risk, guideline FW-GDL-WL-03 stipulates that new and reconstructed livestock water developments should be designed to prevent animal entrapment and facilitate animal escape. Similar management direction for wildlife compatible range structures is currently followed, so the proposed plan components should not result in a noticeable change to existing livestock management.

Disease transmission from domestic animals, particularly domestic sheep and goats, is considered a primary threat to bighorn sheep populations. Standard FW-STD-WL-02 is specific to domestic sheep grazing in the vicinity of bighorn sheep habitat. It states that to prevent disease transmission between wild sheep and domestic sheep and goats, domestic sheep and goat grazing (excluding pack goats) shall not be authorized in or within 16 miles of bighorn sheep occupied core herd home ranges. Under the No Action Alternative, there is a permit for domestic sheep grazing in the Allison-Berg Allotment authorizing 2,875 animal unit months. Although, due to the potential conflict with bighorn sheep, the permit has been modified to not allow domestic sheep grazing until an updated National Environmental Policy Act analysis is complete. The allotment is within a bighorn sheep core herd home range; therefore based on standard FW-STD-WL-02, domestic sheep grazing would not be authorized under all Action Alternatives, so the permit would be terminated. Future sheep or goat grazing in areas greater than 16 miles from bighorn sheep occupied core herd home ranges would require a site-specific risk assessment prior to determining whether to authorize sheep or goat occupancy by permit.

The effects from wildlife management add to the complexity of allotment management. The effects would be the same for all Action Alternatives.

Northern Rockies Lynx Management Direction

The No Action and action alternatives retain the direction for managing Canada lynx habitat from the March 2007 Record of Decision for the Northern Rockies Lynx Management Direction (NRLMD) (U.S. Department of Agriculture 2007e), which provides guidelines for grazing management. Guidelines are designed to minimize potential adverse effects and improve habitat conditions. The U.S. Fish and Wildlife Service found in the analysis included in the biological opinion for the NRLMD that application of the measures in most cases, had no effects or discountable effects to lynx (U.S. Department of the Interior 2017a).

Twelve livestock grazing allotments, all located on the Nez Perce half of the plan area, include lynx habitat. No lynx habitat is located within livestock grazing allotments on the Clearwater. The Northern Rockies Lynx Management Direction contains one objective and four guidelines pertaining to livestock grazing management in lynx habitat. The management direction only applies to occupied lynx habitat. Since the Nez Perce currently has unoccupied lynx habitat, the direction should be "considered," recognizing that lynx may be present, but would not have to be followed until such time as lynx occupy the unit. Any authorization or re-authorization of grazing allotments should consider the management direction.

Table 390 displays the amount of lynx habitat located within livestock grazing allotments. Two allotments that include 60,668 acres of lynx habitat are vacant and are not currently grazed. Approximately 72,627 acres are located in active allotments. Only about eight percent of the lynx habitat in the plan area overlaps with grazing allotments. See the Allotment and Lynx Habitat Overlap map in Appendix A.

Table 390. Acres of lynx habitat by livestock grazing allotment and percent of allotment.

Allotment Name	Status	Acres of Lynx Habitat	Percent of Allotment
Allison-Berg	Active	6,308	17
Butte Gospel	Active	22,261	57
Cannon Ball	Active	4,983	19
Cow Creek	Active	2,589	9
Fiddle Creek	Active	1,253	15
Florence	Vacant	27,681	52
Hanover Mountain	Active	6,387	41
Hungry Ridge	Active	6,218	20
Mallard Creek	Vacant	32,987	89
Papoose	Active	2,416	18
Peter Ready	Active	13,246	28
White Bird Creek	Active	6,967	21
Total	**Vacant**	**60,668**	**n/a**
Total	**Active**	**72,627**	**n/a**

Data Source: Nez Perce-Clearwater Geospatial Information System database.

Tribal Trust Responsibilities

The Nez Perce Tribe has ancestral and treaty-reserved rights to uses and resources on the Nez Perce-Clearwater. Indian treaty rights are property rights held by the sovereign Indian tribes who signed the treaties. Under the Nez Perce Treaty of 1855 and subsequent treaties, the Nez Perce Tribe was reserved separate reservation lands but also retained certain rights to hunt, fish, graze, and gather on the lands ceded to the United States. These rights retained on ceded lands are known as "off-reservation treaty rights" or "other reserved rights."

The Land Management Plan includes desired conditions promoting vegetative conditions that provide a sustainable diversity of habitats necessary to provide plant and animal species that are of tribal importance (FW-DC-TT-01), and emphasizing that culturally important botanical species are present and vigorous in quantities that are harvestable and accessible to Nez Perce tribal members (FW-DC-TT-03). Standard FW-STD-TT-01 specifies that agency proposed actions shall consider Treaty Rights and impacts to American Indian religious and cultural sites, practices, and treaty-reserved resources and access to those resources over the long-term.

Tribal trust responsibilities could make allotment management more complex. Maintaining tribal trust responsibilities could constrain livestock grazing in particular locations, especially in meadow and riparian areas. Due to changing climates and potential increase in drought and invasive species infestations, forage and water resources may become more limited, thus intensifying the potential conflict between livestock grazing and maintaining plant species important to the Nez Perce Tribe.

Plan components in the meadows, grasslands, and shrublands; livestock grazing; and aquatic and riparian livestock grazing sections emphasize the need to support native plant communities and forage for animals throughout the planning area and include standards and guidelines to reduce the impacts to resources from livestock grazing and protect important botanical species.

Cultural Resources Management

Livestock grazing can contribute to the deterioration of cultural and historical resources through physical contact, such as hoof action or rubbing on structures. They can also remove or alter vegetation that protects sites from erosion and make these resources more visible for unauthorized collection. In cases where the level of impact is unacceptable, the impacts could be mitigated with fencing, relocation of watering developments, or with changes in grazing management. Under all alternatives, plan components are in place to ensure the protection of cultural and historic sites and resources. If livestock are excluded from a site or forage use levels are reduced, total animal unit months on an allotment may be reduced. The potential for these effects is the same for all alternatives.

Recreation Management

Recreational use is expected to increase on the Nez Perce-Clearwater. Recreation management can alter livestock grazing in several ways. Achieving reasonably uniform livestock distribution across an allotment is one objective of livestock management because it allows the optimal use of available forage. Areas with concentrated human activity are generally avoided by livestock. Concentrated or frequent recreation use along roads and near popular areas can cause livestock to avoid grazing or passing through an area and work directly against a permittee's attempts to distribute livestock evenly. Fences are a common solution but require installation and maintenance and can be costly. Fencing of roadways may result in a safer travelway for motorists and livestock but may also result in a loss of forage available to permitted livestock.

Livestock grazing may annoy some recreationists because of smells, flies, noise, and manure on trails and around campsites. People using camping or picnic sites on the national forest sometimes become concerned with livestock in and around their recreation sites. Cattle are occasionally shot by national forest users, or struck and injured, or killed by vehicles, resulting in a direct economic loss. Livestock grazing was determined not suitable in developed recreation sites (FW-SUIT-REC-06) in the land management plan action alternatives. Livestock grazing was also excluded from developed recreation sites in the No Action alternative. Livestock are generally excluded from developed recreation sites by fencing of campgrounds.

Higher levels of summer recreation could create increased levels of potential conflicts with livestock grazing, and oftentimes may complicate livestock management and make it more expensive. For example, gates may be left open and livestock inadvertently or purposely relocated. Winter recreation and motorized over-snow vehicle use would not impact livestock grazing because the permitted grazing season would not occur during the winter months.

Increased recreational uses on the Nez Perce-Clearwater would most likely make grazing on the national forest more expensive for permittees under any alternative. Livestock allotments are primarily located within the roaded landscapes on the Nez Perce-Clearwater. With expected increases in visitation vehicle collisions with livestock on system roadways and vandalism to range improvement, infrastructure could increase. These effects from recreational use would be the same under all alternatives.

System Road and Motorized Trail Management

The primary impact to livestock grazing from roads and trails management is focused on the level of motorized access to and on an allotment. Generally, the greater ease and availability of motorized access into and throughout an allotment, the more efficient and cost effective it is to manage livestock and maintain structural improvements. Livestock are trailed or trucked to and from grazing allotments along roads, and permittees access cow camps using roads and motorized trails. The effects from road and motorized trail management and maintenance levels would be the same under all alternatives.

Ecosystem Services Management

Ecosystem services are the benefits the National Forests provide to area residents, visitors, and the American public. Ensuring ecosystem services are provided is critical to providing for ecologic, social, and economic sustainability. The Land Management Plan includes a desired condition that is important for promoting sustainable forage for livestock grazing. It states that the Nez Perce-Clearwater provides ecosystem services to area residents and visitors. Key benefits the Nez Perce-Clearwater provides include clean water; clean air; wood products, including timber and firewood; forage; hunting, trapping, and fishing; fish; cultural values, including heritage values, subsistence food gathering, and spiritual and inspirational values; scenery; recreation; and flood control and soil stabilization (FW-DC-ES-01).

Livestock are trailed or trucked to and from grazing allotments along roads, and permittees access cow camps using roads and motorized trails. Generally, the greater ease and availability of motorized access into and throughout an allotment, the more efficient and cost effective it is to manage livestock and maintain structural improvements. The Land Management Plan includes a guideline to help ensure access for management of livestock grazing allotments. Guideline FW-GDL-ES-01 specifies that to provide for social and economic sustainability of rural communities, access to activities such as recreation, hunting, fishing, gathering, egress, and wildfire management should continue to be provided for on routes or in areas designated as open to motorized use in the summer and winter. If a route is identified as adversely affecting aquatic ecological values, rerouting and route improvement should be considered prior to closure, to preserve motorized access opportunities. If a route or area needs to be closed, alternate motorized access to maintain social and economic sustainability of rural communities should be provided. The beneficial effects from ecosystem services management would be the same under all Action Alternatives.

Designated Wilderness

The Nez Perce-Clearwater manages the entire Gospel-Hump Wilderness and portions of the Selway-Bitterroot and Frank Church-River of No Return Wilderness areas (See maps in Appendix 1). The Mallard Creek vacant allotment has a 1 percent portion located within the Frank Church-River of No Return wilderness. There are four grazing allotments that at least partially lie within the Gospel-Hump Wilderness, with almost all of Hanover Mountain Allotment and about half of the Butte Gospel Allotment occurring within the wilderness area. Only about 1 percent of the Florence and Hungry Ridge allotments are located within the wilderness. See Table 382 in the Affected Environment section for more specific information for allotments within designated wilderness.

Minor infrastructure associated with the management of these allotments includes fences, water lines, and water tanks. In designated wilderness, livestock grazing “and activities and the necessary facilities to support a livestock grazing program, would be permitted to continue in wilderness areas, when such grazing was established prior to classification of an area as wilderness” in accordance with Congressional Grazing Guidelines (FSM 2323.2, WO Amendment 2300-90-2). There is to be “no curtailment of grazing permits or privileges in an area simply because it is designated wilderness.” Wilderness designation should not prevent the maintenance of existing fence or other livestock improvements, nor the construction and maintenance of new fences or improvements which are consistent with allotment management plans which are necessary for the protection of the range.

Livestock grazing was determined suitable in the designated wilderness areas in the land management plan action alternatives (MA1-SUIT-WILD-05), per designating legislation and management plans specific to that wilderness area. Livestock grazing in designated wilderness is also suitable in the No Action alternative. The Land Management Plan includes a standard for designated wilderness that specifies management activities within designated wilderness areas shall preserve wilderness character as required by the Wilderness Act, as well as each wilderness area’s enabling legislation and its specific management plan (MA1-STD-WILD-01). Access to and within allotments in designated wilderness areas is more difficult and adds to allotment management complexity. The effects would be the same for all alternatives.

Designated Wild and Scenic Rivers

The Nez Perce-Clearwater administers all or part of three designated wild and scenic rivers. Approximately 3,760 acres, or 15 percent, of the Cannon Ball active allotment occur within the Designated Rapid River Wild and Scenic River. The segment of Rapid River located on the Nez Perce-Clearwater is classified as wild.

Livestock grazing was determined suitable in the designated wild and scenic rivers in the land management plan action alternatives (MA1-SUIT-DWSR-05). Livestock grazing in designated wild and scenic rivers is also suitable in the No Action alternative. Livestock grazing is allowed within the designated river area provided it does not substantially interfere with public use or detract from the values which caused the river to be included in the National Wild and Scenic River System.

Structures and improvements within a wild river area are accepted, if they are necessary to support the range activities, provided the area retains a natural appearance and the structures harmonize with the environment.

Although livestock grazing is allowed in designated wild and scenic rivers, due to the importance of the area, there is added scrutiny. Livestock management may become more time and labor intensive and livestock grazing impacts may need to be evaluated more often. The effects would be the same for all alternatives.

Recommended Wilderness

Recommended wilderness areas are lands that have wilderness characteristics and may be suitable for inclusion in the National Wilderness Preservation System. Congress reserves the authority to make final decisions on wilderness designation. The Forest Service preserves the opportunity for recommended wilderness areas to be included in the National Wilderness Preservation System by protecting and maintaining the ecological and social characteristics that provide the basis for their suitability for wilderness designation.

The Preferred Alternative proposes 258,210 acres of recommended wilderness in three areas, but no livestock grazing allotments occur within the recommended areas. Livestock grazing was determined suitable in the recommended wilderness areas in the land management plan Action Alternatives (MA2-SUIT-RWILD-05). The No Action Alternative specifies to not establish any new allotments in recommended wilderness. Access to and within allotments in recommended wilderness areas is more difficult and adds to allotment management complexity, although recommended wilderness areas are currently within Idaho Roadless Rule areas. Although livestock grazing is allowed in recommended wilderness, due to the importance of the area, there is added scrutiny. Livestock management may become more time and labor intensive and livestock grazing impacts may need to be evaluated more often.

Eligible and suitable wild and scenic rivers

Rivers identified as eligible or suitable for inclusion as part of the Wild and Scenic Rivers system will be managed to protect the river-related outstandingly remarkable values identified for the river and protect the free-flowing nature and quality of the water. They will also be managed to maintain their preliminary classifications of wild, scenic, or recreational. These protection measures will be maintained until a decision is made on the future use of the river and adjacent lands through an Act of Congress or a determination that the river is not suitable for inclusion. Under the Preferred Alternative, the Allison-Berg Allotment is the only allotment containing an eligible or suitable wild and scenic river, which is the Salmon River.

Livestock grazing was determined suitable in the designated wild and scenic rivers in the land management plan action alternatives (MA2-SUIT-E&SWSR-05). Livestock grazing should be managed to protect identified river values (FSH 1909.12, Chapter 80, Section 84.3(10)). Livestock grazing in eligible wild and scenic rivers is also suitable in the No Action Alternative. Although livestock grazing is allowed in eligible and suitable wild and scenic rivers, due to the importance of the area, there is added scrutiny. Livestock management may become more time and labor intensive and livestock grazing impacts may need to be evaluated more often.

Research Natural Areas

Research Natural Areas (RNAs) are permanently established to maintain areas of natural ecosystems and areas of special ecological significance. These protected natural areas include unique ecosystems or ecological features, rare or sensitive species of plants and animals and their habitat, or high-quality examples of widespread ecosystems. There are four research natural areas located within five active livestock grazing allotments and two natural research areas located within three vacant allotments (Table 391). Mud Springs Ridge is a proposed natural research area and would be established through a separate decision by the Regional Forester.

Table 391. Research natural areas within livestock grazing allotments.

Research Natural Area	Allotment	Status	Acres
Four-Bit Creek	Cedar	Active	1.3
Mud Springs Ridge	Cow Creek	Active	277
Mud Springs Ridge	Sherwin Creek	Active	11
No Business Creek	Peter Ready	Active	1
O'Hara Creek	American River	Active	54
O'Hara Creek	Elk/Lick Creek	Vacant	22
Upper Newsome Creek	Hamby	Vacant	2
Upper Newsome Creek	Newsome	Vacant	1190

Data Source: Nez Perce-Clearwater Geographic Information System database.

Livestock is generally excluded from research natural areas in the No Action Alternative. In the 1987 Clearwater Forest Plan, livestock grazing is not permitted in research natural areas. The 1987 Nez Perce Forest Plan excluded livestock grazing unless it was necessary to preserve the vegetation for which the research natural area was established.

Livestock grazing was determined suitable within research natural areas in the Land Management Plan Action Alternatives, as specified in the individual research natural area establishment reports (MA2-SUIT-RNA-06). During project level analysis for allotment management planning, it may be found that smaller inclusions, such as research natural areas, may not be appropriate for domestic livestock grazing when analyzed at the site-specific level. In these instances, livestock grazing may be found to be not suitable or suitable but with restrictions. Protection measures may include small enclosure fencing or minor changes to the grazing system. The effects would be the same for all Action Alternatives.

Geographic Areas Management

The Lolo Trail National Historic Landmark contains two congressionally designated National Historic Trails: the Lewis and Clark National Historic Trail and the Nez Perce (Nee-Me-Poo) National Historic Trail. There are three active allotments on Nez Perce-Clearwater lands that contain portions of the landmark. The Buckner Allotment contains a 283-acre segment of the corridor, while the Cedar Allotment contains 3,990 acres, and the Musselshell Allotment includes 775 acres. The Landmark does extend into the Dan Lee Meadows Allotment, but off Nez Perce-Clearwater lands.

Livestock grazing was determined not suitable within the Lolo Trail National Historic Landmark in the Land Management Plan Action Alternatives, except in the following current active allotments: Buckner, Cedar, and Musselshell (GA-SUIT-NHL-06). Beginning May 2024, the Cedar Allotment will become vacant, and the Musselshell Allotment will be administratively closed. Although livestock grazing is allowed in the Landmark in three allotments, due to the importance of the site, there is added scrutiny and livestock management may become more time and labor intensive, and livestock grazing impacts may need to be evaluated more often. Under the No Action Alternative livestock grazing is allowed in the Landmark but requires specialized livestock grazing management to prevent adverse impacts upon cultural resources and recreation.

The Salmon River geographic area contains all or portions of the Allison-Berg, Butte Gospel, Cannon Ball, Christie Creek, Cow Creek, Fiddle Creek, Florence, Hungry Ridge, Papoose, Peter Ready, Race Creek, Riverview, Sherwin Creek, and White Bird Creek allotments. These 14 allotments cover approximately 191,320 acres of the geographic area.

The Pilot Knob geographic area contains all or portions of the Elk Summit, Meadow-Lightening, and Newsome Creek allotments. These three allotments cover approximately 20,966 acres of the geographic area.

No suitably determinations were made for the Salmon River and Pilot Knob geographic areas in the Land Management Plan. During project level analysis for allotment management planning, it may be found that smaller inclusions, such as geographic areas, may not be appropriate for domestic livestock grazing when analyzed at the site-specific level. In these instances, livestock grazing may be found to be not suitable or suitable, but with restrictions. Protection measures may include small enclosure fencing or minor changes to the grazing system. The effects would be the same for all Action Alternatives.

Special Areas

Special areas are a category of administratively designated areas defined as an area or feature managed to maintain its unique special character or purpose (36 CFR 219.19). Such areas are protected and managed for public use and enjoyment and are identified due to their unique or special characteristics. Special areas are not congressionally designated but are administratively designated by the Chief of the Forest Service, regional forester, or forest supervisor. There are six special areas located in three active and two vacant allotments (Table 392). The Clear Creek Basalt Glades and Sing Lee Fen are newly proposed special areas identified during the revised Land Management Plan process.

Table 392. Special areas within livestock grazing allotments.

Special Area	Allotment	Status	Acres
Clear Creek Basalt Glades	Tahoe-Clear Creek	Active	267
Giant Cedar Grove	Elk Creek	Vacant	44
Lewis and Clark Cedar Grove	Cedar[1]	Active	58
Morris-Perkins Cedar Grove	Elk Creek	Vacant	48
séewisníme (Place of Mussels)	Musselshell[1]	Active	163
Sing Lee Fen	Newsome	Vacant	25

[1]Beginning May 2024, the Cedar Allotment will become vacant, and the Musselshell Allotment will be administratively closed.

Data Source: Nez Perce-Clearwater Geospatial Information System database. There are no suitability determinations made for special areas in the Land Management Plan Action Alternatives. The No Action Alternative also does not determine suitability or provide direction for livestock grazing in special areas. During project level analysis for allotment management planning, it may be found that smaller inclusions, such as special areas, may not be appropriate for domestic livestock grazing when analyzed at the site-specific level. In these instances, livestock grazing may be found to be not suitable or suitable, but with restrictions. Protection measures may include small enclosure fencing or minor changes to the grazing system. The effects would be the same for all Action Alternatives.

Summary of Consequences

The amount of permitted grazing, notable influences on forage production and availability, and allotment management complexity are key factors in determining permitted livestock grazing sustainability. All alternatives maintain the current level of animal unit months.

Forage production and availability are enhanced through creation of transitory forage in allotments and improvement of rangelands by removing encroaching conifers and controlling invasive species. Alternative X proposes the most acres of vegetation treatment, which would correspond to the highest opportunity for transitory forage. Alternative W, the Preferred Alternative, and Alternative Y, in descending order, also propose high amounts of timber harvest and prescribed fire, corresponding to a high potential for transitory forage creation. The No Action Alternative and Alternative Z propose the least amount of vegetation treatment and therefore, a moderate possibility for transitory forage production. All Action Alternatives propose the same upland forage utilization amounts and propose the same amount of encroaching conifers and invasive species.

The aquatic ecosystems plan components included in the Action Alternatives have a high potential to increase allotment management complexity, with a moderate potential in the No Action Alternative. Alternatives W, Y and Z propose increased amounts of recommended wilderness and eligible and suitable wild and scenic rivers within active grazing allotments, potentially adding to the complexity of managing livestock on those allotments affected. The No Action Alternative does not include any recommended wilderness in allotments but has the highest amount of eligible wild and scenic river acres within allotments. Alternative X proposes no recommended wilderness or eligible and suitable wild and scenic rivers. The Preferred Alternative increases the amount of eligible and suitable wild and scenic rivers within active grazing allotments but does not propose any recommended wilderness within active grazing allotments.

Overall, Alternatives X and the Preferred Alternative maintain the current the levels of permitted use, propose a high potential for transitory forage production, and have a lower allotment management complexity compared to other alternatives. Table 136 provides a summary of potential consequences to livestock grazing, by alternative.

3.6 Designated and Recommended Areas

This section includes analyses of potential effects on designated areas, recommended areas, Research Natural Areas, and special areas.

3.6.1 Designated Areas

The term designated area refers to a specific area on a landscape that has been established by statute, regulation, or policy. Once established, the designation continues until a subsequent decision by the appropriate authority removes the designation. Designated areas within the Nez Perce-Clearwater have been given permanent designation to maintain their unique special character or purpose. Some designated areas were established by statute or law, while others were established through other administrative processes. Certain purposes and restrictions are usually established for designated areas, particularly for those areas that have been designated by law.

This section analyzes the effects of a range of alternatives to the following designated areas:

- Designated Wilderness Areas
- Designated Wild and Scenic Rivers
- Idaho Roadless Areas
- National Recreation Trails
- Mallard-Larkins Pioneer Area
- Northwest Passage Scenic Byway, effects to the following designated areas are discussed elsewhere in Chapter 3
- National Historic Landmark and associated National Historic Trails
    - ♦ Lolo Trail National Historic Landmark
    - ♦ Nez Perce National Historic Trail
    - ♦ Lewis and Clark National Historic Trail
- Research Natural Areas

Designated Wilderness

Passage of the Wilderness Act of 1964 established areas of land designated to provide visitors opportunities for solitude, primitive and unconfined recreation, natural conditions, challenge, and risk. Wilderness is also important for the maintenance of species diversity, protection of threatened and endangered species, protection of watersheds, scientific research, and various social values. Nez Perce-Clearwater designated wildernesses include the highest concentration of areas where the sights, sounds, and influence of humans are largely unnoticeable. The existing wilderness areas are managed to preserve wilderness character. Five qualities help describe wilderness character (Landres et al. 2015).

- **Untrammeled.** Wilderness is essentially unhindered and free from modern human control or manipulation.
- **Naturalness.** Wilderness ecological systems are substantially free from the effects of modern civilization.
- **Undeveloped.** Wilderness is essentially without permanent improvements or modern human occupation.
- **Outstanding opportunities for solitude or a primitive and unconfined type of recreation.** Wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge.
- **Other features of value.** Wilderness may contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Relevant Laws, Regulations, and Policy

Federal Laws

Wilderness Act of September 3, 1964 (16 U.S.C. 1131-1136): This act provides the statutory definition of wilderness and management requirements for these congressionally designated areas. The act established a National Wilderness Preservation System to be administered in such a manner as to leave these areas unimpaired for future use and enjoyment as wilderness. This act established the Selway-Bitterroot Wilderness.

Central Idaho Wilderness Act of July 23, 1980 (P.L. 96-312, 94 Stat. 848): This act provided for the establishment of the River of No Return Wilderness.

98 S. 2354: This bill renamed the "River of No Return Wilderness" in the State of Idaho as the "Frank Church-River of No Return Wilderness." The bill was signed into law on March 14, 1984 and became Public Law 98-231.

Endangered American Wilderness Act of 1978 (P.L. 95-237, 92 Stat. 40), February 24, 1978: This act provided for the establishment of the Gospel-Hump Wilderness.

National Forest Management Act of 1976, as amended (16 U.S.C. 1600): This act provides that management direction for wilderness be incorporated into forest plans and sets minimum standards for the content of the plans.

Regulation

Wilderness-Primitive Areas (**36 CFR 293**): This regulation defines a wilderness-primitive area and provides direction on objectives; control of uses; maintenance of records; establishment, modification, or elimination of a wilderness area, commercial enterprises, roads, motor vehicle use, grazing of livestock, permanent structures, and commercial services; and other topics.

National Forest Wilderness (**36 CFR 261.18**): This regulation prohibits the following in National Forest wilderness: possessing or using a motor vehicle, motorboat, or motorized equipment, except as authorized by federal law or regulation; possessing or using a hang glider or bicycle; landing of aircraft or dropping or picking up of any material, supplies, or person by means of aircraft, including a helicopter except as authorized by federal law or regulation.

Planning Rule (36 CFR 219.7): This rule states that in developing a proposed plan revision, the responsible official shall identify existing designated areas and determine whether to recommend any additional areas for wilderness designation. Forest plans must include components for appropriate management of existing or proposed designated areas.

Forest Service Manual 2320: This manual provides direction for the management of wilderness.

Methodology

It is assumed that designated wildernesses are retained and will be managed according to enabling laws, regulations, and policy, as well as by Land Management Plan components. This analysis assumes that there will be no changes to designated wilderness boundaries or direction for the life of the plan. Under all alternatives, it is assumed that, when designations and land allocations overlap, management activities would follow the management direction for each land allocation, with the most restrictive direction applying when direction conflicts except where the enabling legislation dictates which direction applies. In the case of the Middle Fork Clearwater wild and scenic river designation and the overlapping Selway- Bitterroot designated wilderness, wilderness direction is to be followed if it conflicts with wild and scenic river direction. For the Salmon designated wild and scenic river and the overlapping Frank Church-River of No Return designated wilderness, the wild and scenic river direction is to be followed if it conflicts with the wilderness direction.

Information sources

Information sources include the Nez Perce-Clearwater geographic information system data for mapping and the National Visitor Use Monitoring project for wilderness recreation trends and data. Note that acreages used in the analysis, which are generated by the geographic information system, differ from U.S. Forest Service official acreages due to refinement of mapping technology between the date of designation and current date.

Analysis area

The geographic scope of the analysis is all National Forest System lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects. The temporal scope of the analysis is the anticipated life of the plan.

Indicators and Measures

The alternatives will be evaluated by comparing the following qualitative indicator:

- Effects of the Land Management Plan direction and how well it supports and protects the values associated with the designated wilderness areas.

This indicator is intended to ensure management of designated wilderness on the Nez Perce-Clearwater maintains the five qualities of wilderness character mentioned above.

Affected Environment

Nationally, the Forest Service oversees 37 million acres of wilderness across its National Forests and Grasslands. Currently, the Nez Perce-Clearwater manages approximately 23.7 percent of National Wilderness Preservation System lands within Idaho and 1 percent within the National Wilderness Preservation System. Approximately 1,139,059 acres, just under 30 percent, of the Nez Perce-Clearwater is within three designated wildernesses (Table 393). Portions of the Frank Church-River of No Return, portions of the Selway-Bitterroot, and the Gospel-Hump Wilderness lie within the Nez Perce-Clearwater.

Table 393. Wildernesses with acres on the Nez Perce-Clearwater.

Wilderness	National Forest(s)	Nez Perce-Clearwater acres	Total Acres
Frank Church-River of No Return	Boise[1], Bitterroot, Nez Perce-Clearwater, Payette and Salmon-Challis[2], and Bureau of Land Management lands	110,236	2,359,948
Selway-Bitterroot	Bitterroot, Lolo[3], and Nez Perce-Clearwater[4]	823,151	1,348,663
Gospel-Hump	Nez Perce-Clearwater	205,672	205,672

[1]Management of acres located on the Boise National Forest have been assigned to the Challis National Forest (now combined with the Salmon to form the Salmon-Challis National Forest)

[2]Primary management for the Frank Church-River of No Return is provided by the Salmon-Challis National Forest

[3]Management of acres located on the Lolo National Forest have been assigned to the Bitterroot National Forest

[4]Primary management for the Selway-Bitterroot is provided by the Bitterroot National Forest

Primary recreational activities within the wildernesses include backpacking, hiking, horseback riding, hunting, fishing, and boating. Many visitors use the services of an outfitter and guide operating under Nez Perce-Clearwater special-use permits in wilderness areas.

National Visitor Use Monitoring (NVUM) data regarding wilderness visitation has been collected for the Nez Perce-Clearwater since 2006. Table 394 shows the number and percentage of wilderness visits compared to the total forest visits.

Table 394. Forest and wilderness visits.

Year	Total Nez Perce-Clearwater Visits	Visits within Designated Wilderness	Percent
2006*	689,000	30,000	4.4
2011*	481,000	21,000	4.4
2016	763,000	76,000	10

*Years are combined totals for the Nez Perce and Clearwater National Forests individual NVUM data since the forests were not combined at the time of data collection.

In 2016, National Visitor Use Monitoring data (U.S. Department of Agriculture 2018g) indicated 62 percent of the visitors to designated wilderness were male and 38 percent female. This is very similar to the overall forest visitation gender breakdown of about 60 percent male and about 40 percent female. The largest percentage, 61 percent, of designated wilderness visitors are ages 20 to 59. Those under age 20 represent about 16 percent of designated wilderness visitors, and the remaining about 23 percent of visitors are 60 or older. These age distributions are similar to those for general forest visitation. About 56 percent of forest visitors are 20 to 59 years old, about 16 percent are under age 20, and 28 percent are 60 or older. Comparing by decade, though, indicates that overall forest visitors are often older than designated wilderness visitors. About 20 percent of general forest visitors are ages 60 to 69, the highest percentage of visitors by decade. Comparatively, the highest percentages of designated wilderness visitors are ages 30 to 39 and 50 to 59, comprising 17 percent of each. Designated wilderness visitors ages 60 to 69 represent about 16 percent of visitation. General forest visitors between 30 and 39 and 50 to 59 represent about 15 percent each.

Selway-Bitterroot Wilderness

Congress designated the Selway-Bitterroot as a wilderness area in 1964 encompassing 1,348,663 acres straddling the Bitterroot Mountains and the Idaho-Montana border. The portion on the Nez Perce-Clearwater contains approximately 823,151 acres.

The Bitterroot Mountains form a rugged, glacier-carved border between Idaho and Montana. On both sides of this border is the Selway-Bitterroot Wilderness, the third largest wilderness in the Lower 48 states. Only the 600-foot-wide Nez Perce Trail, an unimproved dirt road also known as the Magruder Corridor, separates the Selway-Bitterroot from the Frank Church-River of No Return Wilderness and forms the southern boundary of the Selway-Bitterroot Wilderness. U.S. Highway 12 forms the northern boundary.

Except for the high crest of the Bitterroot Mountains, the area is dominated by ridges broken with raw granite peaks. Below the ridges are deep canyons covered with thick coniferous forest. Hidden low valleys are rich with old-growth cedar, fir, and spruce, with Ponderosa pine dominating open grassy slopes along the rivers.

Approximately 1,800 miles of hiking, backpacking, and equestrian trails wind through the area providing access to both the Montana and Idaho sides of the mountains, but many trails in the area are unmaintained and rugged. Travel by foot and stock can be challenging but rewarding. The one million plus acres of wilderness provide many opportunities for primitive unconfined recreation and solitude, though many portions of the area are untrailed and rarely traveled. This lack of human presence provides vast tracts of undisturbed habitat for wildlife, such as elk, deer, moose, black bears, mountain lions, and wolves. The Selway-Bitterroot Wilderness and the Frank Church-River of No Return Wilderness make up the core of the Bitterroot Ecosystem Recovery Zone for the federally threatened grizzly bear.

The Selway River, a designated Wild and Scenic river, lies mostly within the Selway-Bitterroot Wilderness. This river rushes out of the mountains of Idaho and is joined by flows from the Moose Creek drainage and lower down the Lochsa River. The Selway is a premier whitewater river offering a wild, remote, and self-reliant river experience.

Frank Church-River of No Return Wilderness

Congress designated the Frank Church-River of No Return Wilderness in 1980, designating 2,359,948 acres divided between the Bitterroot, Nez Perce-Clearwater, Payette, and Salmon-Challis National Forests, as well as the Bureau of Land Management. About 110,236 acres of the wilderness are located on the Nez Perce-Clearwater. Aside from areas of Alaska, nowhere else in the United States provides a wilderness experience to match the sheer magnitude of the Frank Church-River of No Return, the largest contiguous unit of the National Wilderness Preservation System in the Lower 48 states. It is second in size only to California's Death Valley Wilderness, which consists of many non-contiguous pieces. The Frank Church-River of No Return area encompasses and combines two previous Primitive Areas (the Idaho and Salmon Breaks); portions of five national forests; and a small swath of land managed by the Bureau of Land Management. Senator Frank Church played a key role in the passage of the Wilderness Act of 1964 and his name was added to the Wilderness in 1984, shortly before his death.

Two rivers, the Main Salmon and the Middle Fork of the Salmon, as well as other waterways, comprise the heart of the Frank Church-River of No Return Wilderness Area. All the Middle Fork of the Salmon and most of the Main Salmon are designated Wild and Scenic rivers. The Main Salmon forms the southern boundary of the portion of the wilderness within the Nez Perce-Clearwater. The Middle Fork of the Salmon runs north to join the Main Salmon east of the Nez Perce-Clearwater. Reaching 6,300 feet from the river bottom, the canyon carved by the Main Salmon is deeper than most of Earth's canyons, including the Grand Canyon of the Colorado River. This fast-moving waterway has been dubbed the River of No Return. In the northeastern corner of the wilderness, the Selway River flows north into the nearby Selway-Bitterroot Wilderness. Usually trout fishing rates from good to excellent. Unlike the sheer walls of the Grand Canyon, these rivers rush below wooded ridges rising steeply toward the sky, beneath eroded bluffs and ragged, solitary crags.

The Salmon River mountains dominate the interior of the wilderness. Without a major crest, these mountains splay out in a multitude of minor crests in all directions and rise gradually to wide summits. East of the Middle Fork, the fabulous Bighorn Crags form a jagged series of summits, with at least one topping 10,000 feet. The Crags surround 14 strikingly beautiful clear water lakes. Hiking up from the rivers into the mountains brings sudden elevation changes. Great forests of Douglas-fir and lodgepole pine cover much of the area, with spruce and fir higher up and Ponderosa pine at lower altitudes. The forests are broken by grassy meadows and sun-washed, treeless slopes.

This area is a dry country, with as little as 10 inches of precipitation falling near the rivers. As much as 50 inches may fall on the mountaintops, but much of it is snow. Despite the dryness, wildlife abounds. As many as 370 species have been identified in a single year, including eight big game animals.

Wildfire has been allowed to play its natural role in the wilderness. Tens of thousands of acres have burned without the interference of humans, producing a mosaic of vegetation from severely burned timber stands in some areas to lightly burned grass slopes and understory in other areas.

A network of 296 maintained trails, comprising approximately 2,616 miles, provides access to this seemingly endless area, crossing rivers and streams on 114 bridges. This is a paradise for horse packers with 32 Forest Service Roads leading to 66 trailheads. Despite the extensive trail system, an amazing 1.5 million acres remains trail-free. Small planes can land on several primitive airstrips dating back to the days before wilderness designation. Jet boats are allowed on the Main Salmon. Dozens of outfitters offer float, jetboat, horse packing, backpacking, and ski trips through various parts of the wilderness.

There is one vacant grazing allotment that partially lies within the Frank Church-River of No Return wilderness. About 402 acres of the 36,733-acre Mallard Creek allotment lie within the wilderness. This is about one percent of the allotment. This use is allowed and is expected to continue in the future.

Gospel Hump Wilderness

The U.S. Congress designated the Gospel-Hump Wilderness in 1978 through the Endangered American Wilderness Act. It has a total of 205,672 acres, all of which are located on the Nez Perce-Clearwater. The southern boundary of the Gospel-Hump Wilderness is the Main Salmon and the Frank Church-River of No Return Wilderness.

Long before the explorers Lewis and Clark first laid eyes on this region in 1805, the Nez Perce Indians were hunting the elk, deer, and black bears whose descendants still roam here. Discovery of gold in the 1860s brought a flood of miners into central Idaho that did not subside until after the turn of the century. Another brief gold rush occurred during the Great Depression; remnants of gold mining operations are still evident today.

Elevations in the Gospel-Hump Wilderness range from 1,970 feet at the Wind River pack bridge on the Salmon River to 8,940 feet at the summit of Buffalo Hump. The northern portion contains relatively gentle, heavily forested country that sweeps up the glaciated divide between the South Fork of the Clearwater River and the Main Salmon River, which flows out of the nearby Frank Church-River of No Return Wilderness. From the divide, the terrain becomes steep and sparsely vegetated along the Salmon River Breaks.

Moose, mountain goats, bighorn sheep, mountain lions, wolves, and anadromous fish live here. The area sees extreme variations in weather, with temperatures sometimes exceeding 100 degrees Fahrenheit along the Salmon River while snow whitens the high country. Seasonal roads of fair to poor quality surround the wilderness, offering access to trails that lead from the Salmon River Breaks into the high country. Many hikers would classify the high country as very challenging and often impassable due to late snows.

There are four grazing allotments that at least partially lie within the Gospel-Hump Wilderness (Table 395). Almost all of Hanover Mountain allotment, about 50 percent of the Butte Gospel allotment, about 1 percent of the Florence allotment, and less than 1 percent of the Hungry Ridge allotment lie within the Gospel-Hump Wilderness. This use is allowed and is expected to continue in the future.

Table 395. Grazing allotments at least partially within the Gospel Hump wilderness.

Allotment Name	Allotment Status	Wilderness Acres	Total Acres
Butte Gospel	Active	19,125	38,896
Florence	Vacant	340	53,205
Hanover Mountain	Active	15,337	15,472
Hungry Ridge	Active	47	31,521

Data Source: GIS data.

Environmental Consequences

Management of designated wilderness is defined by the Wilderness Act of 1964 (Public Law 88-577), which defined wilderness as a place:

"in contrast with those areas where man and his own works dominate the landscape…where earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain…an area of undeveloped Federal lands retaining its primeval character and influences, without permanent improvements or human habitation, which is protected and managed to preserve its natural condition."

Further direction can be found in the Wilderness Act of 1964, subsequent area specific legislation, Forest Service manual and handbook direction, and in wilderness specific management plans. Project-specific proposals within designated wilderness are also evaluated through Land Management Plan direction and a minimum requirement analysis to evaluate how the proposal may affect wilderness values. Commercial uses of wilderness are controlled by special-use permits and the plans of operation that are required under the special-use permit.

Effects Common to All Alternatives

Direction for wilderness management is detailed in laws, regulations, agency policy, and specific management plans. Therefore, management under the action alternatives, Preferred Alternative, and the No Action Alternative would not differ. There is no change in the amount of designated wilderness under any alternative. All alternatives would maintain and perpetuate the qualities of wilderness character and public values, including, but not limited to, opportunities for scientific study, education, physical and mental challenge, stimulation, and inspiration. A primitive experience would be maintained for all three wilderness areas under all alternatives and natural ecological processes and disturbances would remain the primary forces affecting the composition, structure, and patterns of vegetation. All alternatives would continue to be managed to perpetuate the enduring resource of wilderness and minimize impacts from uses and activities prohibited by the Wilderness Act.

All alternatives would carry forward the need for wilderness patrols, rehabilitation of any impacted sites, wilderness education, and wilderness-specific management plans. These activities are common to all alternatives.

Cumulative Effects

Generally, wilderness areas are in a more natural vegetation condition, in terms of composition and structure, than non-wilderness areas. Large tracts of land relatively free of human-caused disturbance and natural ecological processes and disturbances are the primary forces that contribute to maintaining biological diversity while minimizing the effects of human development on habitat connectivity. Designated wilderness areas on the Nez Perce-Clearwater provide outstanding opportunities to experience solitude and primitive and unconfined recreation, including the values of inspiration and physical and mental challenge. They provide undeveloped areas without permanent improvements or modern human occupation and areas that are essentially free from modern human control or manipulation. The Landscape Assessment completed by the Clearwater Basin Collaborative in 2014 indicates that the disturbance restoration needs within no harvest zones, of which designated wilderness is a part, are about 35 percent of coniferous forests and lower than the percent needed for the suitable timber base of the Nez Perce-Clearwater (Haugo and Benton 2014). This trend is likely to continue as natural processes continue to determine the composition and structure of the wildernesses.

Population growth and development increases the need for public open space. Growth in Missoula and Ravalli counties in Montana; Idaho, Kootenai, Latah, and Nez Perce counties in Idaho; and Asotin and Spokane counties in Washington is likely to increase recreational use of the Nez Perce-Clearwater, which may include an increase in wilderness use. Increased recreational use may impact maintenance of the wilderness character, particularly opportunities for solitude and natural quality. Examples of potential impacts include increased opportunity for crowding in high use areas, soil compaction or erosion, and threats to native plant species from the spread of noxious weeds from sources outside the wilderness. The effects of urbanization and population growth on wilderness use and resource conditions are likely to be gradual and to extend well beyond the planning period. These areas may be affected by management of adjacent lands, such as sights or sounds from vegetation treatments, motorized use, or private development.

Effects to Resource from Other Resources

Land Allocations

Designated wilderness may contain other allocations, such as designated or eligible wild and scenic river corridors or research natural areas. Where land allocations overlap, the more protective direction applies; therefore, wilderness management components and regulations would prevail.

Fire Management

As described in the 1964 Wilderness Act, naturally ignited wildfire should be allowed to burn to maintain or protect the long-term ecological processes of designated wilderness. Where these fires can burn there could be temporary loss of vegetation, short term reduction in water quality due to sedimentation, or short-term air pollution from wildfire smoke; however, these effects are part of the natural ecological processes. Exceptions may occur when a more direct attack is needed to protect life or adjacent property or mitigate risks to responders. Some fires would require actions to be taken to minimize or mitigate effects to identified infrastructure, cultural sites, or other values at risk, and may require a minimum requirement decision guide (MRDG) to conduct such actions to maintain the wilderness character of the areas. These decisions are documented in the Wildland Fire Decision Support System (WFDSS).

Nevertheless, when natural fires are suppressed in fire adapted ecosystems, there could be detrimental effects to ecosystem processes, wildlife habitat, and biodiversity (Keane et al. 2002).

Vegetative Management

These lands are withdrawn from timber production and, therefore, are not suitable for timber production or timber harvest. There would be no effect to designated wilderness from timber harvest.

Recreation and Access

The Frank Church-River of No Return, Selway-Bitterroot, and Gospel-Hump Wildernesses may be affected by increasing recreational use. Visitors to the wilderness may affect others' solitude and camping may negatively affect vegetation and water quality through site compaction and improper disposal of human waste. In all alternatives, plan components are provided to protect the wilderness character from these potential effects. Plan components prohibit motorized and mechanized recreation use within wilderness, except for the mobility impaired. Stock and hiking use on trails may negatively affect natural vegetation by introducing noxious weeds and may also reduce water quality.

Scenery Management

In all alternatives, the scenery of designated wilderness is protected by plan components. The current plans assigned to wilderness across both forests a visual quality objective of preservation equivalent to a very high scenic integrity objective. In the revised plan alternatives, the scenic integrity objective is very high for all designed wilderness, and, in this respect, the revised plan alternatives are more equally protective of scenery in designated wilderness than the current plans.

Permitted Livestock Grazing Management

Livestock grazing permits and allotments within designated wilderness will not change due to this Land Management Plan. Grazing and necessary facilities to support the grazing within designated wildernesses would continue and remain permitted.

Minerals Management

The Frank Church-River of No Return, Selway-Bitterroot, and Gospel-Hump Wildernesses have been withdrawn from mineral entry and are not available for new leases or claims. Surface and mineral rights within the wilderness are entirely federal.

Designated Wild and Scenic Rivers

Congress passed the National Wild and Scenic Rivers System Act in 1968 (1968) for the purpose of preserving rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. The act is recognized for safeguarding the special character of these rivers while also allowing for their appropriate use and development. The act promotes river management across political boundaries and public participation in developing goals for river protection.

For wild and scenic rivers, the designated management boundaries generally average 0.25-mile on either bank in the lower 48 states. The purpose of this 0.25-mile management corridor is to protect river-related values. For management purposes, river segments are classified as wild, scenic, or recreational.

- Wild River: Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.
- Scenic River: Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.
- Recreational River: Those rivers or sections of rivers that are readily accessible by road or railroad that may have some development along their shorelines and that may have undergone some impoundment or diversion in the past.

The Nez Perce-Clearwater has three designated Wild and Scenic Rivers: Middle Fork Clearwater River, Salmon River, and Rapid River. The Middle Fork Clearwater includes the Lochsa and Selway Rivers. Designated Wild and Scenic River acres within the Nez Perce-Clearwater's administrative boundary total approximately 57,891 acres.

Relevant Laws, Regulations, and Policy

Wild and Scenic Rivers Act of October 2, 1968 (Pub. L. 90-542, 82 Stat. 906, as amended): This act established the National Wild and Scenic Rivers System with three classes of river systems: wild, scenic, and recreational. The purpose of the act is to protect the river "for the benefit and enjoyment of present and future generations."

Methodology

It is assumed that designated wild and scenic rivers will be managed according to enabling laws, regulations, and policy, as well as by Land Management Plan components. This analysis assumes that there will be no changes to designated wild and scenic rivers boundaries or direction for the life of the plan. Under all alternatives, it is assumed that, when designations and land allocations overlap, management activities will follow the management direction for each land allocation, with the most restrictive direction applying when direction conflicts, unless otherwise directed through enabling legislation.

Affected Environment

Middle Fork Clearwater River, including the Selway and Lochsa Rivers

On October 2, 1968, Congress designated the Middle Fork Clearwater as part of the Wild and Scenic River System through the Wild and Scenic Rivers Act. This river system includes three uniquely named rivers — the Middle Fork Clearwater River, the Lochsa River, and the Selway River — covering parts of the Nez Perce-Clearwater and Bitterroot National Forests. On the Nez Perce-Clearwater, designated rivers include 64 miles of the Lochsa River from the Powell Ranger Station to Lowell, Idaho; 58 miles of the Selway River from the Nez Perce National Forest boundary with the Bitterroot National Forest near Goat Creek to Lowell, Idaho; and 23 miles of the Middle Fork Clearwater River from Lowell, Idaho, to the Upper Kooskia Bridge in Kooskia, Idaho.

When designated, the five river segments were defined and classified as either wild or recreational segments. No segments were classified as scenic. Those river segments with adjacent roads were designated recreational and the others wild. Of the total five segments, four are within the Nez Perce-Clearwater, as outlined in Table 396.

Table 396. Classification of Middle Fork Clearwater Wild and Scenic River within Nez Perce-Clearwater.

River	Segment	Miles	Classification
Lochsa	Lowell to Powell Ranger Station	64	Recreational
Middle Fork Clearwater	Kooskia to Lowell	23	Recreational
Selway	Lowell to Selway-Bitterroot Wilderness boundary	22	Recreational
Selway	Selway-Bitterroot Wilderness boundary to Nez Perce-Clearwater boundary	36	Wild

Note: This river system contains additional miles within the administrative boundaries of the Bitterroot National Forest.

Under the Wild and Scenic River Act, outstandingly remarkable values were assigned to all segments of the Middle Fork Clearwater River. In 2002, as part of the Snake River Basin water rights adjudication, the outstanding remarkable values were validated for all segments of the river. During the validation process in 2002, the determination was made that all the original outstandingly remarkable values should still be defined for the Middle Fork Clearwater, with one exception. Geology was not defined as an outstandingly remarkable value in 2002 but was in 1968. The other outstandingly remarkable values were defined in both 1968 and 2002. These values include scenery; recreation; fish; wildlife; prehistory, history, and, potentially, traditional and cultural use; water quality; and vegetation and botany.

Scenery Outstandingly Remarkable Value

The Lochsa flows through a narrow, steep-sided canyon surrounded by rugged forested mountains. Many rock outcrops and a steep gradient form rapids. The Black Canyon gorge, with towering granite walls and cascading waterfalls, becomes the focal point during rainy fall and spring periods. Large shrub fields, resulting from the 1910 and 1934 fires, are visible on the upper slopes. These brush fields, along with deciduous trees, provide fall color. The eastern portion of the river corridor is heavily timbered with cedar, larch, Douglas-fir, and other species; the hillsides are more rounded and less rugged but the fall beauty of the larch trees provides contrasting color (U.S. Department of Agriculture 2003d).

The upper Selway River, considered a wild segment, has fast flowing, clear water with numerous riffles and pools. The stream cascades over large boulders and rocks. Rocky outcrops and sheer cliffs rise from the waterline along the river canyon with an occasional open meadow. From Paradise to Selway Falls the river is only accessible by trail. The Wild River Study (U.S. Department of Agriculture 1964) found that "narrow bottom steep-walled canyons possess a beauty difficult to describe with words." The 48-mile segment, from just below Whitecap Creek near Paradise Guard Station to just upstream of Selway Falls, is only accessible by trail through a rugged landscape (U.S. Department of Agriculture 2002d).

The Lower Selway, designated as a recreational segment, begins with Selway Falls. The falls have been described as a place of rare beauty, as white-water tumbles and falls over immense boulders in the narrow canyon (U.S. Department of Agriculture 1964). From here, the canyon widens to create a more pastoral landscape with rolling green hills adjacent to the river. Heavily timbered with cedar, Douglas-fir, and grand fir, the slopes of the lower Selway are intermingled with open, grassy meadows. The river is much wider, with numerous islands and gravel bars. The water's edge and the islands have a variety of coniferous and deciduous vegetative species (U.S. Department of Agriculture 2002d).

The Middle Fork Clearwater has a much broader river canyon than its tributaries, the Lochsa and the Selway. The river is wider and slower moving. The hillsides surrounding the river are rounded and covered to the north by dry grasslands and Ponderosa pine forest and to the south by Douglas-fir and Western redcedar. Near Syringa, Idaho, the vegetative mix changes as elevation and moisture increase. Douglas-fir and Western redcedar forests are interspersed with large brush fields created by fire activity in the early 1900s. This deciduous vegetation provides visual variety in the summer and seasonal color in the fall that enhances the scenic beauty of the river environs. Rock outcrops are found throughout the valley. In the lower portion of the valley, there are unique columnar basalt cliffs adjacent to the riverbanks with basalt formations in the river. The lower river valley, with its gentle topography, allows for broad views of the valley slopes and rock outcrops. The river often appears mirror-like, reflecting the images of the vegetation and rocky ledges found on its banks.

Recreation Outstandingly Remarkable Value

The Lochsa River provides whitewater and scenic floating opportunities, as well as riverside camping and hiking opportunities. The river drops an average gradient of 31 feet per mile with many rapids. The Nez Perce-Clearwater has identified 63 major Class II or greater rapids within the 64-mile length, with more than half that are classified as Class IV (U.S. Department of Agriculture 2002b). On the river, kayakers and rafters dominate recreational use during the peak spring and summer floating season. With many boat launch sites and easy access from U.S. Highway 12, there are different options for single and multi-day trips. In the river corridor, there are nine developed campgrounds with 195 camping units. Highway turnouts provide opportunities for boaters to scout rapids and for visitors to pull over to enjoy scenery. During spring runoff, it is common to see numerous cars parked in the highway turnouts watching huge waves and roiling whitewater as kayakers and rafters run the rapids. Along the Lochsa Corridor, in the 6 miles between Old Man Creek and the Historical Lochsa Ranger Station, five suspension bridges provide foot and stock access via trails to the Selway-Bitterroot Wilderness directly from U.S. Highway 12 (U.S. Department of Agriculture 2002b).

The Selway River drops 7,641 feet in 99 miles. With an average drop of 28 feet per mile in the Upper Selway, the wild river corridor has a considerable number of rapids and high velocity flow with a limited number of slow water recovery pools below rapids. This provides a very challenging and potentially dangerous river, especially during peak flows from mid-May through mid-June (U.S. Department of Agriculture 2002d). This wild segment has only one permitted boat launch per day with up to 16 people, so it provides outstanding opportunities for solitude and a primitive recreation experience (U.S. Department of Agriculture 1976b). The natural beauty of the canyon, combined with the challenge of the rapids and solitude, make the Selway one of the highest quality whitewater float-boating rivers in the country. The wild river corridor is also renowned for stock use and camping, with several trailheads in the river corridor providing access to the Selway-Bitterroot Wilderness (U.S. Department of Agriculture 2002d).

The lower Selway, is the recreation segment, and is readily accessible due to its proximity to the Northwest Passage Scenic Byway, also known as the Lewis and Clark Highway or U.S. Highway 12. This roaded, natural setting provides for both motorized and non-motorized recreation and interaction between users. This corridor provides a wide range of river-related opportunities, including sightseeing, day use, recreational floating and tubing, swimming, picnicking, developed and dispersed camping, fishing, hunting, and hiking on riverside trails (U.S. Department of Agriculture 2002d).

Diverse recreation opportunities abound where motorists, recreation vehicle users, bicyclists, and campers can enjoy dispersed and developed recreation sites along the Middle Fork Clearwater. Easily accessible from the scenic Lewis and Clark Highway, the river corridor affords a wide range of recreation opportunities and access for sightseeing, day use, developed and dispersed camping, fishing, hunting, swimming, and hiking on riverside trails. The calmer waters and the lower elevation of the Middle Fork River provide fishing opportunities for most of the year. It provides a wide range of floating experiences for both commercially permitted and private floaters (U.S. Department of Agriculture 2002d).

Fish Outstandingly Remarkable Value

The Middle Fork Clearwater River and its tributaries play a vital role in the Nez Perce-Clearwater management of sensitive, threatened, and endangered fish species. The Middle Fork Clearwater subbasin is considered a core area for recovery of at-risk salmonids in the upper Columbia River basin. The river and its tributaries provide crucial habitat for threatened and endangered species listed on the Endangered Species Act, including steelhead trout (*Oncorhynchus mykiss* subspecies) and bull trout (*Salvelinus confluentus*). Additionally, spring Chinook salmon (*Oncorhynchus tshawytscha*) have been reintroduced to the river system. Westslope cutthroat trout (*Oncorhynchus clarkii lewisi*) are also present and listed as a U.S. Forest Service Northern Region sensitive species. The Middle Fork Clearwater River functions as a critical migration corridor, connecting the Lochsa and Selway populations of listed fish with the South Fork Clearwater and Lower Clearwater River and tributaries. It provides relatively contiguous distribution of populations and suitable habitat so that the biological needs of the species can be met (U.S. Department of Agriculture 2002c).

Wildlife Outstandingly Remarkable Value

The river corridor provides a diversity of high-quality habitat for wildlife of national and regional significance. Most species rely on habitat conditions alternated by large-scale forest disturbances, particularly fire. The 2002 assessment of Endangered Species Act listed species included the bald eagle, gray wolf, lynx, and grizzly bears (U.S. Department of Agriculture 2002b). The bald eagle and gray wolf have since been delisted due to recovery. Grizzly bears are listed as threatened but not currently occupying the Bitterroot Ecosystem (U.S. Department of Agriculture 2002a). The river corridor and adjacent areas continue to provide habitat for these species. Species of particular interest found in the Middle Fork Clearwater and tributaries include the fisher, Coeur d'Alene salamander, spotted frog, and harlequin duck in the aquatic habitats. Wolverine, bighorn sheep, and Rocky Mountain goats are also present. Critical habitats of the Middle Fork Clearwater River include bald eagle wintering areas and harlequin duck migration routes (U.S. Department of Agriculture 2002c).

Prehistory, History and Traditional/Cultural Use Outstandingly Remarkable Value

Native American people, mostly the Nez Perce, have inhabited and traveled the Middle Fork of the Clearwater for 10,000 years according to cultural resource data. The Lochsa River roughly parallels the "Lolo Trail," which was used by Native Americans as a travel and trade route between the Columbia River basin and the Northern Plains. The Lolo Trail National Historic Landmark is located on ridges north of the Lochsa River and mostly outside the river corridor. Lewis and Clark followed this trail in 1805 and 1806. One of the most significant historical aspects of the Middle Fork Clearwater River is that it was the home and traditional use area of the Looking Glass Band of Nez

Perce. They were involved in the Battle of the Clearwater during the Nez Perce War in 1877 and many fled over the Lolo Trail through Montana (U.S. Department of Agriculture 2002b).

The Landmark encompasses both the Lewis and Clark and the Nez Perce (Nimiipuu) National Historic Trails. The Nez Perce (Nimiipuu) National Historic Trail was designated by Congress to commemorate the 1877 flight of the non-treaty Nez Perce from their homelands in eastern Oregon, Idaho, and Washington. The Landmark and trails are accessed from several points within the Lochsa River corridor (U.S. Department of Agriculture 2002b).

Hundreds of cambium scarred trees remain as evidence from early winter travelers who stripped the bark from trees for food. This use has been documented to have occurred from the early 1700s to the early 1900s.

The rivers are part of the lands ceded by the Nez Perce Tribe in the 1855 treaty. The river corridor is an important area for exercising treaty rights due to the numerous usual and accustomed fishing and camping sites. Members of the Tribe continue to use the river corridor area to hunt; gather roots, berries, and culturally significant plants; and access springs and fountains for drinking or traditional purposes (1855).

In addition to the designated historic trails, properties within the Lochsa corridor are on the National Register of Historic Places. The Lochsa Historical Ranger station complex has been stabilized and interpreted for the public. Additionally, there is a Japanese internment camp where several hundred Japanese-Americans were held for several years during World War II (U.S. Department of Agriculture 2002b).

The Selway corridor is also important for the Nez Perce-Clearwater history, with several historic building complexes that are listed on the National Register of Historic Places. The Moose Creek Ranger Station, near the upper Selway River, is maintained to perpetuate the rustic character of the 1920s. The Fenn Ranger Station was built to accommodate the Selway and Middle Fork Ranger District in 1935. When built, it served as a model for the modern ranger station that would replace the original log structures. This classic station is situated on a serene flat overlooking the Lower Selway River. The Magruder Ranger Station, located on the Upper Selway River on the Bitterroot National Forest, began as a tent camp prior to 1919 and currently serves as a recreation rental and an administrative site. This site is listed on the National Register of Historic Places (U.S. Department of Agriculture 2002d).

Numerous prehistoric Nez Perce religious and cultural sites have been identified in the river corridor, which is within ceded lands for the Nez Perce Tribe and contains values and sites related to religious activities, fishing, hunting, and gathering. There is a strong connection between tribal members and the associated salmon and steelhead fishery. In the 1855 Treaty, the Nez Perce Tribe reserved the right to fish, hunt, and gather roots and berries (1855).

Water Quality Outstandingly Remarkable Value

The Middle Fork Clearwater River, including the Lochsa and the Selway, has exceptionally pure, clear, clean water. In comparison to other rivers in the region, the waters are "unusually clear," except during high run-off and heavy storms. Previous studies found that the "unusually clear" water is one of the principal attractions of the river. The water quality of the Lochsa River is extremely high and supports a healthy and diverse population of aquatic species, including anadromous fish. The clear, cold waters flowing over coarse gravels provide good spawning habitat for resident and anadromous fish. Changes in water quality are linked to natural events, such as fire and climatic extremes (U.S. Department of Agriculture 2002c).

Idaho Department of Environmental Quality direction is to improve or maintain water quality conditions to support beneficial uses. Section 303(d) of the Clean Water Act stipulates that states must identify and prioritize water bodies that are water quality limited, including water bodies that do not meet water quality standards. For waters identified on this list, states must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards. Table 397 lists the water quality status for the Middle Fork Clearwater, Lochsa, and Selway Rivers, as designated in the Endangered Species Act approved 303(d)/305(b) 2012 integrated report (State Technical Services Office 2012, State of Idaho Department of Environmental Quality 2014). The Middle Fork Clearwater and Selway Rivers have no 303(d) listed streams and are fully supporting beneficial uses (Lucas 2017)

Table 397. Water Quality Status of Middle Fork Clearwater, Lochsa, and Selway Rivers.

River	Status
Middle Fork Clearwater River and approximately 35 tributaries	Fully supporting beneficial uses
Upper Selway River and tributaries	Fully supporting beneficial uses
Lower Selway River	Not assessed
Lower Selway River tributaries	Fully supporting beneficial uses
Lochsa River	303(d) listed for water temperature and not supporting the cold-water aquatic life beneficial use
Lochsa River tributaries (lower portion of subbasin)	303(d) listed for water temperature and not supporting the cold-water aquatic life beneficial use
Lochsa River tributaries (mid and upper portion of subbasin)	Fully supporting beneficial uses

Data Source: 2012 Integrated report (State Technical Services Office 2012, State of Idaho Department of Environmental Quality 2014).

The Lochsa River and several tributaries in the lower portion of the subbasin are 303(d) listed for water temperature. Beneficial uses and water quality criteria and standards are identified in the State of Idaho Water Quality Standards and Wastewater Treatment Requirements (IDAPA 58.01.02). Designated beneficial uses for the Lochsa River are cold-water aquatic life, salmonid spawning, primary contact recreation, domestic water supply, and special resource waters. The stream segments designated on the 303(d) list are not supporting the cold-water aquatic life beneficial use. The State of Idaho standard for cold-water biota includes water temperatures of 72 degrees Fahrenheit or less with a maximum daily average not greater than 66 degrees Fahrenheit (IDAPA 16.01.02250,02.c.ii.). The lack of vegetative shading due to stream adjacent roads is the primary cause of stream temperature exceedance. Although the Lochsa River and its tributaries are not meeting the cold-water aquatic life beneficial use based on state water quality standards, they still support federally listed fish species and other important aquatic organisms.

Vegetation or Botany Outstandingly Remarkable Value

Mild temperatures and abundant rainfall harbor a rare forest ecosystem that is a globally unique combination of Pacific coastal and Rocky Mountain biotic elements. The Middle Fork Clearwater canyons support relics of a 25-million-year-old Miocene flora that once extended across the northwest before the appearance of the Cascade Mountains; the canyons are considered a refugium of the mesic-temperate Miocene flora. The refugium environment is most strongly expressed at the confluence of the Selway and Lochsa rivers where they meet to form the Middle Fork Clearwater River. The lush understory vegetation of the lower slopes and valley bottoms is characterized by maidenhair fern (*Adiantum pedatum*) and a high diversity of fern species.

There are two research natural areas in the designated Lochsa Wild and Scenic River corridor. The Lochsa Research Natural Area preserves examples of the disjunct Pacific coast vegetation that includes the Pacific dogwood (*Cornus nuttallii*) and 14 other species that are rarely found inland. The Dutch Creek Research Natural Area is distinguished by stands of northwest paper birch, which was established after multiple catastrophic burns limited seed sources for conifers. These research natural areas have been used for research of aquatic and riparian plant communities, the refugium ecosystem, and Pacific dogwood (U.S. Department of Agriculture 2002b). The O'Hara Research Natural Area, in the Selway corridor, represents unique habitats and species including coastal disjunct habitat and species. Aquatic features are a primary focus of this research natural area with a network of streams ranging from first to fifth order, anadromous fish, and a series of cascades and waterfalls through narrow canyons and wet streamside meadows used by elk and moose (U.S. Department of Agriculture 2002d).

Other Management Practices

The river corridor includes a variety of recreation sites, including developed and dispersed campsites, river access sites, picnic areas, trailheads, and interpretive sites. In the assessment for the Land Management Plan (U.S. Department of Agriculture 2014i), each recreation site within the Middle Fork Clearwater's corridor was assigned a development standard adapted from the Recreation Sites Development Scale Direction (WO_2309.13.10). The recreation sites located in the river corridors provide a mix of site development levels. The site development levels are generally Level 2, minimal site modification, and Level 3, moderate site modification. The Recreation Facility Analysis and Five-Year Program of Work for the Nez Perce-Clearwater (U.S. Department of Agriculture 2014m) includes a listing of planned changes at each recreation site. There are currently no plans for expansion at recreation sites in the river corridor.

Within the Middle Fork Clearwater Wild and Scenic River system, the Nez Perce-Clearwater has acquired approximately 168 scenic and conservation easements, offering partial land interest of private lands in the Middle Fork Clearwater, Lochsa, and Selway River Wild and Scenic River corridors since the designation of these rivers in 1968. These easements include about 4,000 acres of private lands within the designated river boundaries.

The Wild and Scenic Rivers Act (WSRA) authorizes the Secretary of Agriculture to acquire lands and interests in lands within the authorized boundaries of a wild and scenic river (WSRA, Section 6(a)(1)). These easements were acquired because the Nez Perce-Clearwater "desires to administer such land to protect the scenic, recreational, geologic, fish and wildlife, historic, cultures and other similar values of the free-flowing Middle Fork Clearwater including the Lochsa and the Selway Rivers and their immediate environments and to prevent any developments that will tend to mar or detract from their scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values" (WSRA, Section 1(b)) (U.S. Department of Agriculture 1976b).

These easements allow the Nez Perce-Clearwater to influence how private lands are managed. The easements restrict land uses that may be inconsistent with river values including development of buildings, management of timber and other vegetation, farming and ranching activities, mining, and road construction. They limit commercial use of lands and buildings; limit residential development to single family residences; restrict building heights; and define colors, building materials, distance from the river, utilities, and signing. Easements require most development and land management activities on these private lands to be approved by the Nez Perce-Clearwater.

Major Roads

U.S. Highway 12 parallels the entire designated length of the Middle Fork Clearwater and Lochsa Rivers and continues east to the Montana border and beyond. Two highway maintenance stations exist within the river corridor, Fleming, and Bald Mountain, and one outside the corridor, Powell. All three are located on Nez Perce-Clearwater land, where a Special Use Permit is required. County Road 223 parallels the lower 5 miles of the Selway River.

Salmon River

The Salmon River was designated a Wild and Scenic River on July 23, 1980, with segments classified as wild and recreational. Of the total 125 miles, 56 miles are located within the Nez Perce-Clearwater. The Nez Perce-Clearwater designated section is located between Salmon Falls and Long Tom Bar near Vinegar Creek and is classified as wild. The remaining portions of the designated river lie within the Salmon-Challis National Forest to the south.

The Salmon River travels through portions of the Gospel-Hump and Frank Church-River of No Return Wilderness areas. The river management plan is incorporated into the Frank Church-River of No Return Wilderness management plan (U.S. Department of Agriculture 2003b). This document meets the requirements of a comprehensive river management plan for the Salmon River. It is important to note that the Central Idaho Wilderness Bill (P.L. 96-312) dictates that the portions of the Wild and Scenic River that travel through these wilderness areas be managed per the Wild and Scenic Rivers Act, not the Wilderness Act, despite the Section 10b of the Wild and Scenic Rivers Act requirement that the more restrictive provisions of either law apply when there is a conflict.

The Salmon River designated segments cover approximately 9,200 acres. In the 1987 Nez Perce Forest Plan, these acres are identified as Management Area 8.1 (U.S. Department of Agriculture 1987c). The Salmon River Resource Assessment (U.S. Department of Agriculture 2000a) validated the following outstanding remarkable values for the Salmon River as part of the Snake River Basin water adjudication process — recreation; geology; fisheries; wildlife; historic, cultural, and traditional uses; water quality; and vegetation.

Rapid River

Rapid River was added to the national Wild and Scenic Rivers System through the Hells Canyon National Recreation Area Act in 1975. When designated, approximately 26.8 miles were classified as wild. The river was designated as part of the National Recreation Area, rather than through a Wild and Scenic River study. As a result, it was not established with outstandingly remarkable values assigned. Outstandingly remarkable values have since been assigned to the river and are specified in the Hells Canyon National Recreation Area Comprehensive Management Plan (U.S. Department of Agriculture 2003a). The plan identified “traditional use/cultural” prehistoric cultural resources, historic cultural resources, scenery, fisheries, and water quality as the outstanding remarkable values for Rapid River and described them in Appendix K of the Final Environmental Impact Statement associated with that plan (U.S. Department of Agriculture 2003a). This document also serves as the comprehensive river management plan for the Rapid River since it identifies outstandingly remarkable values, establishes programmatic direction for these values, and provides specific direction relative to Section 7 of the Wild and Scenic River Act for protecting the river from harmful effects of water resource projects (U.S. Department of Agriculture 2003a).

The Rapid Wild and Scenic River is part of the Hells Canyon National Recreation Area, although it extends eastward beyond the boundary of the National Recreation Area. Approximately 13 miles of the Rapid Wild and Scenic River are located within the Nez Perce-Clearwater. This is the section located between the Nez Perce-Clearwater boundary up to the Hells Canyon Wilderness boundary on the main stem Rapid River and the West Fork of the Rapid River from the confluence up to the Payette National Forest boundary near Wyant Camp. Management of the Rapid Wild and Scenic River is coordinated between the Wallowa-Whitman, Payette, and Nez Perce-Clearwater National Forests (U.S. Department of Agriculture 2003a).

Approximately 4,200 acres of the designated Wild and Scenic River boundary lie within the Nez Perce-Clearwater. The land area within the Rapid River classified river boundary is identified as Management Area 8.3 in the Nez Perce Forest Plan (U.S. Department of Agriculture 1987c).

Rapid River is also located within the boundaries of the designated Rapid River Idaho Roadless Area, which is located on portions of both the Nez Perce-Clearwater and the Payette National Forests. The Idaho Roadless Rule (36 CFR 294) defers to previous management plans for the designated wild and scenic river corridors but applies to the management of the surrounding roadless area. Of the total 78,700 acres in the roadless area, 21,000 acres are located within the Nez Perce-Clearwater. Of these acres, approximately 4,300 acres of designated wild and scenic river corridor are managed under the Land Management Plan special area designation and the remaining 16,700 acres fall within the wildland recreation theme, the most restrictive of Idaho Roadless Rule themes (U.S. Department of Agriculture 2008d).

Environmental Consequences

Effects Common to All Alternatives

Under all alternatives, designated rivers would be managed according to the Wild and Scenic River Act, Forest Service policy, and management area direction for Wild and Scenic Rivers. The three rivers would be managed to protect their free-flowing condition, water quality, and outstandingly remarkable values. Therefore, the management of wild and scenic rivers under Forest Service policy would be the same for the No Action Alternative, the action alternatives, and the Preferred Alternative.

Cumulative Effects

The cumulative effects to the designated Wild and Scenic Rivers within the Nez Perce-Clearwater boundary are assessed based on a spatial boundary of the Nez Perce-Clearwater and the named rivers and streams contained therein. The temporal bound is the life of the Land Management Plan.

Cumulative effects to the designated rivers could result from the expansion of populations in the nearby urban areas. As the population increases, it is likely that the demand for water-based recreational opportunities such as fishing, rafting, kayaking, and similar uses will also increase. As a result, demand for more or larger capacity access points may also increase. Since the designations of the rivers as Wild and Scenic Rivers, water-related activities have been steadily increasing. The pressures of these demands are occurring not only within developed access and recreation sites but in dispersed sites as well. The impacts on these sites are likely to continue to occur since indirect effects to water quality and outstandingly remarkable values may occur.

Management activities generally take place outside of designated wild and scenic rivers unless an action is needed to help protect or enhance the water quality, free-flowing nature, or identified outstandingly remarkable values. Therefore, it is not expected that there will be any additional cumulative direct or indirect effects to the designated rivers unless the effects are in response to a need to protect one of the qualities of the river segments. A site-specific analysis should be conducted at that time to address the effects from that action to the designated river segment.

Effects to Resource from Other Resources

Management Area Prescription

The Wild and Scenic River Act and management area direction for designated wild and scenic rivers protects the free-flowing conditions, water quality, and outstandingly remarkable values for which the river was designated. All alternatives have the same miles of designated rivers.

Fire Management

Wildland fire, both planned and unplanned ignitions, could change the outstandingly remarkable values present in a river segment, especially segments with outstandingly remarkable values of scenery or historic resources. Plan components address using fire as a permissible tool to maintain ecological conditions within river corridors if it protects or enhances the free-flowing conditions, water quality, and outstandingly remarkable values for which the wild or recreational river was designated.

Vegetative Management

Rivers with a classification of wild are not suitable for timber production and timber harvest is not allowed. There would be no effects from timber harvest on those segments. On rivers with a recreational classification, timber production is unsuitable, but timber harvest is suitable for multiple-use purposes, for salvage logging, and to achieve desired vegetation conditions. Any timber harvest would protect or enhance the free-flowing conditions, water quality, or outstandingly remarkable values for which the recreational segment was designated.

Recreation and Access

Impacts from recreational use and management within designated river segments are anticipated to remain about the same or possibly rise as an increasing regional population leads to increasing demand for water-related activities. Although river corridors may be used for camping, canoeing, hiking, and other activities, the impacts are expected to remain at existing levels in part due to permit systems in place along much of the designated stretches of river. On those stretches where permits are not necessary for overnight use, there may be increasing use as the population increases. Creation of new dispersed camping and day-use sites may occur as a result. Trail maintenance work should be expected to have little if any impact in the river corridors. The use of motorized and mechanical equipment on designated Forest Service roads, trails, and backcountry airstrips is prohibited on wild and scenic river segments classified as wild, except as provided for by the authorized officer upon a determination that such use is necessary for the administration of the river or to protect and enhance the values for which the river was designated. Consistent with FSM 2354.420, motorized use may be permitted if such use is compatible with other management direction, public use of the resource, and resource attributes of the river. Motorized use is prohibited if the use causes, or is likely to cause, considerable adverse effects on the resource. Normally, motorized use will be prohibited in a wild river area.

Mineral Development

Anticipated effects from minerals management would be low under all alternatives. In accordance with FSM 2816.3, subject to valid existing rights, the minerals in federal lands within designated wild and scenic rivers are withdrawn from all forms of appropriation under the mining laws, and from operation of the mineral leasing laws, as of the date of the Wild and Scenic Rivers Act or inclusion of a river into the National Forest System.

The potential for leasable minerals is low across most of the Nez Perce-Clearwater, and, currently, there are no permits or operating plans for exploration within the designated river corridors. Although the potential for locatable minerals does exist, there are no valid existing rights, therefore no potential for mining operations within the corridors. Mineral materials are present and could potentially be used for construction purposes, but, generally, proposals for development of mineral materials do not occur and allowing such development would be at the discretion of the Nez Perce-Clearwater.

Idaho Roadless Areas

The 2001 Roadless Rule was published to ensure inventoried roadless areas sustained their values into the future. The roadless areas were initially identified during the Roadless Area Resource Evaluations of 1972 (RARE I) and 1979 (RARE II). The 1970s processes for inventoried undeveloped areas typically exceeded 5,000 acres and met the minimum criteria for wilderness consideration under the Wilderness Act. After the 2001 Roadless Rule, the State of Idaho and the U.S. Forest Service published the 2008 Idaho Roadless Rule, which identified 34 roadless areas across the Nez Perce-Clearwater. Sixteen of these roadless areas are located on the Nez Perce Forest, encompassing 497,000 acres, and 18 are located on the Clearwater National Forest, encompassing 984,000 acres, for a total of approximately 1,481,000 acres of undeveloped area.

Idaho Roadless Rule Areas are managed under the Idaho Roadless Rule of 2008. While a management allocation may allow activities, such as vegetation management in a roadless area, it does not require it. If such activities are proposed, they would need to be further evaluated in site-specific National Environmental Policy Act analysis prior to approval and implementation. Management direction for all Idaho Roadless Rule Areas on the Nez Perce-Clearwater has been proposed in the Land Management Plan and for each alternative.

These areas provide a range of primitive and semi-primitive recreation opportunities. Roadless area recreation levels vary from low to moderate depending upon their location. Use levels tend to be lower than the developed portions of the Nez Perce-Clearwater, where roads allow easier access to developed and dispersed recreational opportunities. Roadless areas provide a myriad of resource benefits, including undeveloped fisheries and wildlife habitat, biological diversity, and year-round dispersed motorized and non-motorized recreation.

Each roadless area was evaluated through the forest planning process to determine if it provides wilderness characteristics and whether it should be recommended for wilderness (Appendix E). Areas not recommended for wilderness through the forest planning process may still be considered for wilderness by Congress and would remain roadless areas under the Land Management Plan unless Congress designates them.

In 2008, the Idaho Roadless Rule established management direction for roadless areas in Idaho. The Rule designates 250 Idaho Roadless Areas and establishes five management themes that provide prohibitions with exceptions or conditioned permissions governing road construction, timber cutting, and discretionary mineral development. The themes are Wild Land Recreation; Primitive;

Backcountry/Restoration; Special Areas of Historic and Tribal Significance; General Forest, Rangeland and Grassland; and Land Management Plan Special Areas.

The Idaho Roadless Rule identifies the relation of the Rule to land management plans as follows:

"The provisions set forth in this subpart shall take precedence over any inconsistent land management plan component. Land management plan components that are not inconsistent with this subpart will continue to provide guidance for projects and activities within Idaho Roadless Areas; as shall those related to protection of threatened and endangered species. This subpart does not compel the amendment or revision of any land management plan (36 CFR 294.28d)."

Roadless areas will continue to be managed under the permissions and exceptions of the Idaho Roadless Rule. For areas that are recommended for wilderness, the authorized official may pursue an Idaho Roadless Rule theme change from the Chief of the U.S. Forest Service. The Idaho Roadless Rule primarily deals with road construction and reconstruction; timber cutting, sale, and removal; and mineral activities.

Relevant Laws, Regulations, and Policy

Idaho Roadless Rule (36 CFR 294 Subpart C): This rule provides state-specific direction for the conservation of inventoried roadless areas in the National Forest within the State of Idaho.

Methodology

Information sources

The geographic information system is the primary information source.

Analysis area

The geographic scope of the analysis is National Forest System lands administered by the Nez Perce-Clearwater. The temporal scope of the analysis is the anticipated life of the plan.

Measurement Indicators

The following measurement indicator was used for this analysis:

- Acres of Idaho Roadless Rule areas by Recreation Opportunity Spectrum Class

Affected Environment

The Nez Perce-Clearwater has approximately 1,481,565 acres in 34 different inventoried roadless areas (Table 398). This constitutes about 36 percent of the lands administered by the Nez Perce-Clearwater. Roadless areas would continue to be managed under the 2008 Idaho Roadless Rule and compatible Land Management Plan direction. There are no open roads within the roadless areas.

Table 398. Idaho Roadless Area acres by Idaho Roadless Rule management themes.

Idaho Roadless Area	Total Acres	Backcountry/ Restoration	Land Management Plan Special Areas	Primitive	Special Areas of Historic and Tribal Significance	Wild Land Recreation
Adjacent to Gospel-Hump Wilderness	2,383	2,383	0	0	0	0
Bighorn-Weitas	254,901	247,386	295	0	7,221	0
Clear Creek	9,170	9,170	0	0	0	0

Idaho Roadless Area	Total Acres	Backcountry/ Restoration	Land Management Plan Special Areas	Primitive	Special Areas of Historic and Tribal Significance	Wild Land Recreation
Dixie Summit-Nut Hill	12,929	11,989	940	0	0	0
East Meadow Creek	96,856	0	537	96,319	0	0
Eldorado Creek	6,816	5,506	0	0	1,310	0
Gospel Hump	46,380	46,380	0	0	0	0
Hoodoo	153,852	0	0	0	1,977	151,874
John Day	10,300	10,300	0	0	0	0
Lick Point	6,874	6,874	0	0	0	0
Little Slate Creek	12,235	12,235	0	0	0	0
Little Slate Creek North	5,947	4,709	1,237	0	0	0
Lochsa Face	75,967	39,908	8,031	27,385	644	0
Lolo Creek1	71	71	0	0	0	0
Mallard	19,597	19,597	0	0	0	0
Mallard-Larkins	126,346	35,491	0	31,473	0	59,382
Meadow Creek-Upper North Fork	43,243	414	2	42,827	0	0
Moose Mountain	22,023	8,215	0	13,808	0	0
North Fork Slate Creek	10,411	10,411	0	0	0	0
North Fork Spruce-White Sand	35,794	20,333	0	5,867	0	9,594
North Lochsa Slope	117,659	14,854	6,315	81,279	15,212	0
O'Hara-Falls Creek	33,193	24,813	8,380	0	0	0
Pot Mountain	51,069	50,872	198	0	0	0
Rackliff-Gedney	89,955	84,382	5,573	0	0	0
Rapid River	21,020	0	4,298	0	0	16,722
Rawhide	6,030	1,023	0	5,007	0	0
Salmon Face	9,180	9,180	0	0	0	0
Selway Bitterroot	622	0	0	622	0	0
Silver Creek-Pilot Knob	20,949	0	0	0	20,949	0
Siwash	8,991	8,991	0	0	0	0
Sneakfoot Meadows	23,330	5,255	1,946	6,568	0	9,561
Weir-Post Office Creek	22,078	19,716	333	0	2,029	0
West Fork Crooked River	9,493	9,493	0	0	0	0
West Meadow Creek	115,973	115,770	203	0	0	0
Total	1,481,565	835,649	38,287	311,154	49,341	247,133

[1]Lolo Creek is administered by Lolo National Forest.

Data Source: GIS data.

The Final Environmental Impact Statement for the Idaho Roadless rule projected that 0.16 percent of the 9,340,300 acres managed under the Idaho Roadless Rule would be affected by timber removal or road construction in the first 15 years. For the nearly 1,500,000 acres of roadless areas on the Nez Perce-Clearwater, this would total 2,400 acres over the 15-year period, or approximately 160 acres per year (U.S. Department of Agriculture 2008d). In the 10-year period from October 2008 to

September 2018, approximately 1,800 acres were affected through community protection zone fuels reduction, constructed fuel breaks during wildfires, and removal of post-fire roadside hazard trees (Table 399). This estimate of 1,800 acres in the first 10 years is slightly more than the Idaho Roadless Rule projection of 2,400 acres over a 15-year period. However, several extreme fire seasons have occurred during that time and much of the tree removal has been tied to fire and post-fire hazard activities.

Table 399. Past harvest activity in Idaho Roadless Rule Areas

Activity	Acres
Community Protection Zone fuels reduction	373
Constructed fire lines	231
Post fire-roadside hazard tree removal	1,194
Total harvest in Idaho roadless areas	1798

Data Source: GIS data.

These 1,800 acres affected by past harvest activity in Idaho Roadless Rule Areas include projects with completed National Environmental Policy Act decisions that are underway, including the Orogrande fuels project where approximately 280 acres were logged; clearing for temporary road construction in the West Fork Crooked River Roadless Area; and the Lowell wild and urban interface project, with a signed decision to log 93 acres in the Rackliff-Gedney Roadless Area. Approximately 24.3 miles of fuel breaks were constructed in roadless areas during the major fire seasons of 2012 and 2015. Fuel breaks are typically 30-foot-wide vegetation free zones. Therefore, converting these fuel breaks to acres results in approximately 88 acres of fuel breaks within portions of seven roadless areas. Many of these have been rehabilitated since the fires. The exception is a large fuel break constructed in 2015 during the Blue Fire to protect the Dixie and Comstock communities. It is 5.9 miles long and roughly 200 feet wide, equaling 143 acres of cleared land.

The combined total of 88 acres from the narrower fires lines plus 143 acres for the Blue Fire line in the Gospel Roadless Area equals 231 acres total of cleared vegetation in recent years. Roadside hazard trees following wildfire have been cut to maintain safe public access within or adjacent to roadless areas. This timber removal is generally within 200 feet of existing open roads. This totaled approximately 1,200 acres in 17 different roadless areas following the 2012 and 2015 fire seasons.

Environmental Consequences

No roadless areas are proposed to change from being roadless areas. In some alternatives, some roadless areas fall within or are a part of other management areas. There are Idaho Roadless Rule areas within Management Area 1, Designated Wild and Scenic Rivers; and Management Area 2, Recommended Wilderness Areas, Suitable Wild and Scenic Rivers, Research Natural Areas, and Proposed Research Natural Areas. All inventoried roadless areas would continue to be managed in alignment with the prohibitions and exceptions of the 2008 Idaho Roadless Rule, but those inventoried roadless areas that are also in another management area designation within an alternative may have restrictions beyond those in the Idaho Roadless Rule due to Land Management Plan components for those management area designations. The Idaho Roadless Rule does not discuss all the activities that may affect other designations and is less potentially restrictive than the other designation. In cases where multiple management areas are present, the Idaho Roadless Rule direction will stand in conjunction with the other management area restrictions.

Effects of No Action Alternative

In the No Action Alternative, all 34 Idaho Roadless areas would continue to be managed under their current roadless rule themes. When the 2008 Idaho Roadless Rule was being developed, the roadless areas where current 1987 Forest Plans recommended wilderness areas overlapped were assigned to the wildland recreation theme (U.S. Department of Agriculture 2008c). This includes a portion of the Mallard-Larkins, Hoodoo, North Fork Spruce-White Sands, and Sneakfoot Meadows roadless areas. Additionally, Rapid River is currently managed under the wildland recreation theme. See Table 398 above for the management themes for all roadless areas. Table 400 shows the roadless rule area acres that overlap with one or more other land management designations or allocations. Due to overlapping allocations and rounding, total acreages may not match total acreages of roadless areas.

Table 400. Idaho Roadless Rule Area acres with other designations or allocations under the current forest plan.

Designation or Allocations	Acres
Designated Wild and Scenic River Corridor	26,113
Designated National Historic Landmark	28,391
Designated Research Natural Area	6,483
Eligible Wild and Scenic River Corridor	58,564
Recommended Wilderness	197,695
Total within other designations or allocations	**317,247**

Data Source: GIS data.

Effects Common to Action Alternatives

No roadless areas will be added or subtracted under the Land Management Plan. Likewise, no roadless area themes will be changed under the Land Management Plan. Across all alternatives, the roadless areas will remain the same; although overlapping land management allocations change under some alternatives, which could affect the management of the roadless areas. Table 401 shows the acres of roadless area theme retained across all alternatives. Specifics of which roadless area includes which themes can be found in Table 398.

Table 401. Idaho Roadless Rule Area acres by theme.

Theme	Acres
Backcountry/Restoration	835,649
Land Management Plan Special Area	38,287
Primitive	311,154
Special Area of Historic or Tribal Significance	49,341
Wild Land Recreation	247,133
Total	**1,481,565**

Data Source: GIS data.

Effects of Action Alternatives

Under all alternatives, Idaho Roadless Rule Areas will be managed according to the Idaho Roadless Rule and Management Area 2 unless they are overlain by other land allocations by alternative. Across alternatives, there are roadless areas that are also recommended for wilderness, found suitable for wild and scenic rivers, or are within proposed research areas. If the roadless area also falls within one or more of these land allocations, plan components associated with that land allocation would be applied to the roadless area in addition to the management restrictions associated with the roadless area's theme.

Table 402, Table 403, Table 404, and Table 405 display the roadless area acreages that are within other land allocations by alternative. Those roadless areas overlapping with existing designations are retained across all alternatives so there is no change to the number of acres within designated wilderness, designated wild and scenic rivers, designated national historic landmarks, or designated research natural areas. All revised plan alternatives have some acreage of roadless areas that do not have additional allocations. Where allocations overlap, the more protective components would apply. Due to overlapping allocations and rounding, total acreages may not match total acreages of roadless areas.

Table 402. Idaho Roadless Rule Area acres with other allocations under Alternative W.

Allocations	Acres
Suitable Wild and Scenic River Corridor	10,076
Recommended Wilderness	856,932
Proposed Research Natural Areas	307
Total within other designations or allocations	**867,315**

Data Source: GIS data.

Table 403. Idaho Roadless Rule Area acres with other allocations under Alternative X.

Allocations	Acres
Suitable Wild and Scenic River Corridor	0
Recommended Wilderness	0
Proposed Research Natural Areas	307
Total within other designations or allocations	**307**

Data Source: GIS data.

Table 404. Idaho Roadless Rule Area acres with other allocations under Alternative Y.

Allocations	Acres
Suitable Wild and Scenic River Corridor	51,756
Recommended Wilderness	309,306
Proposed Research Natural Areas	307
Total within other designations or allocations	**361,369**

Data Source: GIS data.

Table 405. Idaho Roadless Rule Area acres with other allocations under Alternative Z.

Allocations	Acres
Suitable Wild and Scenic River Corridor	24,952
Recommended Wilderness	567,887
Proposed Research Natural Areas	307
Total within other designations or allocations	**593,146**

Data Source: GIS data.

In addition to the impacts of overlapping land allocations, the roadless characteristics may be affected by alternatives and associated plan components. Some of the nine roadless characteristics have been discussed collectively due to their interconnected nature.

- High-quality or undisturbed soil, water, and air; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land: Approximately 38 percent of the Nez Perce-Clearwater, totaling 1,481,565 acres, is in Idaho Roadless Rule areas. All alternatives retain the Idaho Roadless Rule themes as they currently exist. These themes and the associated restrictions on management activities ensure most of the acres would have limited management activities that could significantly alter the landscape or interrupt natural processes. It is anticipated that less than 1 percent of the area will have any timber harvest over the life of the Land Management Plan. Even though the alternatives have various acreages available for summer motorized recreation, it is anticipated that few new motorized routes would be developed during this time period. Wildland fire is expected to be used as a tool for ecosystem restoration across this landscape. However, fire is recognized as a natural process that routinely occurs in, and affects, the vegetative conditions of the area. Therefore, all alternatives would provide large, undisturbed areas and ecological conditions that support high-quality or undisturbed soil, water, and air and overall ecosystem health to support indigenous plants and animals.
- Data Sources of public drinking water: There is no expected change across alternatives to the roadless characteristic for sources of public drinking water. In all alternatives, these characteristics would remain protected whether they are in a roadless area without an overlapping land allocation or not.
- Primitive, semi-primitive motorized, and semi-primitive non-motorized classes of dispersed recreation and natural-appearing landscapes with high scenic quality: All alternatives distribute more than 86 percent of the roadless rule areas as summer primitive, semi-primitive non-motorized, or semi-primitive motorized. Alternative X has the least amount with only 86 percent, which is 3 percent less than Alternative Y. The Preferred Alternative has the highest amount with 97 percent. Alternatives W, Y, and Z are comparable around 90 percent. The No Action Alternative is approximately 92 percent within these three classes.

Splitting these three recreation opportunity spectrum classes into non-motorized versus motorized reveals a bit more of a difference across alternatives.

Alternative W is very similar to the No Action Alternative regarding motorized versus non-motorized classes within roadless areas. Alternative W has 62 percent of the roadless areas in a non-motorized class and the No Action Alternative has 64 percent. Under Alternative W, all acres that are within the Backcountry/Restoration theme and not overlapped by recommended wilderness land allocations are classified in a motorized class. The overlapping recommended wilderness acres are classified into one of the non-motorized classes. Of all alternatives, Alternative W has the highest recommended wilderness acres, but these recommended wilderness acres are spread across the different roadless area themes so there are some large portions of Backcountry/Restoration roadless areas classified as motorized. The No Action Alternative has the fewest acres of recommended wilderness, except Alternative X, and the most acres of eligible or suitable wild and scenic rivers. Therefore, each of these alternatives has significant areas of overlapping allocations.

Alternative X, at 35 percent, and the Preferred Alternative, at 42 percent, provide the least amount of area restricted to non-motorized recreational activities. Alternative X has no recommended wilderness or suitable wild and scenic rivers, therefore no overlapping land allocations. Alternative X also allocates all backcountry restoration themed Idaho Roadless Areas as motorized.

Alternative Y, at 70 percent, and Alternative Z, at 76 percent, would provide the most area available for non-motorized recreation. This is due to the allocation of backcountry restoration themed Idaho Roadless Areas as non-motorized, except some existing motorized trail corridors and some specific loop opportunities that connect these existing motorized trails. Under these alternatives, recreationists seeking roadless experiences with motorized access would have the least available acres for their desired opportunity.

The Preferred Alternative has the fewest number of acres recommended for wilderness of all the action alternatives and second fewest number of acres of eligible and suitable wild and scenic rivers. The Preferred Alternative also allocates most of these Idaho Roadless Areas as motorized, except portions of Bighorn-Weitas, Weir-Post Office Creek, and Lochsa Face to provide a non-motorized corridor for wide-ranging wildlife species. The Preferred Alternative provides the closest balance between motorized, at 58 percent, and non-motorized, at 42 percent, of all the alternatives.

Although the alternatives allocate acres classified as motorized, this does not necessarily mean that there are motorized trails on the ground in these areas. A decision regarding establishing motorized trails within the suitable motorized recreation opportunity spectrum classes would occur in site-specific National Environmental Policy Act analysis and decisions.

Maps displaying the recreation opportunity spectrum and overlapping Idaho roadless rule areas can be found in Appendix A.

Table 406 displays the acres of Idaho roadless rule areas by recreation opportunity spectrum across the alternatives.

Table 406. Idaho Roadless Rule Areas acres by summer recreation opportunity spectrum classes and alternative.

Summer Recreation Opportunity Spectrum Class	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Primitive	126,276	30,350	30,350	47,028	47,028	0
Semi-primitive non-motorized	834,276	872,964	469,625	995,997	1,064,317	603,292
Non-motorized Total	960,552	903,314	499,975	1,043,025	1,111,345	603,292
Semi-primitive motorized	397,396	445,138	778,938	272,308	219,079	833,992
Roaded Natural	131,442	117,004	181,120	168,276	138,891	27,870
Rural	345	3,049	3,049	3,825	3,049	1,925
Motorized Total	529,183	565,191	963,107	444,409	361,019	863,787

Summer Recreation Opportunity Spectrum Class	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Total Roadless Area Acres	1,489,735	1,468,505	1,463,082	1,487,434	1,481,637	1,467,079

Data Source: Nez Perce-Clearwater GIS data.

All alternatives distribute more than 89 percent of the roadless rule areas as winter primitive, semi-primitive non-motorized, or semi-primitive motorized. At 89 percent, the No Action Alternative is the only alternative with less than 95 percent of the roadless areas in those three classes. When broken down by motorized versus non-motorized winter use, Alternatives X and Z both have 96 to 97 percent of the roadless areas suitable for over-snow vehicle use. This is due to a lack of recommended wilderness under Alternative X and the suitability of over-snow vehicle use in recommended wilderness areas within Alternative Z. As a result, very little of either alternative's roadless areas are unsuitable for over-snow use. The bulk of both alternatives is in semi-primitive motorized classification.

Alternative W, where the highest acres of recommended wilderness overlap with roadless areas, the smallest acreage is classified as motorized winter use at 41 percent. This is about 10 percent higher than the No Action Alternative.

The No Action Alternative classifies 32 percent of the roadless areas as one of the motorized classes. Therefore, all action alternatives would have more motorized recreation opportunity spectrum classified acres than the No Action Alternative. As with the summer classifications, those recreationists seeking both a roadless experience and a motorized winter experience would find them in all alternatives except for Alternative W, which has a higher number of acres classified as suitable for over-snow motorized use.

The Preferred Alternative is most like Alternative Y. Seventy-two percent of the Idaho Roadless Areas would be available for motorized recreation. This alternative has the fewest acres recommended for wilderness and the second fewest found suitable as wild and scenic rivers. Therefore, it has the least overlapping allocations of all the action alternatives. Most of the areas not recommended or suitable would be open for motorized recreation. Alternative Y has 77 percent in a motorized class, which is primarily influenced by the smaller acres of recommended wilderness in this alternative. In the roadless areas where the land allocations overlap over-snow vehicle use would not be suitable. Table 407 outlines the acres in each winter recreation opportunity spectrum class by alternative.

Table 407. Idaho Roadless Rule acres by winter recreation opportunity spectrum classes and alternative.

Winter Recreation Opportunity Spectrum Class	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Primitive	135,647	0	0	0	0	0
Semi-primitive non-motorized	882,827	864,915	39,994	345,028	39,994	399,453
Non-motorized Total	1,018,474	864,915	39,994	345,028	39,994	399,453
Semi-primitive motorized	311,511	574,765	1,370,642	1,075,839	1,375,899	1,026,111
Roaded Natural	159,407	28,833	52,453	66,601	56,721	41,514

Winter Recreation Opportunity Spectrum Class	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Rural	345	0	0	0	0	0
Motorized Total	471,263	603,598	1,423,095	1,142,440	1,432,620	1,067,625
Total Roadless Area Acres	1,489,737	1,468,513	1,463,089	1,487,468	1,472,614	1,467,078

Data Source: Nez Perce-Clearwater GIS data.

Reference landscapes: All alternatives retain the Idaho Roadless Area themes as they currently exist. These themes, and the associated restrictions on management activities, ensure that most of the areas will have limited management activities that would significantly alter the landscape or interrupt natural processes. It is anticipated that less than 1 percent of the area will have any timber harvest over the life of the Land Management Plan. Even though the alternatives have various acreages available for summer motorized recreation, it is anticipated that few new motorized routes would be developed during this period. Therefore, all alternatives provide ample opportunity for reference landscapes to compare those areas of the Nez Perce-Clearwater that will be primary for management activities.

Traditional cultural properties and sacred sites: There is no expected change across alternatives to the cultural properties and sacred site roadless characteristics. In all alternatives these characteristics would remain protected whether they are in a roadless area without an overlapping land allocation or not.

Cumulative Effects

Population growth and development increases the demand for public open space. Growth in Missoula and Ravalli counties in Montana, as well as Spokane, Washington, and various communities in north Idaho, is expected to increase recreational use of the plan area, including within inventoried roadless areas. The effects of urbanization and population growth on inventoried roadless areas and resource conditions are likely to be gradual and to extend beyond the planning period. This is not likely to change management of the roadless areas but may influence public demand for recreational opportunities within the roadless areas.

Inventoried roadless area characteristics are changed by development, such as roads, timber management, and recreation facilities. The development of roads and the management of vegetation has affected roadless areas in the past. However, since the passage of the Idaho Roadless Rule, development within roadless areas has been greatly reduced and all alternatives will retain the existing roadless character.

Effects to Resource from Other Resources

Management Area

The Idaho Roadless Rule limits road construction and reconstruction; timber cutting, sale and removal; and mineral activities to varying levels depending on the roadless area theme. Overlapping land allocations and designations and associated Management Area 1 and 2 plan components may further restrict activities within roadless areas.

Fire Management

In all alternatives, plan components for fire management encourage management response as appropriate to wildfires that may occur within inventory roadless areas and provide opportunities for natural fire to promote or enhance the ecological attributes of these areas.

Vegetative Management

Idaho Roadless Rule (36 CFR 294 Subpart C) (2008) direction must be followed for vegetative treatments within roadless areas where Idaho Roadless rules apply unless an overlapping land allocation further restricts the vegetation management options within the area.

The existing roadless character may be modified where timber harvest occurs. In Management Area 2, timber harvest is expected to be limited and generally would be done for purposes that would result in retaining the natural integrity of the ecosystem. Timber harvest that is done to reduce hazardous fuels may be more intensive and change the undeveloped character, to some degree, until the vegetation re-grows. This is most likely to happen on the edges of a roadless area nearer communities. Primitive recreation opportunities would be unchanged unless temporary roads are constructed, which is permitted under specific circumstances in the Idaho Roadless Areas in Management Area 2.

Under the Idaho Roadless Rule, temporary road construction is permitted in community protection zones or where there is a significant risk of wildland fire to at-risk communities or municipal water supply systems and there is no other reasonable option to reduce the risk to these communities or water systems. While there are about 36,200 acres within community protection zones (U.S. Department of Agriculture 2008e), it is unlikely that all acres would meet the criteria for no other option being available to reduce the risk to the communities or water systems. Determination of whether a temporary road would be necessary and would be the only reasonable option would be made at project level, site-specific National Environmental Policy Act analysis. If temporary roads are constructed, it may take longer for an area to return to its natural state than if timber harvest without temporary road construction were to take place.

Table 408 displays the Idaho Roadless Rule areas with community protection zones and their acreages within the community protection zones. As projected in the Final Environmental Impact Statement for the Idaho Roadless rule, a total of 1,500 acres over the first 15 years, or approximately 100 acres per year, are expected to be affected by timber harvest or road construction within the community protection zones (U.S. Department of Agriculture 2008d). Therefore, even if a portion of the community protection zone is determined to require temporary road construction or timber harvest to reduce the risk to a community or water system, the number of acres affected would remain relatively small.

Table 408. Idaho Roadless Rule Area acres with Backcountry/Restoration Community Protection Zones.

Idaho Roadless Rule Area Name	Community Protection Zone Acres
Lochsa Face	1,100
Moose Mountain	700
Clear Creek	2,400
Dixie Summit- Nut Hill	500
Gospel Hump	16,600
Lick Point	2,300
Little Slate Creek North	400
Mallard	3,600
West Fork Crooked River	5,500
West Meadow Creek	3,100

Idaho Roadless Rule Area Name	Community Protection Zone Acres
Total	**36,200**

Data Source: GIS data.

Recreation and Access

Recreational opportunities are managed through the management area plan components and the recreation opportunity spectrum class the lands are within. Within the roadless areas, most opportunities are primitive and semi-primitive recreation. The Idaho Roadless Rule does not restrict motorized or mechanized use within roadless areas, it restricts road building.

Therefore, travel management for motorized trails determines what is or is not allowed for motorized trails within the roadless areas. While motorized trails may be permissible by a roadless rule theme, they may not be appropriate to manage overlapping land allocations or may not be appropriate in site specific analysis for that roadless area.

All the alternatives distribute more than 89 percent of the roadless rule areas as winter primitive, semi-primitive non-motorized, or semi-primitive motorized. The No Action Alternative is the only alternative with less than 95 percent of the roadless areas in those three classes. Eighty-nine percent of the No Action Alternative is in one of those classes. Alternatives X and Z both have 96 percent of the roadless areas suitable for over-snow vehicle use. This is due to a lack of recommended wilderness under Alternative X and the suitability of over-snow vehicle use in recommended wilderness areas within Alternative Z. As a result, very little of either alternative's roadless areas are unsuitable for over-snow use. The bulk of both alternatives is in semi-primitive motorized classification.

Alternative Y has 77 percent in a winter motorized class, which is primarily influenced by the smaller acres of recommended wilderness in this alternative. In the roadless areas where the land allocations overlap over-snow vehicle use would not be suitable. Under Alternative W, where the highest acres of recommended wilderness overlap with roadless areas, the smallest acreage is classified as motorized winter use at 41 percent. This is about 10 percent higher than the No Action Alternative. The No Action Alternative classifies 32 percent of the roadless areas as one of the motorized classes. Therefore, all action alternatives would have more motorized recreation opportunity spectrum classified acres than the No Action Alternative. As with the summer classifications, those recreationists seeking both a roadless experience and a motorized winter experience would find them in all alternatives except for Alternative W, which has a higher number of acres classified as suitable for over-snow motorized use. Table 407 outlines the acres in each winter recreation opportunity spectrum class by alternative. The Preferred Alternative provides the most balance between summer motorized, 58 percent, and non-motorized, 42 percent, recreation but keeps 72 percent of the area open to winter motorized use.

Mineral Development

The Idaho Roadless Rule specifies permissible activities associated with mineral development, as well as saleable, locatable, and leasable minerals by theme. For those roadless areas where there is no overlapping land allocation, the applicable roadless theme direction would dictate whether mineral development is permissible. For those areas within other allocations in addition to roadless areas, the more restrictive permissions for mineral development would apply. Mineral development plan components do not vary by alternative except in association with overlapping land allocations.

Road construction and reconstruction associated with mining activities within Idaho Roadless areas may only be approved after evaluating other access options and must be conducted in a manner that minimizes effects on surface resources and must be consistent with land management plan components. Roads constructed or reconstructed within Idaho Roadless areas must be decommissioned upon completion of the project or expiration of the lease, permit, or other authorization. There would be no change to this direction for those roadless areas where no other overlapping land allocation exists. In these areas, if road construction is undertaken, the impacts to the roadless character and general low development character would be temporarily impacted during the duration of the project. After project completion, the effects of road building would likely be retained for a period until natural processes return the area to its un-roaded state.

Alternative W has the least amount of acreage open to mineral entry of the alternatives. This is in part due to the large amounts of recommended wilderness and suitable wild and scenic rivers. Therefore, the largest amount of roadless area acreage would also be restricted to mineral entry under Alternative W. Alternative X has the least amount of overlapping land allocations with roadless and would retain the largest number of acres where mineral entry could occur if the criteria of the roadless area there are met.

Mineral Materials

The Nez Perce-Clearwater will not authorize the sale of common variety mineral materials in Idaho Roadless Areas designated as Wild Land Recreation, Special Areas of Historic or Tribal Significance, or Primitive themes. The Nez Perce-Clearwater may authorize the use or sale of common variety mineral materials and associated road construction or reconstruction to access these mineral materials in Idaho Roadless Areas designated as Backcountry/Restoration only if the use of these mineral materials is incidental to an activity otherwise permissible in Backcountry/Restoration theme areas. In the case of roadless areas within the Backcountry/Restoration theme, if road construction is undertaken, the impacts to the roadless character and general low development character would be impacted during the duration of the incidental activity.

Locatable Minerals

The Idaho Roadless Rule does not affect mining activities conducted pursuant to the General Mining Law of 1872. There are no expected effects to the roadless areas by retention of this allowance with the roadless areas under a Land Management Plan.

Leasable Minerals

All roadless areas fall within Management Areas 1 and 2, which are not open for leasable mineral entry under all alternatives. Therefore, there is no expected effect to roadless areas from leasable minerals impacts.

Recommended Wilderness

There are many overlapping roadless areas and recommended wilderness areas. In these locations, the management decisions would follow the most restrictive of the two land allocations.

Under Alternatives W and Y and the Preferred Alternative, no motorized over-snow or mechanized travel would be suitable within recommended wilderness. As a result, those roadless areas that are recommended wilderness within these alternatives would also be found unsuitable for motorized over-snow and mechanized travel. Under Alternative Z, these uses would be found suitable. Under Alternative X, there is no recommended wilderness. Over-snow and mechanized travel being found suitable does not necessarily imply that those uses would occur or be allowed. Therefore, the finding that these uses are suitable within the roadless areas that are also recommended wilderness does not inherently allow motorized over-snow use or mechanized use within these areas. It is unknown whether these uses will be allowed in the future and whether they will increase or remain the same within the roadless areas.

Eligible and Suitable Wild and Scenic Rivers

There are many overlapping roadless areas and eligible and suitable rivers. In these locations the management decisions would follow the most restrictive of the two land allocations.

In all alternatives, motorized over-snow use, motorized travel, and mechanized travel is suitable, although in wild classified segments, the motorized use may only occur if the outstandingly remarkable values are protected. In cases where a wild segment overlaps with roadless area that is within a Backcountry/Restoration theme where a road may be permissible if it meets the criteria associated with resource protection, health, and safety of a permissible limited mineral exception, a road may be built that may alter and effect the low development of the roadless area and its roadless characteristics.

Summary of Consequences

The Idaho Roadless Rule roadless area boundaries and acreages are established as a part of the 2008 Idaho Roadless Rule and would not change in any alternative. These lands would continue to be managed under the guidance established by the 2008 Idaho Roadless Rule, with more restrictive guidance provided by additional designations or land allocations. Changes in the acres of overlapping land allocations and associated plan components may affect the roadless areas. These overlapping land allocations are more restrictive than the roadless rule permissions and prohibitions, which would generally reduce the development scale of the roadless areas (Table 409). Under Alternative X, only 5 percent of the roadless area acres are also in an overlapping land allocation. Under this alternative, most of the roadless area acres would be managed based on restrictions and permissions of the Idaho Roadless Rule. Under Alternative W, 61 percent of the roadless area acres also reside within another land allocation, which is likely to further restrict management actions within these roadless areas.

Table 409. Idaho Roadless Rule Area acres with other overlapping designations or allocations by alternative.

Overlapping	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Yes	315,230	897,794	68,978	424,671	653,129	366,900
No	1,166,335	583,771	1,412,587	1,056,894	828,436	1,114,736
Total	1,481,565	1,481,565	1,481,565	1,481,565	1,481,565	1,481,565
Percent Overlapping	21	61	5	29	44	25

Data Source: GIS data.

As with the overlapping land allocations, the other influence on the roadless rule areas are restrictions and opportunities based on the recreation opportunity spectrum class allocations. These are influenced by overlapping land allocations, as well as specific guidance based on alternatives. Table 410 presents the acres and percent of summer motorized and non-motorized acres within Idaho Roadless Rule areas across the alternatives. Under Alternative W, where the highest amount of overlapping land allocations exists, the motorized access opportunities are still quite high, only less than those of Alternative X where there is very little overlapping land allocation. Under Alternative Z and Alternative Y, the motorized access opportunities are both similar despite much larger differences in the overlapping land allocations. These two alternatives are also the two alternatives where the motorized classes are lower than the No Action Alternative and would reduce the suitable for motorized acres from the current condition. The Preferred Alternative provides the closest balance between summer motorized and non-motorized recreation use.

Table 410. Idaho Roadless Rule Area acres and percent in summer motorized or non-motorized recreation opportunity spectrum (ROS) class by alternative.

Lumped Summer ROS class	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Non-motorized acres	945,745	915,296	495,069	1,031,944	1,080,742	603,292
Non-motorized percent	64	62	33	70	73	42
Motorized acres	535,891	566,341	986,569	449,694	400,895	863,787
Motorized percent	36	38	67	30	27	58

Data Source: Nez Perce-Clearwater GIS data.

Table 411 presents the acres and percent of winter motorized and non-motorized acres within Idaho Roadless Rule areas across the alternatives. Under Alternative W, where the highest amount of overlapping land allocations exists, the motorized access opportunities are the lowest, just below half of the roadless areas. All other Action Alternatives have high acres of motorized recreation opportunity spectrum classes above 70 percent. Alternatives X and Z, despite having vastly different overlapping land allocations, have the same amount of motorized classified acres due to the caveat under Alternative Z for over-snow use in recommended wilderness areas. The Preferred Alternative provides approximately 72 percent of the area for winter motorized use. All action alternatives include more winter motorized classified acres than the No Action Alternative, providing more suitable acres for this use.

Table 411. Acres and percent of Idaho Roadless Rule Areas in winter motorized or non-motorized recreation opportunity spectrum classes by alternative across the Nez Perc-Clearwater.

Lumped Winter ROS class	No Action Alternative	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternative
Non-motorized acres	1,018,474	864,914	39,994	345,028	39,994	399,453
Non-motorized %	68%	58%	3%	23%	3%	28%
Motorized acres	471,262	603,598	1,423,095	1,142,439	1,432,546	1,026,111
Motorized %	32%	41%	96%	77%	96%	72%

Data Source: Nez Perce-Clearwater GIS data.

National Recreation Trails

The National Trails System Act of 1968 established not only a system of nationwide historic trails but also scenic and recreation trails. There are no scenic trails on the Nez Perce-Clearwater but there are eight recreation trails. Unlike historic and scenic trails, recreation trails are designated by the Secretary of the Department whose jurisdiction they fall into. The requirements for designation include connecting people to local resources and improving their quality of life.

Relevant Laws, Regulations, and Policy

National Trails System Act of October 2, 1968 (Pub. L. 90-543, 82 Stat. 919, as amended): This act was signed into law by President Lyndon B. Johnson on October 2, 1968. The purpose of the act was "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the nation." This act authorized three types of trails: 1) national scenic trails, 2) national recreation trails, and 3) connecting-and-side trails. In 1978, national historic trails were also added to the national trail system. National scenic trails and national historic trails may only be designated by Congress. National recreation trails may be designated by the Secretary of Interior or the Secretary of Agriculture. Through designation, these trails are recognized as part of the American National Trail System.

Trails for America in the 21st Century (Executive Order 13195): This order was signed by President Clinton in 2001 to achieve the common goal of better establishing and operating the American national system of trails. The order addresses development and management of national scenic and historic trails by protecting trail corridors.

Methodology

It is assumed that designated national recreation trails are retained and will be managed according to established reports, as well as laws, regulations, policy, and Land Management Plan components. This analysis assumes that there will be no changes to the designated national recreation trails or direction for the life of the plan. Under all alternatives, it is assumed that, when designations and land allocations overlap, management activities would follow the management direction for each land allocation, with the most restrictive direction applying when direction conflicts.

Information sources

Information sources include the Nez Perce-Clearwater geographic information system data for mapping, the INFRA database for trail design and maintenance information, and the National Recreation Trail Database by American Trails. Note that acreages used in the analysis, which are generated by the geographic information system, differ from the U.S. Forest Service official acreages due to refinement of mapping technology between designation and current day.

Analysis area

The geographic scope of the analysis is all National Forest System lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects. The temporal scope of the analysis is the anticipated life of the plan.

Indicators and Measures

The alternatives will be evaluated by comparing the effects of the Land Management Plan direction and how well it supports and protects the values associated with the designated national recreation trails.

Affected Environment

National recreation trails provide a variety of outdoor recreation uses. Table 412 displays the trails by area, name, and mileage on the Nez Perce-Clearwater and designated use by alternative.

Table 412. Nez Perce-Clearwater national recreation trails.

Trail Name	Trail Numbers	Designation Year	Miles	Designated Use
Anderson Butte, comprised of Boundary Trail and Kirks Fork Trail	835; 830	1979	14.80	Motorized
East Boyd-Glover Roundtop, comprised of East Boyd Trail and Glover Trail	703; 704	1979	23.00	Motorcycle
Colgate Licks Nature	1091	1979	1.25	Hiking
Meadow Creek	726	1980	15.00	Mechanized
Elk Creek Falls	740	1988	2.10	Mechanized
Idaho Giant Red Cedar	748	1988	0.50	Mechanized
White Pine Trail[1]	224; 224A; 224B	1979	3.62	Mechanized
Lochsa River Historic Trail[1]	unknown	1991	16.00	Mechanized
DeVoto Grove Interpretive[2]	789	NA	NA	NA

[1]Listed in the National Recreation Trail Database but their designation establishment reports have not been located.
[2]This trail is being considered for designation but has not been designated at this time.
Data source: INFRA database and National Recreation Trail Database by American Trails.

Environmental Consequences

Neither the existing Nez Perce nor Clearwater Forest Plans outlined plan components to address these specially designated trails. Therefore, if the No Action Alternative is selected, this lack of direction in the forest plans will be retained.

In all action alternatives, the plan components do not vary, nor do the location of trails vary by alternatives. Under the revised plan alternatives, the national recreation trails would meet the purpose of the National Trails System Act, which is "to promote the preservation of, public access to, travel within, and enjoyment and appreciation of the open-air, outdoor areas and historic resources of the Nation."

Cumulative Effects

The eight national recreation trails on the Nez Perce-Clearwater contribute to a system of over 1,200 individual national recreation trails in all 50 states. National recreation trails benefit from the prestige and increased visibility of being a part of the National Trail System. National recreation trails can often compete for additional funding or for state or federal grant opportunities.

Effects to Resource from Other Resources

Vegetation and Timber Management

Some stretches of the trails may be in areas where timber harvest could occur. This may alter the experience on the trail but is permissible.

Fire Management

Both natural and management-ignited fires could change the scenery visible from the trails, including charred vegetation in the short-term as well as re-growth in the longer term.

Watershed, Riparian, and Aquatic Management

The revised plan alternatives provide more detailed guidance than the current plans for protection of watersheds, riparian areas, and aquatic habitats. Plan components and activities related to aquatics would generally have little effect on national recreation trails. Where the trails cross or parallel streams, plan components related to riparian management zones would help maintain the natural character of those areas and complement the management of the trail.

Sustainable Recreation Management

In all alternatives, recreation opportunity spectrum settings are specified that are consistent with the desired conditions of the trails.

Scenery Management

In all alternatives, the Land Management Plan scenic integrity objectives may influence the design or the location of on-the-ground projects that would be visible from any of the listed critical viewing platforms. In those cases, design features or mitigations may be required to meet or exceed the assigned scenic integrity objective, which describes the maximum threshold of visual dominance and deviation from the surrounding scenic character.

Methodology

It is assumed that the scenic byway is retained. This analysis assumes that there will be no changes to the designation for the life of the plan. Under all alternatives, it is assumed that when designations and land allocations overlap, management activities would follow the management direction for each land allocation, with the most restrictive direction applying when direction conflicts.

Information sources

Information sources include the Nez Perce-Clearwater geographic information system data and the Federal Highway Administration America's Byways database.

Analysis Area

The geographic scope of the analysis is all National Forest System lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects. The temporal scope of the analysis is the anticipated life of the plan.

Indicators and Measures

The alternatives will be evaluated by comparing the effects of the Land Management Plan direction and how well it supports and protects the values associated with the scenic byway.

Affected Environment

Visitors enjoy this 202-mile-long route for its views like those seen by Lewis and Clark, as well for access to the Lochsa River and Clearwater River opportunities for fishing, swimming, boating, camping, wildlife viewing, and hiking. While this route is designated for the history of the Lewis and Clark Expedition, it travels through the Nez Perce Reservation and provides access to the Nee-Mee-Poo Trail and the Lolo National Historic Landmark to the north of U.S. Highway 12.

Mallard-Larkins Pioneer Area

The Mallard-Larking Pioneer Area is a portion of the Mallard-Larkins Roadless Area. There are no expected effects among alternatives than those associated with the Mallard-Larking Roadless Area.

Northwest Passage Scenic Byway

The Northwest Passage Scenic Byway follows U.S. Highway 12 from Lolo Pass at the Idaho and Montana border to Lewiston, Idaho, at the Idaho and Washington border. This scenic byway loosely follows the route of the Lewis and Clark Expedition as they journeyed past clear rivers, deep canyons, and rugged mountains 200 years ago in search of the Northwest Passage. This 202-mile-long road was designated as a Scenic Byway in 2002 and an All-American Road in 2005. This route was the last section of U.S. Highway 12 built. Work on the Lewiston to Lolo Pass section began in 1920 with the final section completed in 1962.

Environmental Consequences

The existing forest plans do not provide specific direction for the scenic byway. The land surrounding the byway is managed primarily via management direction for designated wild and scenic rivers. The road parallels the designated Middle Fork Clearwater Wild and Scenic River for most of its distance through the Nez Perce-Clearwater and falls within this corridor. The route would continue to be managed in association with the wild and scenic river corridor direction.

Cumulative Effects

There are no expected cumulative effects to the scenic byway different from those to the wild and scenic river corridor.

3.6.2 Recommended Areas

Changes between draft and final environmental impact statement

As described below, five indicators were selected to show how elements are affected by recommended wilderness management area allocation. These numerical values are presented in tables and narrative throughout this section. Readers will note that these numbers have changed from those in the Draft Environmental Impact Statement. The changes in trail miles for motorized and mechanized use are a result of more accurately identifying trails that are affected by recommended wilderness and Recreation Opportunity Spectrum classifications. Recognizable on-the-ground trail termini were identified that would aid in administration of any current or subsequent trail closures. They are not just those trail segments that are within the recommended wilderness areas. Acres suitable for winter motorized use were recalculated after adjustments to Recreation Opportunity Spectrum classifications and updated data including current closures on the Nez Perce-Clearwater.

Additionally, boundary adjustments were made to the Mallard-Larkins recommended wilderness that result in an increase of 5,146 acres.

These adjustments include the addition of the Bear Creek drainage from the Forest boundary and south to Minnesaka Creek. An addition of 3,943 acres. This area has no roads or system trails, appears completely affected by natural events without human intervention, offers undiminished opportunity for solitude or primitive and unconfined recreation, and contributes to ecosystem underrepresentation and potentially coastal disjunct species.

Another adjustment to the western boundary is the continuation of Dog Creek to its headwaters below Grassy Point as the boundary rather than the metes and bounds survey and ridgeline above. This includes an area that was heavily logged during the white-pine salvage era and has had repeated fires since. Although evidence of this activity is apparent these features are becoming more obscure as brush and tree species continue to grow and other ecological processes affect the area. Aside of the waning evidence of man, the geologic and ecologic characteristics of this area is consistent with the rest of the landscape of Goat Ridge, of which it is a part. Anticipated management of this area is for continued use of wildland fire to move the area toward its desired condition.

These areas are in Management Area 2 with a primitive roadless area classification, they are not in the suitable timber base and no commercial harvest is planned or anticipated throughout the life of the Plan. Manageability of the western boundary of the recommended wilderness is improved by these two additions which use readily apparent natural features to define the area rather than metes and bounds survey lines without regard to landform. In addition, the Bear Creek area is adjacent to a slender portion of recommended wilderness on the Idaho Panhandle National Forest. These additions complete the ecological connection along Goat Ridge and with the area north of the ridgeline from Mallard Peak to the Little North Fork Clearwater River; the boundary between Forests.

Recommended wilderness areas are lands that have wilderness characteristics and may be suitable for inclusion in the National Wilderness Preservation System. The starting point for this assessment of recommended wilderness areas for the Land Management Plan is the roadless areas as identified in the Idaho Roadless Rule. The Idaho Roadless Rule identified 34 roadless areas on the Nez Perce-Clearwater; 16 areas on the Clearwater National Forest and 18 areas on the Nez Perce National Forest. These lands are generally free from roads and other constructed features and have a high potential to provide solitude or a primitive and unconfined type of recreation. Recommended wilderness areas also provide for species diversity, protection of threatened and endangered species, protection of watersheds, scientific research and other ecological processes, and social values. Recommendation of wilderness through this Land Management Plan is a preliminary administrative determination and will receive further review and possible modification by the Chief of the Forest Service, the Secretary of Agriculture, and the President of the United States. Congress reserves the authority to make final decisions on wilderness designation.

The wilderness recommendation process occurs in four primary steps: inventory, evaluation, analysis, and recommendation. The wilderness inventory, evaluation, and analysis process are included within Appendix E. Recommended wildernesses considered in this Land Management Plan process will vary by alternative. Table 413 shows recommended wilderness areas by alternative.

Table 413. Recommended wilderness areas by alternative (Alt)

Recommended Wilderness[2]	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Bighorn Weitas	No	Yes	No	No	No	No
East Meadow Creek	No	Yes	No	Yes	Yes	Yes
Hoodoo	Yes	Yes	No	Yes	Yes	Yes
Mallard Larkins	Yes	Yes	No	Yes	Yes	Yes
Meadow Creek- Upper North Fork	No	Yes	No	No	Yes	No
Moose Mountain	No	Yes	No	No	No	No
North Fork Spruce- White Sand	No	Yes	No	No	Yes	No
North Lochsa Slope	No	Yes	No	No	No	No
Pot Mountain	No	No	No	No	Yes	No
Rapid River	No	Yes	No	Yes	Yes	No
Rawhide	No	No	No	No	Yes	No
Sneakfoot Meadows	Yes	Yes	No	No	Yes	No
West Meadow Creek	No	No	No	No	Yes	Yes
Elk Summit[1]	Yes[1]	Yes	No	No	Yes	No
Lakes[1]	Yes[1]	Yes	No	No	Yes	No
Storm Creek[1]	Yes[1]	Yes	No	No	Yes	No

[1]These recommended wilderness areas listed in the 1987 Clearwater Forest management plan (No Action Alternative) have changed names or been absorbed into other recommended wilderness areas. Elk Summit, Lakes, and Storm Creek are now part of the North Fork Spruce-White Sand Idaho Roadless Area and recommended wilderness under Alternatives No Action, W and Z.

Data Source: Recommended Wilderness Process Appendix E.

[2]Depending on the alternative, recommended wilderness may include all or portions of Idaho Roadless Areas.

Relevant Laws, Regulations, and Policy

36 CFR § **219 Sec. 219.7(v)**: This regulation requires identification and evaluation of lands that may be suitable for inclusion in the National Wilderness Preservation System and determines whether to recommend any such lands for wilderness designation.

Forest Service Manual 1923 – Wilderness Evaluation, 1923.03 – Policy: This manual directs the agency that all areas that may be suitable for inclusion in the National Wilderness Preservation System must be inventoried and evaluated for recommendation as designated wilderness areas during plan development or revision.

Forest Service Handbook 1909.12 Chap. 70: This direction contains the framework for evaluating and recommending lands for inclusion in the National Wilderness Preservation System.

Methodology

The directives contain the framework for the wilderness recommendation process. Forest Service Handbook 1909.12, Chapter 70 identifies a four-step process – Inventory, Evaluation, Analysis, and Recommendation. The primary function of the identification and inventory step is to identify all lands within the plan area that may have wilderness characteristics, as defined in the Wilderness Act of 1964, using a transparent process. In the inventory step the most recent roadless inventory was used, following the names and boundaries of areas as described in the Idaho Roadless Rule. Although some of these areas had different names and configurations in the past, the names and acreages from the Idaho Roadless Rule will be referred to within this report. Lands included in the inventory were documented and identified on a map and were carried forward for further evaluation.

An interactive map was made available on the Nez Perce-Clearwater's website displaying an initial identification and inventory of lands that may be suitable for inclusion in the National Wilderness Preservation System. The wilderness inventory area, comprised of 1,481,637 acres, was separated into 34 named areas. The methodology specifically looked at inventoried roadless areas managed by the Nez Perce-Clearwater.

Thirty-three out of the 34 Idaho Roadless Areas went through a wilderness evaluation. Appendix E documents the wilderness evaluation worksheet and narrative for each area. The Lolo Creek roadless area has a total acreage of 17,500 acres but only 100 acres are managed by the Nez Perce-Clearwater, with the remainder managed by the Lolo National Forest. For this reason, the Lolo Creek roadless area will be managed consistent with the prescriptions decided upon by the Lolo National Forest and was dropped from this evaluation.

Consistent with Forest Service manual direction, an analysis of that data was conducted to determine the degree to which each area met the five wilderness characteristics as described in the Wilderness Act of 1964; therefore warranting further consideration for recommendation as wilderness through this Land Management Plan process. The analysis presents a synopsis of the data for each roadless area as a rationale to move an area forward or to drop it from further consideration. See Appendix E for further explanation.

Measurement Indicators

The indicators were developed based on the issue statements developed from the scoping comments and comments made to the draft wilderness evaluation to show how elements are affected by recommended wilderness management area allocation:

- Changes in wheeled motorized opportunities compared with the existing condition
- Changes in motorized over-snow vehicle opportunities compared with the existing condition
- Changes in trail miles that allow mechanized transport compared with the existing condition
- Changes in amount of commercial use of permanent structures
- Acres of underrepresented ecological groups of the National Wilderness Preservation System

Analysis area

The geographic scope of the analysis is the National Forest System lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundaries form the geographic scope for cumulative effects. The temporal scope of the analysis is the life of the plan.

Affected Environment

The 1987 Forest Plans recommended about 198,200 acres for wilderness (Table 414) all within the boundaries of the Clearwater National Forest. More recent GIS data shows the area as 197,695 acres. These areas are Elk Summit, Hoodoo, Lakes, Mallard Larkins, Sneakfoot Meadows, and Storm Creek. There were no wilderness recommendations in the Nez Perce National Forest Plan.

Table 414. Existing recommended wilderness area 1987 Forest Plan and GIS acres

Recommended Wilderness Area	1987 Forest Plan Acres	GIS Acres
Elk Summit	3,300	3,453
Hoodoo	113,000	111,988

Recommended Wilderness Area	1987 Forest Plan Acres	GIS Acres
Lakes	4,000	3,500
Mallard- Larkins	66,700	66,377
Sneakfoot Meadows	8,700	9,465
Storm Creek	2,500	2,912
Totals	198,200	197,695

Data Source: 1987 Forest Plans and Nez Perce-Clearwater GIS data.

The 1987 Clearwater National Forest plan standards for recommended wilderness state that the management standards for these areas will meet a visual quality objective of preservation and will manage all uses to maintain wilderness qualities and retain semi-primitive settings. Travel management in existing recommended wilderness areas was addressed in the Clearwater Travel Planning Record of Decision, dated October 31, 2017. Under this direction, areas that are currently managed as recommended wilderness prohibit mechanized transport, including mountain bicycles or game carts, and motorized equipment, including e-bikes and motorized over-snow vehicles. Road construction, timber harvest, and mineral activities may only be allowed to the extent permitted in the Idaho Roadless Rule.

Both designated and recommended Wilderness is recognized as one way in which underrepresented ecosystems are protected (Loomis and Echohawk 2002), as well as a way to potentially protect more of these ecosystems. An initial study (Loomis and Echohawk 2002) in 1998 and a subsequent one in 2015 (Dietz et al. 2015) examined how well the National Wilderness Preservation System captures the diversity of ecosystems across the United States. These two studies evaluated the province-level eco-regional boundaries described by (Bailey 1995) and Aycrigg et.al. (2013) finer scale vegetation communities.

The Wilderness Society used these papers to assess the Nez Perce-Clearwater Idaho Roadless Rule Areas and their representation of underrepresented ecosystems as part of the recommended wilderness process. Appendix E lists the nationally underrepresented ecosystems in these portions of the Nez Perce-Clearwater and was used as part of the evaluating criteria as described in Appendix E. As shown in Table 415, about 70 percent of the Nez Perce-Clearwater is within an underrepresented ecosystem. Of this, 24 percent are already within the National Wilderness System in one of the designated wildernesses. Another 36 percent are within designated Idaho roadless rule areas and a final 3 percent are within the 1987 forest plan recommended wilderness areas. Some of the acres within Idaho roadless rule areas are also recommended wilderness so the totals do not equal one hundred percent of the forestwide acres but most of the underrepresented acres on the Nez Perce-Clearwater are within one of these existing designations.

Table 415. Acres and percent of underrepresented ecological groups forestwide by land allocation

Land Allocation	Acres	Percent
Designated wilderness	649,363	24%
Idaho roadless rule areas	962,275	36%
Recommended wilderness	92,855	3%
Forestwide	2,677,378	70%[1]

[1]Percent total Nez Perce-Clearwater Forest that is within an underrepresented ecosystem.

Data Source: The Wilderness Society data analysis

Environmental Consequences

Effects under the No Action Alternative

The No Action Alternative would retain the recommended wildernesses as described in the 1987 Clearwater Forest Plan as per the Clearwater Travel Management decisions, dated January 2012 and October 2017. There are no recommended wilderness areas described in the 1987 Nez Perce Forest Plan. Table 416 lists the indicators that were used to evaluate effects to the existing recommended wilderness areas, which will be compared to the action alternatives. There are a total of 197,695 acres within these six recommended wilderness areas.

Table 416. Indicator values for recommended wilderness under the No Action Alternative

Indicator	Value
Acres of recommended wilderness	197,695
Change in miles of trails open to wheeled motorized use	0
Change in acreage of suitable motorized over-snow vehicle areas	0
Change in miles of trails open to nonmotorized mechanized transportation	0
Change in commercial rental (buildings and structures) units	0
Acres of underrepresented ecological groups of the National Wilderness Preservation System	94,335

Data Source: Nez Perce-Clearwater GIS data and The Wilderness Society data.

There would be no change to any of the indicators to assess the effects to recommended wilderness across alternatives. The fifth indicator, underrepresented acres within recommended wilderness, is not a measure of change across alternatives and was not part of the 1987 forest plan. It is therefore listed in the table by the acres of underrepresented ecosystems within each of the existing recommended wilderness areas. Under the existing condition within these areas there are 328 miles of trail closed to motorized and mechanized transport, and 197,695 acres closed to motorized over-snow use. There would be no changes to these indicators under the No Action alternative.

The 197,695 acres of recommended wilderness when combined with the 1,139,059 acres of designated wilderness would bring the total acreage to about 1,336,754 acres or about 33.9 percent of the Nez Perce-Clearwater that is in designated or recommended wilderness. Forest Service Handbook 1909.12, Chapter 70 states, "All plan components applicable to a recommended wilderness must protect and maintain the social and ecological characteristics that provide the basis for wilderness recommendation." Consistency with this direction and Land Management Plan components, would provide a primitive setting on approximately 34 percent of the Nez Perce-Clearwater where wheeled motorized use, motorized over-snow vehicle use, and mechanized transport, including bicycles and game carts, would be prohibited.

The No Action Alternative includes approximately 94,335 acres of underrepresented ecological groups or about three percent of the available underrepresented ecosystem acres on the Nez Perce-Clearwater. If added to the acres of underrepresented ecosystems in designated wilderness 27 percent of the forestwide underrepresented acres would be within one of these allocations.

The six recommended wilderness areas that would be retained under the No Action Alternative are listed in Table 417, with their indicator values. All recommended wilderness areas are on the

Clearwater National Forest. There would be no recommended wilderness areas on the Nez Perce National Forest under this alternative.

Table 417. No Action Alternative indicator values by recommended wilderness area

Recommended Wilderness Area	Indicator 1 (acres)	Indicator 2 (miles)	Indicator 3 (acres)	Indicator 4 (miles)	Indicator 5 (Number)	Indicator 6 (acres)
Elk Summit	3,453	0	0	0	0	2,279
Hoodoo	111,988	0	0	0	0	46,810
Lakes	3,500	0	0	0	0	2,310
Mallard-Larkins	66,377	0	0	0	0	37,569
Sneakfoot Meadows	9,465	0	0	0	0	3,445
Storm Creek	2,912	0	0	0	0	1,922
Total	197,695	0	0	0	0	94,335

Indicator 1 = acres of recommended wilderness. Indicator 2=change in miles of trails open to wheeled motor use. Indicator 3=change in acreage of suitable motorized over-snow vehicle areas. Indicator 4=change in miles of trails open to mechanized transportation. Indicator 5=change in commercial rental (buildings and structures) units. Indicator 6=Acres of underrepresented ecological groups of the National Wilderness Preservation System.

Data Source: Nez Perce-Clearwater GIS data and The Wilderness Society data.

Wilderness Characteristics under the No Action Alternative

This section provides a brief narrative of the wilderness characteristics for recommended wilderness areas. Refer to the Final Environmental Impact Statement Appendix E for a more detailed description of these characteristics for each roadless area:

- Apparent Naturalness
- Solitude and Primitive and Unconfined Recreation
- Practicability of areas less than 5,000 acres – All areas analyzed in the final environmental impact statement, except Storm Creek in the No Action Alternative, are greater than 5,000 acres and are not discussed in this section
- Presence of Ecological, Geological or other features of Scientific, Educational, Scenic or Historical Value
- Manageability to Preserve Wilderness Characteristics

No Action Alternative – 197,695 acres

Hoodoo, Mallard Larkins, Sneakfoot Meadows (including Lakes and Elk Summit), and Storm Creek

This is the only alternative that identifies Storm Creek as a separate area because it was identified this way in the 1987 Forest Plan. All other alternatives incorporate Storm Creek, Lakes, and Elk Summit in the North Fork Spruce-White Sand roadless area.

Apparent Naturalness

The Hoodoo, Mallard Larkins, and Sneakfoot Meadows (including the Lakes and Elk Summit areas), and Storm Creek roadless areas retain a high degree of natural integrity and appearance with few man-made developments or evidence of timber harvest. The Mallard Larkins area includes two fire lookouts, one rental cabin, and a special use Snotel site that detracts from its apparent naturalness when a visitor is in proximity to them. Except for these minor intrusions these three areas appear natural, ecological systems appear to be functioning, and the areas retain their primeval character.

Solitude, Primitive, and Unconfined Recreation

Generally, these areas provide ample opportunity for solitude and primitive and unconfined recreation. However, each of the areas have some sites that attract visitors and often have multiple people at the same time. When this occurs, the opportunity for solitude in or near these areas, or on trails that access them, is reduced. Hoodoo is bounded by Forest Road #581, a popular road on the southern side. Sneakfoot Meadows is bounded by Forest Road #360 to the east and Forest Road #362 on the northwest, as well as Forest Road #358 that penetrates the area. Mallard Larkins has roads that penetrate the area and have been excluded from the roadless area. Noise from these roads reduces solitude for short distances into the areas. Topography and vegetative screening affect how far these impacts occur. Each of these areas have viewpoints that offer broad vistas beyond the area's boundary. Many of these vistas include evidence of timber harvest, roads, or human habitation that reduces the sense of solitude or primitive and unconfined recreation. These factors are inconsistent with wilderness character, reduce the apparent naturalness and the opportunity for quiet solitude or primitive and unconfined recreation, and may disrupt use of an area by some wildlife species where they occur. These activities could also increase the need for management actions to improve education, respect for, and compliance with wilderness values and boundaries. Other than these localized exceptions and intrusions, the vast majority of these 197,695 acres offer an opportunity for solitude, self-reliance, challenge, and adventure without the evidence of human presence or manipulation.

Presence of Ecological, Geological, or Other Features of Scientific, Educational, Scenic, or Historical Value

From one-third to over half of each of these areas supports ecosystems that are underrepresented in the national wilderness preservation system. Hoodoo has the most acres of modeled whitebark pine habitat of any of the roadless areas. The other areas also contain significant modeled whitebark pine habitat. Approximately two-thirds of each area is within the natural range of variability and most watersheds are functioning properly; Hoodoo does have portions of watersheds functioning at risk. High mountain peaks, rugged rock formations, and high mountain lakes are geological features of interest that add to the high scenic character and overall wilderness character of these areas.

Manageability to Preserve Wilderness Characteristics

A significant portion of these three roadless areas are adjacent to other roadless areas. Additionally, approximately one-third of Sneakfoot Meadows is adjacent to the Selway Bitterroot Wilderness. More than half of Mallard Larkins and almost half of Hoodoo is adjacent to front country or other ownership. A minimum number of mining claims and no grazing occur in these areas. Over-snow use is historic and well established in portions of Hoodoo and Sneakfoot Meadows. Mountain bike use is also high in portions of Hoodoo, moderate in portions of Mallard Larkins, and to a lesser degree in Sneakfoot Meadows. Summer motorized activity in these areas occurs but is minimal and not well established. These motorized and mechanized activities have continued in these areas despite being administratively prohibited in Hoodoo, Mallard-Larkins and Sneakfoot Meadows since 2012.

The boundaries with front country could increase the intrusion of sights and sounds into the roadless areas as management activities occur proximate to those areas. This increases the opportunity to see timber harvest, roads, and human habitation from viewpoints within the area. This would reduce the opportunity for solitude and primitive and unconfined recreation. The presence of motorized winter and summer mechanized activity also increases potential intrusion of sights and sounds not compatible with a wilderness experience.

Effects that Vary by Action Alternative

Alternative W - 856,932 acres

Alternative W includes 10 areas as recommended wilderness totaling 856,932 acres. These areas would be managed in a summer and winter primitive or semi-primitive non-motorized recreation opportunity spectrum setting. Motorized equipment and mechanized travel would not be suitable, including aircraft and unmanned aerial systems, except for administrative use by federal, state, and local agencies.

Additionally, the construction of new structures or buildings would not be suitable unless explicitly needed to protect resources or administer the area. The maintenance of existing buildings and structures, and measures to protect those buildings and structures, would be allowed. Replacement of existing buildings, unless explicitly needed to protect resources or administer the area, would not be allowed. Continued commercial use of the four rental cabins – Liz Butte Cabin, Liz Creek Cabin, Scurvy Mountain Lookout, and Meadow Creek Station – would be allowed under this alternative.

There are several existing roads open to high clearance vehicles within recommended wilderness areas under this alternative. The East Meadow Creek recommended wilderness area contains two roads – Forest Service Road 285 Elk Mountain, extending 8.9 miles, and Forest Service Road 357 Running Creek, covering 10.4 miles – that would be excluded from the recommended wilderness area and remain open to motorized travel. The Sneakfoot Meadows recommended wilderness area has one road, Forest Service Road 358, which would remain open to motorized vehicles leading into Kooskooskia Meadows for 2.1 miles, after-which the trail is non-motorized. Within the Hoodoo recommended wilderness area, the Fish Lake trail would remain open to motorized travel for approximately 4.5 miles, after-which the trail is non-motorized. This motorized route is excluded from the recommended wilderness areas.

Alternative W finds use of motorized equipment and mechanical transport to be suitable for administrative use by agency personnel, partners, and members of the public under agreement with the Nez Perce-Clearwater that preserves or improves the wilderness characteristics of the area and to maintain infrastructure and trails. All other motorized equipment and mechanized travel use would be prohibited by the public.

There are 1,110 miles of system trails associated with recommended wilderness areas under Alternative W, with 285 miles currently open to motorized travel. Including the motorized trails, there are 648 miles that are currently open to nonmotorized mechanical transport. Table 418 describes the summer and winter recreation opportunity spectrum classes within the recommended wilderness areas of Alternative W. Under this alternative there are no acres in a summer or winter recreation opportunity motorized class. Mechanized transport would also be not-suitable Therefore, the motorized and mechanized activities and uses that are not allowed in the forest plan's record of decision could begin to be removed after site-specific analysis is completed. Mechanical transport on system trails within recommended wilderness areas could decrease from 648 miles to 0 miles through this process. Likewise, wheeled motorized use on designated routes could decrease from 285miles to 0 miles within recommended wilderness areas after site-specific analysis is completed. Finally, the winter motorized suitable acres in the recommended wilderness areas could also be reduced to zero under this alternative.

Table 418. Acres of recommended wilderness in summer and winter recreation opportunity spectrum classes (ROS) under Alternative W

Category	Summer ROS acres	Winter ROS acres
Primitive	24,080	0
Semi-primitive non-motorized	832,852	856,932
Non-motorized Total	856,932	856,932
Semi-primitive motorized	0	0
Roaded Natural	0	0
Rural	0	0
Motorized Total	0	0
Total Acres	856,932	856,932

Data Source: Nez Perce-Clearwater GIS data.

This alternative would result in the greatest reduction to miles suitable for summer wheeled motorized use and mechanized transport, and least acres suitable for motorized over-snow vehicle use on the Nez Perce-Clearwater. Displacement of both wheeled and over-snow motorized vehicles and mechanized travel on the Nez Perce-Clearwater would occur if a site-specific decision prohibited these uses. Should these closures occur, use might become concentrated in areas that remain suitable for motorized wheeled and motorized over-snow vehicle, causing some users to have negative experiences or go elsewhere to an off-forest location or to other lands open to motorized use and mechanical transport. Areas allowing for motorized over-snow vehicle use would decrease by 639,514 acres as a result of acres of recommended wilderness. Total acres suitable for winter over-snow motorized access across the Forest, by these and other changes, would decrease by 578,556 acres as compared to the No Action alternative.

In this alternative, the construction of new buildings or structures would not be allowed unless explicitly needed to protect resources or administer the area. Maintenance of current buildings and structures, and measures to protect those buildings and structures, would be permitted. The replacement of existing buildings, unless explicitly needed to protect resources or administer the area, would not be allowed.

Alternative W includes 503,305 acres of underrepresented ecological groups, which is higher than all the other alternatives. This is the amount this alternative would add of underrepresented ecological groups to the National Wilderness Preservation System if these areas were designated as wilderness.

The total amount of recommended wilderness when combined with existing designated wilderness, 1,139,059 acres, would bring the total acreage to about 1,995,991 acres or about 50.67 percent of the Nez Perce-Clearwater that is in designated or recommended wilderness. These acres would provide a primitive and/or semi-primitive non-motorized setting on the Nez Perce-Clearwater, where wheeled motorized use, motorized over-snow vehicle use, and mechanical transport, such as bicycles and game carts, would decrease. The primitive setting is characterized by large, remote, wild, and predominantly unmodified landscapes with no motorized activity and a lower probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few facilities or developments. Semi-primitive non-motorized settings are characterized by areas of the Nez Perce-Clearwater that are managed for non-motorized use. Uses may include hiking and equestrian trails, mountain bikes, and other non-motorized mechanized vehicles. Rustic facilities may be present, usually for administrative or resource protection purposes. These areas provide for the opportunity for exploration, challenge, and self-reliance. This alternative provides opportunity for a primitive or semi-primitive non-motorized recreation opportunity spectrum setting through recommending 856,932 acres for wilderness designation.

Alternative W has more recommended wilderness than the other alternatives (Table 419 and Table 420). There would be a five-year objective for removing those activities or uses that are not allowed in the Land Management Plan's record of decision.

Table 419. Change in indicator values under Alternative W

Indicator	Value
Acres of recommended wilderness	856,932
Change in miles of trails open to wheeled motorized use	-285
Change in acreage of suitable motorized over-snow vehicle areas	-578,556*
Change in miles of trails open to nonmotorized mechanized transportation	-648
Change in commercial rental (buildings and structures) units	0
Acres of underrepresented ecological groups of the National Wilderness Preservation System	503,305

Data Source: Nez Perce-Clearwater GIS data.

*Value includes changes by ROS in all Idaho Roadless Areas

Table 420. Alternative W indicator values by recommended wilderness area

Recommended Wilderness Area	Indicator 1 (acres)	Indicator 2 (miles)	Indicator 3 (acres)	Indicator 4 (miles)	Indicator 5 (Number)	Indicator 6 (acres)
Bighorn Weitas	254,901	-152	-254,901	-353	0	159,823
East Meadow Creek	96,856	-40	-96,856	-61	0	65,572
Hoodoo	151,874	-2	-39,886	+12	0	63,483
Mallard Larkins	90,849	0	-24,472	-4	0	51,421
Meadow Creek- Upper North Fork	43,075	0	-43,075	-26	0	17,833
Moose Mountain	22,023	-2	-22,023	-13	0	12,003
North Fork Spruce Creek-White Sand	35,424	-1	-25,559	-3	0	23,380
North Lochsa Slope	117,659	-88	-117,659	-155	0	85,656
Rapid River	20,941	0	-1,218	-45	0	15,642
Sneakfoot Meadows	23,330	0	-13,865	0	0	8,492
Totals	856,932	-285	-639,514	-648	0	503,305

Indicator 1 = acres of recommended wilderness. Indicator 2=change in miles of trails open to wheeled motor use. Indicator 3=change in acreage of suitable motorized over-snow vehicle areas. Indicator 4=change in miles of trails open to mechanized transportation. Indicator 5=change in commercial rental (buildings and structures) units. Indicator 6=Acres of underrepresented ecological groups of the National Wilderness Preservation System.

Data Source: Nez Perce-Clearwater GIS data.

Wilderness Characteristics under Action Alternatives

Alternative W – 856,932 acres

Bighorn Weitas, East Meadow Creek, Hoodoo, Mallard Larkins, Meadow Creek–Upper North Fork, Moose Mountain, North Fork Spruce–White Sand, North Lochsa Slope, Rapid River, Sneakfoot Meadows

Apparent Naturalness

Bighorn Weitas has three historic lookout towers and two other cabins. Mallard Larkins has two fire lookouts, one rental cabin, and a special use SNOTEL site. The Meadow Creek Ranger Station is in the East Meadow Creek area and is used as a recreation rental. In addition, there are 22 trail bridges scattered among these areas. The Bighorn Weitas area is surrounded by, and adjacent to, roads and has some cherry-stemmed roads that intrude into the area. East Meadow Creek includes 19 miles of low-standard roads either adjacent to or bisecting the area. Mallard Larkins has cherry-stemmed roads that penetrate and have been excluded from the roadless area. There are a significant number of acres with noxious weeds, generally associated with these roads and some trails. Grazing is nonexistent in all areas except Rapid River, which is completely in a grazing allotment. Many of the areas have had roadside hazard tree removal along these roads but no other timber harvest is readily apparent. Except for these man-made roads, structures, and associated impacts, these 856,932 acres appear natural with ecosystems functioning without human influence.

Solitude, Primitive and Unconfined Recreation

Most acres in these areas are in either a primitive or semi-primitive non-motorized recreation opportunity class. However, due to their adjacency to open roads, they also include semi-primitive motorized or roaded natural recreation opportunity classes. Hoodoo has one motorized trail penetrating the interior. This is a six-mile-long all-terrain vehicle trail to Fish Lake that is cherry-stemmed out of the roadless area. Hoodoo also has Forest Road #581B, approximately 1 mile long, that accesses Toboggan Hill. It is also cherry-stemmed out of the roadless area. Due to topography and dense vegetation, with few exceptions, the sights and sounds associated with these roads and trails do not penetrate far into the areas. North Lochsa Slope is a notable exception with noise from Forest Road #500 and with U.S. Highway 12 obvious in much of the area. Hiking, backpacking/camping, horseback riding, hunting, fishing, and sightseeing are popular activities. Winter motorized use is popular and well established in Bighorn Weitas, Hoodoo, North Fork Spruce–White Sand, and Sneakfoot Meadows, despite administrative closure to this activity in Hoodoo and Sneakfoot Meadow. Mountain biking is becoming increasingly popular in these areas as well. Moose Mountain has little to no winter motorized use or mountain biking. The presence of man-made structures, adjacent and interior roads, motorized trails, winter motorized activities, and the overall popularity of these areas for primitive recreation affect portions of these areas. Most of these 856,932 acres, however, offer ample opportunity for solitude, unconfined recreation, adventure, and challenge.

Presence of Ecological, Geological or Other Features of Scientific, Educational, Scenic or Historical Value

Most of the recommended wilderness areas contain ecosystems that are underrepresented in the national wilderness preservation system and about two-thirds of the acres are within their natural range of variability. East Meadow Creek and Hoodoo include substantial acreage that is modeled whitebark pine habitat, while the others only have some whitebark pine habitat. Mallard Larkins supports one of the largest Rocky Mountain goat populations in northern Idaho; Hoodoo also supports a goat population. Generally, water quality is good, and watersheds are functioning properly, except in North Lochsa Slope which includes six miles of stream that are impaired due to high water temperature. The East Meadow Creek area borders Meadow Creek, a principle tributary of the Selway River, which is recognized as an important watershed, supporting Chinook salmon, steelhead, bull trout, red band trout, and westslope cutthroat trout.

The Lolo Trail National Historic Landmark separates Bighorn Weitas and North Lochsa Slope and is a corridor of historic and Nez Perce significance. Bighorn Weitas, East Meadow Creek, North Lochsa Slope, and Sneakfoot Meadows all contain research natural areas. The North Lochsa Slope and Rapid River areas include or are bounded by a designated wild and scenic river. These features add to the scenic, historic, and cultural values of these areas that draw visitors specifically to enjoy them.

Manageability to Preserve Wilderness Characteristics

Bighorn-Weitas, Hoodoo, Mallard Larkins, Meadow Creek-Upper North Fork, and Rapid River share a large portion of their boundary with front country. Approximately one-third of the boundaries of Moose Mountain, North Fork Spruce-White Sand, and North Lochsa Slope are adjacent to front country. East Meadow Creek and most of Sneakfoot Meadows are bounded by wilderness or other roadless areas. Sights and sounds from activities in the front country can be apparent in some locations in roadless areas, reducing the opportunity for solitude and primitive recreation.

Bighorn Weitas, Hoodoo, North Fork Spruce-White Sand, and Sneakfoot Meadows are popular snowmobile areas. Mountain biking is also popular in Bighorn Weitas, Hoodoo, Mallard Larkins, North Lochsa Slope, and to a lesser degree in North Fork Spruce-White Sand and Sneakfoot Meadows. Snowmobiling and mountain biking are continuing in all these areas despite being administratively prohibited in Hoodoo and Sneakfoot Meadows. These activities are inconsistent with wilderness character and reduce the apparent naturalness and the opportunity for solitude or primitive and unconfined recreation and may disrupt use of an area by some wildlife species where they occur. These activities could also increase the need for management actions to improve education of, respect for, and compliance with wilderness values and boundaries.

Alternative X – 0 acres

There are no areas recommended for wilderness in this alternative (Table 421 and Table 422). Therefore, the 1987 Forest Plan recommended wilderness areas would no longer be managed as recommended wilderness. Under this alternative, some wilderness characteristics within inventoried roadless areas would be maintained by the requirements of the Idaho Roadless Rule, which limits building roads and timber harvest, although motorized use is not prohibited. Refer to the Sustainable Recreation and Idaho Roadless Rule Area sections for additional information. The Nez Perce-Clearwater would continue to provide a primitive recreation opportunity spectrum experience in the existing designated wilderness of 1,139,059 acres, or 29 percent, of the Nez Perce-Clearwater.

Although Alternative X has no recommended wilderness, the summer recreation opportunity spectrum for the existing recommended wilderness areas would be a semi-primitive non-motorized classification. Therefore, there would be no change in motorized access from the existing condition as described under the No Action Alternative. Mechanized access is not restricted by this classification therefore there would be an increase of 328 miles open to mechanized use that are closed under the existing condition.

Under this alternative the winter recreation opportunity spectrum classification would be semi-primitive motorized. Therefore, areas allowing for motorized over-snow vehicle use would increase by 278,893 acres as a result of these changes. Total acres suitable for winter over-snow motorized access across the Forest, by these and other changes, would increase by 288,342 acres as compared to the No Action alternative.

Because this alternative recommends no additional areas for wilderness, opportunities for solitude and remoteness in a primitive setting would decrease across the Nez Perce-Clearwater. Therefore, this alternative provides the least amount of primitive setting of all the alternatives.

Alternative X includes 0 acres of underrepresented ecological groups, which is lower than all other Alternatives. This is the amount this alternative would not add to underrepresented ecological groups to the National Wilderness Preservation System since these areas would not be recommended.

Table 421. Change in indicator values under Alternative X

Indicator	Value
Acres of recommended wilderness	0
Change in miles of trails open to wheeled motorized use	0
Change in acres of suitable motorized over-snow vehicle areas	+278,390*
Change in miles of trails open to nonmotorized mechanized transportation	+328
Change in the number of commercial rental (buildings and structures) units	0
Acres of underrepresented ecological groups of the National Wilderness Preservation System	0

Data Source: Nez Perce-Clearwater GIS data.

*Value includes changes by ROS in all Idaho Roadless Areas

Table 422. Alternative X indicator values by recommended wilderness area

Recommended Wilderness Area	Indicator 1 (acres)	Indicator 2 (miles)	Indicator 3 (acres)	Indicator 4 (miles)	Indicator 5 (number)	Indicator 6 (acres)
None	0	0	+278,390	+328	0	0

Indicator 1 = acres of recommended wilderness. Indicator 2=change in miles of trails open to wheeled motor use. Indicator 3=change in acreage of suitable motorized over-snow vehicle areas. Indicator 4=change in miles of trails open to mechanized transportation. Indicator 5=change in commercial rental (buildings and structures) units. Indicator 6=Acres of underrepresented ecological groups of the National Wilderness Preservation System.

Data Source: Nez Perce-Clearwater GIS data.

Alternative X – 0 acres

34 Roadless Areas, No Recommended Wilderness

Under this alternative, none of the 1,481,637 acres of roadless areas would be recommended for wilderness. However, these areas would still retain many of the wilderness characteristics that are present in them today. Although the Idaho Roadless Rule allows for limited management actions and motorized and mechanized recreation activities, it is anticipated that any activity would occur on less than one percent of these lands per decade. Therefore, the roadless values and wilderness characteristics of these 1,481,637 acres are expected to remain present and largely intact through the planning cycle.

Alternative Y

Alternative Y would recommend 4 areas for recommended wilderness totaling 309,306 acres. These areas would be managed in either a primitive or semi-primitive non-motorized recreation opportunity spectrum setting, with motorized and nonmotorized mechanized travel prohibited, including aircraft and unmanned aerial systems, excepting administrative use by federal, state, or local agencies. Additionally, the existing recommended wilderness areas of Sneakfoot Meadows and North Fork Spruce-White Sand would be under a summer semi-primitive non-motorized classification. Trails currently closed would remain closed to motorized use. However, trails currently closed to mechanized transport would be suitable for this activity.

The construction of new structures or buildings would not be suitable unless explicitly needed to protect resources or administer the area. The maintenance of existing buildings and structures, and measures to protect those buildings and structures, would be allowed. Replacement of existing buildings, unless explicitly needed to protect resources or administer the area, would not be allowed. Continued commercial use of one rental cabin, Meadow Creek Station, within these recommended wilderness areas would be allowed under this alternative.

There are several existing roads open to high clearance vehicles within recommended wilderness areas under this alternative. The East Meadow Creek recommended wilderness area contains two roads – Forest Service Road 285 Elk Mountain, 8.9 miles, and Forest Service Road 357 Running Creek, 10.4 miles – that penetrate the area, are excluded from the area, and would remain open to motorized travel. Within the Hoodoo recommended wilderness area, the Fish Lake trail at 4.1 miles would be closed to motorized travel pending site-specific analysis.

Alternative Y finds use of motorized equipment and mechanical transport to be suitable for administrative use by agency personnel, partners, and members of the public under agreement with the Nez Perce-Clearwater that preserves or improves the wilderness characteristics of the area and to maintain infrastructure and trails. All other motorized equipment and mechanical transport by the public would be prohibited. There are 449 miles of system trails within Alternative Y's recommended wilderness areas, with 42 miles currently open to motorized travel. There are 117 miles that are currently open to mechanized transport, including motorized trails. Several areas within the Alternative Y recommended wilderness areas are currently managed as recommended wilderness, and as such, currently do not allow for mechanized transport. Table 423 describes the summer and winter recreation opportunity spectrum classes within the recommended wilderness areas of Alternative Y. Under this alternative there are no acres in a motorized class. Therefore, the motorized and mechanized activities or uses that are not allowed in the Land Management Plan's record of decision could begin to be removed after site-specific analysis is completed. Mechanized transport on system trails within recommended wilderness areas could decrease from 117 miles to 0 miles through this process. Likewise, wheeled motorized use on designated routes could decrease from 42 miles to 0 miles within recommended wilderness areas after completion of site-specific analysis. Finally, the winter motorized suitable acres could also be reduced to zero.

Table 423. Acres of recommended wilderness in summer and winter recreation opportunity spectrum classes (ROS) under Alternative Y

Category	Summer ROS	Winter ROS
Primitive	24,080	0
Semi-primitive non-motorized	285,226	309,306
Non-motorized Total	309,306	309,306
Semi-primitive motorized	0	0
Roaded Natural	0	0
Rural	0	0
Motorized Total	0	0
Total Acres	309,306	309,306

Data Source: Nez Perce-Clearwater GIS data.

This alternative and Alternative W would result in the most changes to wheeled motorized use, mechanized transport, and motorized over-snow vehicle use opportunities on the Nez Perce-Clearwater (Table 424 and Table 425). Displacement of motorized, both wheeled and over-snow vehicles, and mechanized transport on the Nez Perce-Clearwater could occur if a site-specific decision is completed that prohibits these uses in recommended wilderness. Should these closures occur, use might become concentrated in areas that remain suitable for motorized wheeled and motorized over-snow vehicle, causing some users to have negative experiences or go elsewhere to an off-forest location or to other lands open to motorized use and mechanized transport.

Table 424. Change in indicator values under Alternative Y

Indicator	Value
Acres of recommended wilderness	309,332
Change in miles of trails open to wheeled motorized use	-42
Change in acres of suitable motorized over-snow vehicle areas	-30,937*
Change in miles of trails open to nonmotorized mechanized transportation	-59
Change in the number of Commercial rental (buildings and structures) units	0
Acres of underrepresented ecological groups of the National Wilderness Preservation System	174,723

Data Source: Nez Perce-Clearwater GIS data.

*Value includes changes by ROS in all Idaho Roadless Areas

Table 425. Alternative Y indicator values by recommended wilderness area (RWA)

Recommended Wilderness Area	Existing RWA Dropped	Indicator 1 (acres)	Indicator 2 (miles)	Indicator 3 (acres)	Indicator 4 (miles)	Indicator 5 (number)	Indicator 6 (acres)
East Meadow Creek	n/a	96,856	-40	-96,856	-61	0	65,572
Hoodoo	n/a	100,680	-2	+11,332	-7	0	42,084
Mallard Larkins	n/a	90,855	0	-24,478	-4	0	51,424
Rapid River	n/a	20,941	0	-1,286	-45	0	15,643
n/a	Sneakfoot Meadows	n/a	0	+9,465	+20	n/a	n/a
n/a	NF Spruce White Sand	n/a	0	+9,865	+38	n/a	n/a
Total acres		**309,332**	**-42**	**-91,958**	**-59**	**0**	**174,723**

Indicator 1 = acres of recommended wilderness. Indicator 2=change in miles of trails open to wheeled motor use. Indicator 3=change in acreage of suitable motorized over-snow vehicle areas. Indicator 4=change in miles of trails open to mechanized transportation. Indicator 5=change in commercial rental (buildings and structures) units. Indicator 6=Acres of underrepresented ecological groups of the National Wilderness Preservation System.

Data Source: Nez Perce-Clearwater GIS data.

In this alternative, the construction of new buildings or structures would not be allowed unless explicitly needed to protect resources or administer the area. Maintenance of current buildings and structures, and measures to protect those buildings and structures, would be permitted. The replacement of existing buildings, unless explicitly needed to protect resources or administer the area, would not be allowed.

Alternative Y includes 174,723 acres of underrepresented ecological groups, which is higher than Alternative X and lower than Alternatives W and Z. This is the amount this alternative would add of underrepresented ecological groups to the National Wilderness Preservation System if these areas were designated as wilderness.

The total amount of recommended wilderness when combined with existing designated wilderness, 1,139,059 acres, would bring the total acreage to about 1,448,391 acres, or about 36.8 percent, of the Nez Perce-Clearwater that is in designated or recommended wilderness. These acres would provide a primitive or semi-primitive non-motorized setting on the Nez Perce-Clearwater where wheeled motorized use, motorized over-snow vehicle use, and mechanized transport, including bicycles and game carts, would be prohibited. The primitive setting is characterized by large, remote, wild, and predominantly unmodified landscapes with no motorized activity and a lower probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few facilities or developments. Semi-primitive non-motorized settings are characterized by areas of the Nez Perce-Clearwater that are managed for non-motorized use. Uses may include hiking and equestrian trails, mountain bikes, and other non-motorized mechanized vehicle. Rustic facilities may be present, usually for administrative or resource protection purposes. These areas provide for the opportunity for exploration, challenge, and self-reliance. This alternative provides additional opportunity for a primitive or semi-primitive non-motorized recreation opportunity spectrum setting by 7.8 percent through recommending 309,306 acres for wilderness designation.

Alternative Y has more recommended wilderness than Alternative X and the Preferred Alternative, and less than Alternatives W and Z. There would be a five-year objective for removing those uses that are inconsistent with wilderness designation.

Alternative Y – 309,332 acres
East Meadow Creek, Hoodoo, Mallard Larkins, and Rapid River

Apparent Naturalness

The East Meadow Creek and Mallard Larkins roadless areas each have administrative structures and recreation rentals. All the areas have trail bridges. These facilities are not readily apparent, except when a visitor is in proximity to them. East Meadow Creek has 19 miles, Mallard Larkins has 1.1 miles, and Hoodoo has 0.5 miles of interior roads. Roadside hazard tree removal has occurred along the interior roads or adjacent roads. Except for these minor intrusions, these areas appear natural, ecological systems appear to be functioning, and the areas retain their primeval character.

Solitude, Primitive, and Unconfined Recreation

These areas are predominantly in either a primitive or semi-primitive non-motorized recreation opportunity class. However, due to their adjacency to open roads, they also include semi-primitive motorized or roaded natural recreation opportunity classes. Hoodoo, Mallard Larkins, and Rapid River share a large portion of their boundary with front country. East Meadow Creek is bounded by wilderness or another roadless area. The sights and sounds from activities in the front country can be apparent in roadless areas, reducing the opportunity for solitude and unconfined recreation. Hoodoo and Mallard Larkins also have motorized trails penetrating the interior. Due to topography and dense vegetation, with few exceptions, the sights and sounds associated with these roads and trails, or activities in the front country, do not penetrate far into the areas. Winter motorized use is popular and well established in the Hoodoo area despite being administratively closed to this activity. Mountain biking is popular in portions of Hoodoo and Mallard Larkins. East Meadow Creek, Hoodoo, and Mallard Larkins are large areas with few developments. Except for the intrusions from roads and motorized and mechanized use, there is ample opportunity for solitude. These areas also include large, wild landscapes that offer challenge, adventure, and self-reliance to support primitive and unconfined recreation when not in proximity to the sights and sounds from activities inconsistent with wilderness character.

Presence of Ecological, Geological or Other Features of Scientific, Educational, Scenic or Historical Value

Most areas contain ecosystems that are underrepresented in the national wilderness preservation system and two-thirds to three-fourths of the acres are within their natural range of variability. East Meadow Creek and Hoodoo include substantial acreage that is modeled whitebark pine habitat, while the others have some whitebark pine habitat. Mallard Larkins supports one of the largest Rocky Mountain goat populations in northern Idaho; Hoodoo also supports a goat population. Generally, water quality is good, and watersheds are functioning properly. The East Meadow Creek area borders Meadow Creek, a principal tributary of the Selway River, which is recognized as an important watershed, supporting Chinook salmon, steelhead, bull trout, red band trout, and westslope cutthroat trout. High mountain peaks, rugged rock formations, and high mountain lakes in Hoodoo and Mallard Larkins are geological features of interest that add to the high scenic character and overall wilderness character that draws visitors to these areas. Hot springs and the Meadow Creek National Recreation Trail draw visitors to the Meadow Creek roadless area, and the Rapid River Wild and Scenic River draws visitors to the Rapid River roadless area.

Manageability to Preserve Wilderness Characteristics

Portions of the Hoodoo roadless area include a popular snowmobile area. Mountain biking is also popular in Hoodoo and Mallard Larkins. These activities are inconsistent with wilderness character and reduce the apparent naturalness and the opportunity for quite solitude and primitive and unconfined recreation and may disrupt use of an area by some wildlife species where they occur. These activities could also increase the need for management actions to improve education, respect, and compliance with wilderness values and boundaries in these areas.

Alternative Z – 569,755 acres

Alternative Z would have 10 areas for recommended wilderness totaling 569,755 acres. These areas would be managed in a summer primitive or semi-primitive non-motorized recreation opportunity spectrum, with motorized travel prohibited, excluding recreational and administrative use of aircraft and unmanned aerial systems. The winter recreation opportunity spectrum for these areas would be primarily semi-primitive motorized and would allow for motorized over-snow vehicle use. Bicycles and other forms of mechanized transportation would also be allowed year-round.

Additionally, the construction of new structures or buildings would not be suitable unless explicitly needed to protect resources or administer the area. The maintenance of existing buildings and structures, and measures to protect those buildings and structures, would be allowed. Under this alternative the replacement of existing buildings and structures would be allowed. Commercial rental of existing structures would not be allowed under this alternative. Meadow Creek Station is the only existing commercial rental within these recommended wilderness areas.

There are several existing roads open to high clearance vehicles within recommended wilderness areas under this alternative. The East Meadow Creek recommended wilderness area contains two roads –Forest Service Road 285 Elk Mountain, 8.9 miles, and Forest Service Road 357 Running Creek, 10.4 miles – that are currently open and could be closed to motorized travel pending a site-specific analysis. The Sneakfoot Meadows recommended wilderness area has one road, Forest Service road 358, which could also be closed to motorized vehicles leading into Kooskooskia Meadows for 2.1 miles pending a site-specific analysis. Within the Hoodoo recommended wilderness area the Fish Lake trail would remain open to motorized travel.

Alternative Z finds use of chainsaws and other motorized equipment and mechanical transport to be suitable for administrative use by agency personnel, partners, and members of the public under agreement with the Nez Perce-Clearwater. Administratively, this use would be permitted to accomplish restoration activities, to accomplish administrative work that protects and or enhances the wilderness characteristics of the area, or to maintain infrastructure and trails to facilitate access into areas.

There are 725 miles of system trails within Alternative Z's recommended wilderness areas, with 146 miles currently open to motorized travel. There are six areas within the Alternative Z recommended wilderness areas that are currently managed as recommended wilderness or have prohibitions on mechanized transport, and as such, do not allow for mechanized transport. However, under this alternative the amount of trail miles open to nonmotorized mechanized transport would increase to 325 miles. Table 426 describes the summer and winter recreation opportunity spectrum classes within the recommended wilderness areas of Alternative Z. Under this alternative there are no acres in a motorized class. Therefore, the motorized trail use that is not allowed in the Land Management Plan's record of decision could begin to be removed after site-specific analysis is completed.

Table 426. Acres of recommended wilderness in summer and winter recreation opportunity spectrum classes (ROS) under Alternative Z

Category	Summer ROS	Winter ROS
Primitive	34,750	0
Semi-primitive non-motorized	532,595	0
Non-motorized Total	567,345	0
Semi-primitive motorized	0	464,338
Roaded Natural	0	10,143
Rural	0	0
Motorized Total	0	474,481
Total Acres	567,345	474,659

Data Source: Nez Perce-Clearwater GIS data.

There could be a decrease from 146 miles to 0 miles available to wheeled motorized use on designated routes within recommended wilderness areas after site-specific analysis is completed. The winter motorized suitable acres could increase by 217,348 acres because in this alternative all recommended wilderness acres are within a winter semi-primitive motorized or roaded natural class. This suitability finding does not ensure that all acres of recommended wilderness would be accessible for winter over-snow vehicle use.

A larger amount of the forest would be found suitable for winter over-snow use than the current 1987 plans find suitable and would result in the largest increase to winter over-snow motorized use since all recommended wilderness acres would be suitable for over-snow use. Under the No Action Alternative, only 7 percent of recommended wilderness areas would be suitable for winter over-snow use; but, under this alternative, 100 percent of the recommended wilderness areas would be suitable. Likewise, the miles of trail suitable for mechanized travel within the recommended areas would also be retained under this alternative. Wheeled motorized travel would be reduced in this alternative for the recommended wildernesses. This alternative has more acres of recommended wilderness than Alternative Y and less than Alternative W so it would cumulatively reduce the amount of wheeled suitable acres across the forest compared to Alternative Y and expand the amount compared to

Alternative W. Displacement of wheeled motorized vehicles on the Nez Perce-Clearwater could occur if a site-specific decision is completed that prohibits these uses in recommended wilderness. Should these closures occur, use might become concentrated in areas that remain suitable for motorized wheeled transport causing some users to have negative experiences and/or go elsewhere to an off-forest location or to other lands open to motorized use.

Alternative Z includes 333,078 acres of underrepresented ecological groups, which is higher than Alternatives X and Y and lower than Alternatives W. This is the amount this alternative would add of underrepresented ecological groups to the National Wilderness Preservation System if these areas were designated as wilderness.

The total amount of recommended wilderness when combined with existing designated wilderness, 1,139,059 acres, would bring the total acreage to about 1,708,814 acres, or about 43.4 percent, of the Nez Perce-Clearwater that is in designated or recommended wilderness. These acres would provide summer recreation opportunities that are consistent with the recreation opportunity spectrum classification of semi-primitive non-motorized or primitive on 57 percent of the Nez Perce-Clearwater, where wheeled motorized use would decrease. The primitive setting is characterized by large, remote, wild, and predominantly unmodified landscapes with no motorized activity and a lower probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few facilities or developments. Semi-primitive non-motorized settings are characterized by areas of the Nez Perce-Clearwater that are managed for non-motorized use. Uses may include hiking and equestrian trails, mountain bikes, and other non-motorized mechanized transport or equipment. Rustic facilities may be present, usually for administrative or resource protection purposes. These areas provide for the opportunity for exploration, challenge, and self-reliance. This alternative provides opportunity for a primitive or semi-primitive non-motorized recreation opportunity spectrum setting through recommending 569,755 acres for wilderness designation.

Alternative Z has more recommended wilderness than Alternative X, Y, and the Preferred Alternative, and less than Alternative W (Table 427 and Table 428). Therefore, it would provide the second highest amount of recommended wilderness setting on the Nez Perce-Clearwater.

Table 427. Change in indicator values under Alternative Z

Indicator	Value
Acres of recommended wilderness	569,755
Change in miles of trails open to wheeled motorized use	-146
Change in acres of suitable motorized over-snow vehicle areas	+278,383*
Change in miles of trails open to nonmotorized mechanized transportation	+325
Change in the number of Commercial rental (buildings and structures) units	-1
Acres of underrepresented ecological groups of the National Wilderness Preservation System	333,078

Data Source: Nez Perce-Clearwater GIS data.

*Value includes changes by ROS in all Idaho Roadless Areas

Table 428. Alternative Z indicator values by recommended wilderness area

Recommended Wilderness Area	Indicator 1 (acres)	Indicator 2 (miles)	Indicator 3 (acres)	Indicator 4 (miles)	Indicator 5 (number)	Indicator 6 (acres)
East Meadow Creek	96,856	-16	0	+33	-1	65,180
Hoodoo	147,039	0	+111,986	+5	0	61,462
Mallard Larkins	79,011	0	+66,377	+4	0	44,720
Meadow Creek- Upper North Fork	43,243	0	0	+26	0	17,364
North Fork Spruce - White Sand	13,816	0	+9,865	0	0	9,119
Pot Mountain	51,069	-24	0	+44	0	36,158
Rapid River	19,510	0	+19,655	+45	0	14,574
Rawhide	5,681	0	0	0	0	2,352
Sneakfoot Meadows	19,609	0	+9,465	0	0	7,138
West Meadow Creek	95,800	-106	0	+168	0	75,011
Total	569,755	-146	+217,348	+325	-1	333,078

Indicator 1 = acres of recommended wilderness. Indicator 2=change in miles of trails open to wheeled motor use. Indicator 3=change in acreage of suitable motorized over-snow vehicle areas. Indicator 4=change in miles of trails open to mechanized transportation. Indicator 5=change in commercial rental (buildings and structures) units. Indicator 6=Acres of underrepresented ecological groups of the National Wilderness Preservation System.

Data Source: Nez Perce-Clearwater GIS data.

Alternative Z – 569,755 acres

East Meadow Creek, Hoodoo, Mallard Larkins, Meadow Creek-Upper North Fork, North Fork Spruce-White Sand, Pot Mountain, Rapid River, Rawhide, Sneakfoot Meadows, West Meadow Creek

Apparent Naturalness

The East Meadow Creek, West Meadow Creek, and Mallard Larkins roadless areas each have administrative structures. East Meadow Creek and Mallard Larkins also have recreation rentals. Six of the areas have trail bridges. These facilities are not readily apparent, except when a visitor is in proximity to them. East Meadow Creek has 19 miles, West Meadow Creek has 10.7 miles, Hoodoo has 0.5 miles, Mallard Larkins has 1.1 miles, and Meadow Creek-Upper North Fork has 0.3 miles of interior roads. Roadside hazard tree removal has occurred along some of these interior roads and adjacent roads. Various species of noxious weeds are present in all areas, with a significant number of acres in East Meadow Creek, Mallard Larkins, Pot Mountain, and West Meadow Creek. Most noxious weed infestations are associated with adjacent roads and some interior trails. Meadow Creek-Upper North Fork has had past mining activity, which is still apparent today in the headwaters of the North Fork Clearwater River. Grazing is nonexistent in all areas except Rapid River, which is completely in a grazing allotment and a small portion of West Meadow Creek. Evidence of grazing is readily apparent in these areas. Except for these intrusions, these areas appear natural, ecological systems appear to be functioning without human intervention, and the areas retain their primeval character.

Solitude, Primitive, and Unconfined Recreation

These areas are predominantly in either a primitive or semi-primitive non-motorized recreation opportunity class. However, due to their adjacency to open roads, they all also include semi-primitive motorized or roaded natural recreation opportunity classes. Rawhide, with its small size and adjacency to a well-traveled road, provides about half of its area in a roaded natural setting.

Hoodoo, Mallard Larkins, Meadow Creek-Upper North Fork, Pot Mountain, Rapid River, and West Meadow Creek share a large portion of their boundary with front country. East Meadow Creek, North Fork Spruce-White Sand, Sneakfoot Meadows, and Rawhide are predominantly adjacent to wilderness or other roadless areas. Sights and sounds from activities in the front country can be apparent in roadless areas, reducing the opportunity for solitude and unconfined recreation. Due to topography and dense vegetation, with few exceptions, the sights and sounds associated with these roads, trails, and activities in the front country do not penetrate far into most areas. However, roadless areas with roads penetrating the interior via cherry stems increase the amount of area impacted by the sights and sounds associated with motorized use of these roads. Additionally, the topography and lack of dense vegetation in Rawhide allows sights and sounds to be pervasive in most of the area; the potential for solitude here is minimal.

Winter motorized use is popular and well established in Hoodoo, North Fork Spruce–White Sand, and Sneakfoot Meadows, despite administrative closure to this activity in Hoodoo and Sneakfoot Meadows. Mountain biking is popular in portions of Hoodoo, Mallard Larkins, Pot Mountain, and West Meadow Creek. East Meadow Creek, Hoodoo, Mallard Larkins, and West Meadow Creek are large areas with few developments. Except for the intrusions from roads and motorized and mechanized use, or from increased contact with other visitors in popular areas, there is ample opportunity for solitude in most of these areas if one is to leave well-traveled routes. These areas also include large, wild landscapes that offer challenge, adventure, and self-reliance to support primitive and unconfined recreation when not in proximity to the sights and sounds from activities inconsistent with wilderness character.

Presence of Ecological, Geological or Other Features of Scientific, Educational, Scenic or Historical Value

A large percentage of each area contains ecosystems that are underrepresented in the national wilderness preservation system and about two-thirds of the acres are within their natural range of variability. East Meadow Creek, Hoodoo, and West Meadow Creek include substantial acreage that is modeled whitebark pine habitat, while the other areas have some whitebark pine habitat. East Meadow Creek, Pot Mountain, and Sneakfoot Meadows contain research natural areas.

Mallard Larkins supports one of the largest Rocky Mountain goat populations in Northern Idaho; Hoodoo also supports a mountain goat population. Wolverine female denning habitat occurs in Hoodoo, Mallard-Larkin, Meadow Creek-Upper North Fork, Pot Mountain, and Sneakfoot Meadows. The other areas in this alternative do not contribute substantially to wolverine denning habitat. The East Meadow Creek and West Meadow Creek areas border Meadow Creek, a principal tributary of the Selway River, which is recognized as an important watershed, supporting Chinook salmon, steelhead, bull trout, red band trout, and westslope cutthroat trout.

High mountain peaks, rugged rock formations, and high mountain lakes in Hoodoo and Mallard Larkins are geological features of interest that add to the high scenic character and overall wilderness character that draws visitors to these areas. Hot springs and the Meadow Creek National Recreation Trail draw visitors to the Meadow Creek roadless area, and the Rapid River Wild and Scenic River draws visitors to the Rapid River roadless area.

Manageability to Preserve Wilderness Characteristics

Hoodoo, Mallard Larkins, Meadow Creek-Upper North Fork, Pot Mountain, Rapid River, and West Meadow Creek share a large portion of their boundary with front country. Approximately one-third of the boundary of North Fork Spruce-White Sand is adjacent to front country. East Meadow Creek, North Fork Spruce-White Sand, Sneakfoot Meadows, and Rawhide are predominantly adjacent to wilderness or other roadless areas.

Boundaries with front country increases the intrusion of sights and sounds into the roadless areas as management activities occur proximate to those areas. This also increases the opportunity to see timber harvest, roads, and human habitation from viewpoints within the area. This would reduce the opportunity for solitude and primitive and unconfined recreation.

Portions of Hoodoo, North Fork Spruce-White Sand, and Sneakfoot Meadows are popular snowmobile areas. Mountain biking is popular in portions of Hoodoo, Mallard Larkins, Pot Mountain, and to a lesser degree in Sneakfoot Meadows as well. Motorized summer activity in these areas is minimal and not well established. The presence of motorized winter and summer mechanized activity also increases potential intrusion of sights and sounds not compatible with a wilderness experience. These activities are inconsistent with wilderness character and reduce apparent naturalness and the opportunity for quite solitude and primitive and unconfined recreation. These activities could also increase the need for management actions to improve education, respect, and compliance with wilderness values and boundaries.

Preferred Alternative – 263,357 acres

The Preferred Alternative recommends three areas for wilderness, totaling 263,357 acres. These include portions of the Mallard-Larkins, Hoodoo, East Meadow Creek, and West Meadow Creek Idaho Roadless Areas. These areas would be managed under the semi primitive non-motorized class of the Recreation Opportunity Spectrum for both summer and winter. Motorized and nonmotorized equipment and mechanized travel by the public would not be suitable in these areas. The use of chainsaws and other motorized equipment and mechanical transport would be suitable for administrative use by agency personnel, partners, and members of the public under agreement with the Nez Perce-Clearwater. These tools would be permitted to accomplish restoration activities, to accomplish administrative work that protects and or enhances the wilderness characteristics of the area, or to maintain infrastructure and trails to facilitate access into the areas. Administrative use of aircraft and unmanned aerial systems would be suitable. The use of prescribed fire is suitable. Use of biological agents would also be suitable for the control of insects and disease.

No commercial use of permanent structures, except recreation rentals, would occur. Currently, the Meadow Creek Ranger Station is used as a recreation rental and that use would continue. Existing structures would remain in place and maintenance and replacement of these structures may occur as needed. The construction of new structures or buildings would not be suitable unless explicitly needed to protect resources.

Roads adjacent to the areas would remain open or closed as determined through travel planning decisions. The boundary of the recommended areas would be set back 300 horizontal feet from the center line of these roads. The Meadow Creek Recommended Wilderness Area has one road that penetrates the interior of the area. This road, Forest Road #285, would remain open and excluded from the recommended wilderness area. The recommended wilderness area boundary would be set 300 horizontal feet either side of the center line of this road. The Hoodoo Recommended Wilderness Area has one road that penetrates the interior. Road #581B is a short road that accesses Toboggan Hill. This road remains closed to public motorized and mechanized travel. Road 705 penetrates the Mallard-Larkins Recommended Wilderness Area but was excluded from the roadless area.

Boundary Adjustments from Idaho Roadless Rule Areas for Recommended Wilderness Areas

Hoodoo – 108,276 acres

The Preferred Alternative excludes a portion of the Hoodoo Idaho Roadless Area that includes Road 295, Trail 419 and Fish Lake to the northern boundary of the roadless area. An additional exclusion offsets the recommended wilderness boundary 150 feet from the Divide Trail #738 for the length of the trail adjacent to the recommended wilderness area. These exclusions provide opportunity for non-motorized mechanized use such as mountain biking, in an area that was popular for this activity prior to closure through the 2017 travel management decision. These adjustments provide opportunity for this non-motorized activity without encroachment into the recommended wilderness area.

This alternative also excludes a southern portion of the Hoodoo Idaho Roadless Area in the Williams Range area. This includes an area from Blacklead Mountain, following the North Fork Ranger District boundary north of Williams Peak, Goat Lake and Williams Lake, then southeast along Williams Creek to Road 595. This exclusion will provide for high mountain over-snow vehicle use in an area that was popular for this activity prior to closure in 2012, while reducing encroachment into the recommended wilderness.

Mallard-Larkins – 82,286 acres

The Preferred Alternative excludes from the Mallard-Larkins recommended wilderness the southern portion of the Mallard-Larkins Idaho Roadless Area of approximately 35,500 acres that has a Backcountry Restoration theme. This area was not included in the RARE II, or 1987 Clearwater Forest Plan recommended wilderness nor was it covered under the 2017 Clearwater Travel Management Decision. The area is bounded by numerous motorized routes suitable for a variety of motorized vehicles and has interior trails popular for motorcycle travel. This area would be under a summer and winter semi-primitive motorized recreation opportunity spectrum classification, suitable for year-round motorized activities.

This alternative also excludes from recommended wilderness that portion of the Mallard-Larkins Idaho Roadless Area west of the Mallard-Larkins Pioneer Area and south of Minnesaka Creek to the Forest boundary. This includes the Smith Ridge portion of the IRA, south and west of the cherry-stem exclusion area associated with Forest Road 700 to the roaded area and motorized trail along the North Fork Clearwater to the western Forest boundary. It also includes a small portion of the northern slopes of Smith Ridge below the cherry stem to the Little North Fork Clearwater and Minnesaka Creek. This area has an Idaho Roadless Rule theme of Primitive but is bisected by primary travel routes and additional secondary roads that were originally excluded from the Idaho Roadless Area. An unidentified corridor through this area has been proposed to complete the GEM trail, a motorized trail from Elk City to Pierce, Idaho. In this area the trail would use existing open roads but would also require reconstruction and construction of a section of an existing closed road to connect with a road on Idaho state land.

Meadow Creek – 72,795 acres

The Preferred Alternative excludes the southern portion of the East Meadow Creek Idaho Roadless Area from the Meadow Creek recommended wilderness area. This excluded area includes all of the roadless area east of Road 285 and south of Road 357 and Trail 533 to the Selway-Bitterroot Wilderness boundary, approximately 32,700 acres. A corridor 300 horizontal feet either side of center line along Road 285 from the junction with Road 357 north to the terminus of the road at the intersection with Trail 517 is also excluded from the recommended wilderness. Road 285 and Road 357 would remain open to summer motorized use, but beyond that the area encompassing the East

Meadow Creek Idaho Roadless Area would be in a summer recreation opportunity spectrum class of semi-primitive non-motorized, not suitable for summer motorized use. The 32,700-acre excluded area would be in a winter semi-primitive motorized classification suitable for motorized over snow vehicle use as currently available under the 1987 Nez Perce Forest Plan.

This alternative also excludes approximately 107,000 acres of the 115,973-acre West Meadow Creek Idaho Roadless Area from the Meadow Creek recommended wilderness. This area is currently open to and popular for summer and winter motorized recreation. The excluded area would be in a summer and winter semi-primitive motorized recreation opportunity spectrum classification, suitable for year-round motorized activities. Although suitable for summer motorized, some trails that enter into the recommended wilderness area would be closed to motorized use at designated trail termini outside of the recommended area to facilitate user compliance and agency implementation and enforcement of these closures.

The 263,357 acres of recommended wilderness combined with the 1,139,059 acres of existing designated wilderness would bring the total acreage to about 1,402,416 acres, or about 35.6 percent, of the Nez Perce-Clearwater that is in designated or recommended wilderness. These acres would provide summer recreation opportunities that are consistent with the recreation opportunity spectrum classification of semi-primitive non-motorized or primitive on the Nez Perce-Clearwater, where public wheeled motorized use would be prohibited. The primitive setting is characterized by large, remote, wild, and predominantly unmodified landscapes with no motorized activity and a lower probability of seeing other people. Primitive settings are managed for quiet solitude away from roads, people, and development. There are few, if any, facilities or developments. Semi-primitive non-motorized settings are characterized by areas of the Nez Perce-Clearwater that are managed for non-motorized use. Uses may include hiking and equestrian trails, mountain bikes, and other non-motorized mechanized transport equipment. Rustic facilities may be present for administrative or resource protection purposes. However, under the Preferred Alternative, motorized and nonmotorized equipment and mechanized travel by the public would not be suitable in these areas. These areas provide for the opportunity for exploration, challenge, and self-reliance.

There are 380 miles of system trails within the Preferred Alternative's recommended wilderness areas, with 60 miles currently open to motorized travel and 108 miles that are currently open to mechanized transport. Table 429 describes the summer and winter recreation opportunity spectrum classes within the recommended wilderness areas of the Preferred Alternative. Under this alternative, there are no acres in a motorized class. Therefore, the motorized trail use that is not allowed in the Land Management Plan's record of decision could begin to be removed after site-specific analysis is completed.

Table 429. Acres of recommended wilderness in summer and winter recreation opportunity spectrum (ROS) classes under the Preferred Alternative

Category	Summer ROS	Winter ROS
Primitive	0	0
Semi-primitive non-motorized	263,357	263,357
Non-motorized Total	0	0
Semi-primitive motorized	0	0
Roaded Natural	0	0
Rural	0	0
Motorized Total	0	0

Category	Summer ROS	Winter ROS
Total Acres	0	0

Data Source: Nez Perce-Clearwater GIS data.

This alternative has the least number of acres recommended for wilderness except Alternative X, which has no recommended wilderness. All action alternatives reduce the miles of trails suitable to wheeled motorized use compared to the existing condition (Table 430 and Table 431).This alternative would result in the smallest loss of trails suitable for wheeled motorized use of all action alternatives as compared to the No Action alternative. Alternatives W, Y, and Preferred would reduce the acres suitable for motorized over-snow vehicle use, and alternatives X and Z would add acres suitable for this use. The Preferred alternative would reduce the least acres suitable for this use. Three action alternatives would reduce the miles of trail suitable for mechanized transportation. The Preferred Alternative reduces less miles than Alternatives W and Y. Alternatives X and Z would add miles of trail suitable for this use. Except for Alternative X, which has no recommended wilderness, the Preferred Alternative has the least acres of underrepresented ecological groups of all action alternatives.

Table 430. Change in indicator values under the Preferred Alternative

Indicator	Value
Acres of recommended wilderness	263,357
Change in miles of trails open to wheeled motorized use	-2
Change in acres of suitable motorized over-snow vehicle areas	-117,641*
Change in miles of trails open to nonmotorized mechanized transportation	-14
Change in the number of Commercial rental (buildings and structures) units	0
Acres of underrepresented ecological groups of the National Wilderness Preservation System	142,065

Data Source: Nez Perce-Clearwater GIS data.

*Value includes changes by ROS in all Idaho Roadless Areas

Table 431. Preferred Alternative indicator values by recommended wilderness area (RWA)

Recommended Wilderness Area	Existing RWA Dropped	Indicator 1 (acres)	Indicator 2 (miles)	Indicator 3 (acres)	Indicator 4 (miles)	Indicator 5 (number)	Indicator 6 (acres)
East Meadow Creek	n/a	72,795	-60	-64,156	-99	0	50,233
Hoodoo	n/a	108,276	0	+3,290	+31	0	45,259
Mallard Larkins	n/a	82,286	0	-14,890	-4	0	46,573
n/a	Sneakfoot Meadows	n/a	+20	+9465	+20	n/a	n/a
n/a	NF Spruce-White Sand	n/a	+38	+9,865	+38	n/a	n/a
Total		263,357	-2	-56,426	-14	0	142,065

Indicator 1 = acres of recommended wilderness. Indicator 2=change in miles of trails open to wheeled motor use. Indicator 3=change in acreage of suitable motorized over-snow vehicle areas. Indicator 4=change in miles of trails open to mechanized transportation. Indicator 5=change in commercial rental (buildings and structures) units. Indicator 6=Acres of underrepresented ecological groups of the National Wilderness Preservation System.

Data Source: Nez Perce-Clearwater GIS data.

These recommended areas would contribute the following wilderness characteristics, values, and opportunities to the Nez Perce-Clearwater.

East Meadow Creek – 72,795 acres

Apparent Naturalness

This area shows some sign of human impacts. At one time, there were many sheep grazing allotments in the East and West Meadow Creek roadless areas. The effects of this grazing have largely vanished, except evidence of the stock driveways which are apparent to the knowledgeable observer. Two adjacent lookout towers can be seen from some parts of the area and the Meadow Creek Ranger Station, which consists of multiple structures and is used as a recreation rental, is within the area. While this is clearly a man-made facility, its historic context and natural-appearing aesthetics blend well with its primitive setting. The facility is not visible, except when a visitor is on site. Trail bridges, remnant mining, range fences, old firelines, and localized invasive weeds provide evidence of human use in the area and provide minor detractions from the area's apparent naturalness.

Virtually all of the upper Meadow Creek drainage burned in 1919 and much of it is now covered with dense timber, except where large recent fires have burned. The area generally appears natural, vegetation in most of the area is within the natural range of variation, and long-term ecological processes are intact and operating naturally.

Solitude, Primitive, and Unconfined Recreation

Meadow Creek has a well-developed trail system that provides access through much of the area. A few of these trails are heavily used, especially during hunting season. Road #357 borders the area to the southeast and provides access to the trailheads for Trails #530, #531, #533, and #535 into the Selway-Bitterroot Wilderness. Road #285 enters the area from the south and provides cherry-stemmed motorized access to Windy Saddle and near Elk Mountain and trailheads for non-motorized Trails #513, #517, #529, and #647. Road #290 accesses the northern end at Indian Hill lookout and non-motorized Trails #602, #603, and #621. Away from these roads and popular trails, the area provides mostly a primitive and semi-primitive non-motorized recreation setting. Visitors in proximity to nearby open roads and motorized trails may experience audible and/or visual intrusions to their experience. Likewise, when traveling along the many trails of the area, encounters with others is likely as this area is popular for a variety of activities. However, Meadow Creek is adjacent to the Selway-Bitterroot Wilderness and this vast area offers numerous places where one can go with little chance of encountering another person away from these trails. Together, these undeveloped roadless areas offer unlimited opportunity for solitude, adventure, challenge, and primitive and unconfined recreation. Primitive and unconfined recreational uses of the area include hiking, fishing, hunting, backpacking, and, for a select few, kayaking. Three outfitters operate in the area.

Ecological, geologic, or other features of scientific, educational, scenic, or historical value

Meadow Creek is part of the aboriginal territory of the Nez Perce Tribe and is among the lands that have important hunting and fishing areas for the tribe. The present-day Green Mountain Trail #541 is believed to be one of the original routes of the Southern Nez Perce Trail, as well as Trails #502 and #581 in the Bargamin Creek drainage south of the recommended wilderness area. Over 76 percent of the area consists of ecological types that are currently underrepresented in the national wilderness preservation system. Additionally, over 15,000 acres are in modeled white pine habitat, a high elevation species currently in decline. Though not a unique geologic feature, hot springs are located along Warm Springs Creek at the southern end of the area. The Meadow Creek National Recreation Trail enters the area from the north to the historic Meadow Creek Ranger Station. The area provides habitat for an abundance of wildlife typical of the plan area. Hunted species include elk, black bear, moose, wolves, and whitetail deer. The area contains large amounts of habitat for the federally listed threatened Canada lynx and federally listed candidate wolverine. The area contains minor amounts of maternal denning habitat for wolverines. Lower elevations in the meadow creek area contain fisher habitat. The Meadow Creek Recommended Wilderness Area would contribute to the Bitterroot Recovery Zone once grizzly bears move into the area because it would provide additional secure habitat adjacent to the Selway-Bitterroot and Frank Church-River of No Return Wilderness areas that make up the Bitterroot Recovery Zone.

Meadow Creek is an important fisheries watershed on the Nez Perce-Clearwater. The watershed supports spring and summer Chinook, steelhead, westslope cutthroat trout, bull trout, and red band trout. The westslope cutthroat trout is known to have high genetic integrity.

Manageability

The east portion of the recommended wilderness area is currently managed under the primitive theme of the Idaho Roadless Rule, the second most restrictive theme, which includes very limited permissions and exceptions for timber cutting, sale or removal, road construction or reconstruction, and mineral activities. Exceptions include: to improve threatened, endangered, proposed, or sensitive species habitat; to maintain or restore the characteristics of ecosystem composition, structure, and processes; and to reduce the risk of uncharacteristic wildland fire effects to an at-risk community or municipal water supply system. Management is primarily to maintain roadless characteristics. The west portion of the recommended wilderness area is currently managed under the backcountry restoration theme of the Idaho Roadless Rule, which includes limited permissions and exceptions for timber cutting, sale, or removal; road construction and reconstruction; and mineral activities. This includes the following exceptions: to reduce hazardous fuel conditions within or outside of a community protection zone with conditions; to reduce the risk of uncharacteristic wildland fire effects; to improve threatened, endangered, proposed, or sensitive species habitat; and to maintain or restore the characteristics of ecosystem composition, structure, and processes.

The eastern edge of the area is bordered by the Selway-Bitterroot Wilderness. The southeast boundary is defined by a short section of Road #285 then along Road #357. The remainder of the boundary is defined by trails, except a short section that follows the hydrologic divide between Meadow Creek and East Meadow Creek from Granite Peak to Meadow Creek. With that small exception, the well-defined and maintained trails and roads make a readily apparent and manageable boundary. Snowmobile use occurs on Road #285 to Elk Mountain and Road #357. These roads provide access to popular play areas around Elk Mountain and in Bargamin and Running Creeks. This will pose some management issues to prevent this use from occurring into the recommended wilderness area.

Hoodoo – 108,276 acres

Apparent Naturalness

The name "Great Burn" has been attached to the area by several groups and stems from the large wildfires which denuded much of the area during the early 1900's, primarily on the Idaho-side. Except for upper Moose, Pollack, and Swamp Creeks, much of the area north of Kelly Creek is still primarily covered with shrubs with scattered individual and small groups of trees. The area south of Kelly Creek has regenerated largely to lodgepole pine.

The area retains a high degree of natural integrity and appearance. Human activities have resulted in relatively minor and isolated impacts. The area does not include Forest Service Administrative sites or recreation rentals. Use on several of the main trails are the only real detractions from the natural integrity and appearance of the area.

The vegetation in 73 percent of the roadless area is within the natural range of variation and over 40 percent of the area consists of ecological types underrepresented in the National Wilderness Preservation System. Three ecosystems are found within the area – cedar-hemlock-pine, western spruce-fir, and alpine meadows and barren terrain. The cedar-hemlock-pine group represents the lower elevations. Where trees are found, it is represented primarily by western redcedar, grand fir, Douglas-fir, and larch, with very small amounts of western white pine on the Idaho-side. Ponderosa pine is found at the lower and drier elevations.

Solitude, Primitive, and Unconfined Recreation

This area may be accessed by vehicle from forest roads paralleling the boundaries or from dead-end roads. Access from the west is via Road #255 and from Road #581. These roads connect the North Fork Clearwater Basin to the Lochsa Basin, eventually reaching Highway 12. Road #581 is the southwest boundary, providing numerous access points to the roadless area. From the north, the area can be accessed from Road #250 to Road #295, then to the Osier Ridge lookout from Road #737. From the east, the area can be accessed through the Lolo National Forest on Road #7734.

A well-established trail system emanates from these access roads, providing access to the major drainages and ridgelines throughout the area. From these trails, visitors have unlimited opportunity to venture into exceptional wild country; from mountain ridges and peaks above the timberline to mid-slopes shrouded in dense brush and trees to steep drainage bottoms that contain fast-moving, crystal-clear streams. The vastness, scenic beauty, varied vegetation, and topography of the area provides ample opportunity for quite solitude, challenge and primitive and unconfined recreation. Primary activities are hiking, backpacking, horseback riding, fishing, big-game hunting, photography, and the pursuit of a wilderness experience.

Ecological, geologic, or other features of scientific, educational, scenic, or historical value

Hoodoo is one of three roadless areas on the Nez Perce-Clearwater where mountain goats are known to exist and inhabit the high country along the state line divide. These are unusual in the area and are scenic and wild to view. The area provides habitat for an abundance of wildlife typical of the Nez Perce-Clearwater. Hunted species include elk, black bear, mountain goats, moose, wolves, and whitetail deer. The mountain goat herd in the Hoodoo area is perhaps the second largest herd in the plan area. Two species of conservation concern have been observed in the Hoodoo area – harlequin ducks and fishers. The area contains large amounts of habitat for the federally listed threatened Canada lynx and federally listed candidate wolverine.

Species occurring in the Hoodoo recommended wilderness identified in the Regional Forester’s sensitive species list include the gray wolf, western pearlshell mussel, and westslope cutthroat trout. The area also provides habitat for lesser-known species, including boreal owls, rocky mountain tailed frogs, the Idaho giant salamander, and the American marten. The Hoodoo area provides a landscape that adds connectivity to the Bitterroot Ecosystem from other ecosystems like the Northern Continental Divide, Cabinet Yaak, and Selkirk ecosystems, which are located north and east of the Bitterroot ecosystem. Generally, the primitive, undisturbed condition of this area provides important habitat and connection to other areas for a variety of wide-ranging species.

Approximately 44 percent of the area consists of ecological types that are currently underrepresented in the national wilderness preservation system. The vegetation in the area includes over 15,000 acres of modeled whitebark pine habitat (Landguth et al. 2017), a high elevation species currently in decline.

Kelly Creek and its North, Middle, and South Forks flow through this roadless area and have been noted as having high scenic value in the Nationwide Rivers Inventory and reaffirmed as having "outstandingly remarkable" scenic value in the 2017 Nez Perce Clearwater National Forest Wild and Scenic River eligibility review. The water quality in the Hoodoo Roadless Area is generally high with 13 of the 17 sub-watersheds categorized as Watershed Condition Class 1, functioning properly, and encompass 93 percent of the Roadless Area.

Manageability

The recommended wilderness area portion of the Hoodoo Roadless Area is currently managed under the wildland recreation theme, the most restrictive theme of the 2008 Idaho Roadless Rule. The cutting, sale, or removal of timber is prohibited, except for personal or administrative use, as provided for in 36 CFR Part 223 or where incidental to the implementation of a management activity not otherwise prohibited by the Idaho Roadless Rule.

Much of the area is bounded by other roadless areas (58%) with the remainder adjacent to front country (42%). There are no adjacent private lands. Most of the boundary is well defined on major terrain, other recognized features, or roads and trails. In a few locations, however, terrain features are less prominent, and boundaries are difficult to locate on the ground. The management of boundaries shared by other roadless areas is generally not challenging since management is similar.

Recurrent winter motorized use (snowmobiling) was long established in the Idaho side of the roadless area until it was banned with the 2012 Clearwater Travel Plan decision. Despite this closure, incursions by these winter motorized sports enthusiasts has continued. Access to four keys area of high elevation bowls has been from near Powell on the south and from Hoodoo Pass from the north. Snowmobilers cite the unique opportunity, solitude, beauty, and high challenge level for this type of remote snowmobiling experience. The Preferred Alternative recommended wilderness area boundary excludes the most popular riding areas, generally with a well-defined topographic feature, such as prominent ridgelines. Boundary posting, information boards at trailheads, and focused enforcement will be essential to reduce this banned use in the area.

Mountain biking occurs in the area on the Divide Trail #738 and in the Goose Creek area on Trail #414. The Preferred Alternative excludes these areas from the recommended wilderness area. The Divide Trail is open to non-motorized mountain bikes in its entirety, with the recommended wilderness area boundary set 150 horizontal feet from the trail center. The Goose Creek area is excluded from the recommended wilderness area, as it lies north of the boundary established around Fish Lake. As with snowmobiling, boundary posting, information boards at trailheads, and focused enforcement will be essential to restrict this encroaching use and increase compliance in the recommended wilderness area.

Mallard-Larkins – 82,286 acres

Apparent Naturalness

Although there are numerous rock outcroppings, talus slopes, and barren areas, a large proportion of the area is heavily vegetated, ranging from mountain grasslands and meadows to dense mixtures of numerous tree and shrub species. Approximately 80 percent of the land was burned over in 1910 and much of it again in 1919, 1920, and 1924. Where conditions are favorable, stands of lodgepole pine, Douglas-fir, grand fir, Engelmann spruce, larch, western red cedar, western white pine, and mountain hemlock exist since some escaped the fires but most regenerated afterwards. Where the soils are thin and conditions severe, such as on the higher ridges and steep south facing slopes, shrubs still dominate the sites. The lands above 6,000 feet are subalpine in character, supporting mountain hemlock, subalpine fir, and lodgepole pine. Two thirds of the area are within the natural range of variation. Three major streams drain into the main North Fork of the Clearwater, which is outside the roadless area boundary. They include Isabella Creek, Collins Creek, and Skull Creek. Water quality is high and shows minimal undesirable human impact on natural physical or biological processes.

A large portion of the area is undisturbed by man except for trails. However, there are two Forest Service administrative sites, both fire lookouts, at Black Mountain and Mallard Peak and two electronic sites, one at Black Mountain and one on an unnamed ridge west of Perceptor Point. The lookouts are visible from many of the high peaks in the Mallard-Larkins Pioneer Area and the lone electronic site is visible from limited vantage points. Additionally, the dramatic vistas afforded by these peaks allow visitors to see beyond the recommended wilderness area into areas where timber harvesting and other human activity has occurred and is apparent in the middle ground and background. With these few exceptions, the area appears natural and ecological processes are functioning properly, without the influence of man.

Solitude, Primitive, and Unconfined Recreation

The Mallard-Larkins Recommended Wilderness Area is generally accessible by moderate to low standard gravel and dirt roads. Road #715 provides the eastern boundary, Road #252 and Road #5371 provide a portion of the southeastern boundary, and Road #247 establishes the southern boundary. Access from the west is by Roads #700 and #705. Interior access, with some exceptions, is provided over a network of low standard fire control and administrative trails. The roadless area is large and complex, composed of generally steep, rocky ridges and deep canyons. For this reason, much of the area is not accessed by trails.

The area offers a high degree of solitude. The varied terrain and the vastness enable the visitor to experience complete solitude in many areas. Except for the Five Lakes Butte area, cross-country travel is a definite challenge involving a higher degree of risk over the rugged terrain, steep narrow canyons, and densely vegetated slopes. These conditions offer ample opportunity for adventure, challenge, and primitive and unconfined recreation. Screening by both vegetation and topographic features is high in most of the area except from the high peaks and other scattered vantage points.

Concentrations of people around Five Lakes Butte and encounters with travelers along the system trails may tend to disrupt the solitude at certain times. Viewing of activities outside the area, such as logging and roads, is possible from numerous high ridges along the northern and southern boundaries. In addition, the Black Mountain Lookout is used during the summer season and serviced via helicopter, which detracts from the solitude in proximity to that area and flight corridor. Due to the large size of the area and lack of interior roads, the area provides mostly primitive and semi-primitive non-motorized recreation settings. The area provides roaded natural settings near the boundary along adjacent roads. Recreation uses are primarily hiking, horseback riding, hunting, and fishing. Several outfitters operate in the roadless area.

Ecological, geologic, or other features of scientific, educational, scenic, or historical value

Approximately 55 percent of the area consists of ecological types that are currently under-represented in the national wilderness preservation system, and much of the high elevation areas are modeled whitebark pine habitat. The Heritage Cedar Grove, which is a large stand of very old, large western red cedar located near the junction of Elmer Creek and Jug Creek, is a good example of the large cedar stands that were prevalent in association with riparian areas and pre-settlement areas and is an attraction for visitors. Within the recommended wilderness area, Isabella Creek and Elmer

Creek were identified as exhibiting characteristics that best exemplify core coastal refugia, a unique vegetative type.

The area provides habitat for an abundance of wildlife typical of the plan area. Hunted species include elk, black bear, mountain goats, moose, wolves, and whitetail deer. The mountain goat herd in the Mallard Larkin area is the largest herd in the plan area. The Mallard Larkin area contains fisher habitat at lower elevations and habitat for the federally listed threatened Canada lynx and federally listed candidate wolverine. Wolverine female denning habitat is abundant in this recommended wilderness area. Species occurring in the Mallard-Larkins recommended wilderness identified in the Regional Forester's sensitive species list include the gray wolf and westslope cutthroat trout. The area provides a landscape that adds connectivity to the Bitterroot Ecosystem from other ecosystems like the Cabinet Yaak and Selkirk, which are located north of the Bitterroot ecosystem. Generally, the primitive, undisturbed condition of this area provides important habitat and connection to other areas for a variety of wide-ranging species.

The Mallard-Larkins Pioneer Area was designated by the Regional Forester in 1969 as a special administrative unit. While much of this area is on the Idaho Panhandle National Forest, the portion on the Nez Perce-Clearwater contains many high peaks with dramatic views, mountain lakes, and rushing streams. The special area was set aside for its outstanding scenic, roadless, and primitive recreational qualities. The area includes three dramatic waterfalls, some of the largest on the Forest, located in Cliff Creek, Lost Pete Creek, and Falls Creek. Mallard, Heart, and Isabella Peaks and Black Mountain offer unique viewing and photographing opportunities of mountain goats during the spring and summer months.

Manageability

The recommended wilderness area portion of the roadless area is managed under two different roadless themes from the 2008 Idaho Roadless Rule – wildland recreation and primitive. Most of the area up to the Divide with the Idaho Panhandle National Forest is wildland recreation, the most restrictive theme. This represents the area recommended for wilderness in the 1987 Clearwater Forest Plan. The primitive theme, the next most restrictive, is a section of the recommended wilderness area along the southern and western boundaries adjoining the core.

The roadless area boundary of Mallard-Larkins uses forest roads, system trails, topographic features including streams, ridges and elevation, and cross-country for short sections. The majority of the boundary is readily identifiable but the infrequent cross-country sections would require signing for identification. In general, the area is bounded on the north by trails along the Forest boundary with the Idaho Panhandle National Forest, on the east by Road #715, the southeast by Road #5371 and the Indian Henry Ridge Trail #101, down a ridge to Skull Creek, following Skull Creek to the confluence with the North Fork Clearwater River, along the North Fork to Star Ridge, up and over Star Ridge, then using streams, ridges, elevation and Road # 705 to go around managed land in Isabella Creek, then along Dog Creek until it goes over Smith Ridge near Grassy Point, then along Minnesaka Creek to the confluence with the Little North Fork Clearwater River, then continuing along the Forest boundary as described above. It would be beneficial to locate and post this boundary, where needed, soon to avoid confusion later. The vastness of the area provides a manageable area with premiere wilderness character and opportunity for a wilderness experience. However, many vantage points offer views that include readily apparent managed land and active travel corridors. Depending on a visitor's location these could be in the foreground, middle ground, or background and would diminish opportunity for solitude and primitive and unconfined recreation.

Summer motorized incursions continue to occur into the area that may present a persistent enforcement challenge. Adequate boundary marking, trail maintenance, and reconstruction that makes this use more difficult, and concentrated enforcement may help to eliminate this use over time.

Recommended Wilderness Areas

Cumulative Effects

Cumulative effects are the past, present, and reasonably foreseeable future effects from management activities on the Nez Perce-Clearwater and adjacent lands.

It is recognized that all wilderness characteristics may not be fully realized at all times in any given recommended area. Reasonable and foreseeable future actions on National Forest System lands include vegetation management, mining, increased recreational use, wildland fire management, and reduction of fuels in the wildland-urban interface. Generally, the sights and sounds within a recommended wilderness area are used to determine effects on wilderness characteristics. However, depending on proximity to the recommended area boundary, as well as physical characteristics of the area, activities outside of a recommended area can degrade opportunities for solitude, primitive and unconfined recreation, and apparent naturalness. Some activities may be transient and temporary with only short-term impacts, such as noise from logging activities. Other activities may be long-term or permanent and provide potential constant degradation of some wilderness characteristics. Long-term conditions such as increasing populations and associated construction and life noise, increased recreational use of areas in or outside of the wilderness area, or increased and regular traffic on nearby roads or trails could degrade the sights, sounds, and opportunity for solitude normally associated with wilderness.

Growth in Lolo, Ravalli, and Missoula counties in Montana and counties in Idaho proximate to the Nez Perce-Clearwater is likely to increase recreational use, including use within the recommended wilderness areas. The effects of urbanization and population growth on recommended wilderness use and resource conditions are likely to be gradual and to extend well beyond the planning period. Increased recreational use may negatively affect wilderness characteristics, particularly the opportunity for solitude and natural quality. Examples of potential impacts include increased crowding, soil compaction or erosion, proliferation and expansion of dispersed camp sites, user-created trails, threats to native plant species from the spread of noxious weeds, and disruption to wildlife use and utility of an area.

Currently, the Nez Perce-Clearwater manages approximately 23.7 percent of the designated wilderness within Idaho and 1 percent of the National Wilderness Preservation System. Alternative W could potentially add the most acres to the National Wilderness Preservation System, followed by Alternatives Z and Y. The Preferred Alternative would add the least acres of recommended wilderness, except the No Action Alternative and Alternative X which recommends no additional areas for recommended wilderness.

Depending on the alternative, six recommended wilderness areas on the Nez Perce-Clearwater border other National Forests – Hoodoo, Mallard Larkins, Meadow Creek-Upper North Fork, Rawhide, East Meadow Creek, and Rapid River (Table 432). The Mallard Larkins recommended wilderness area shares about 33 miles of boundary with the Idaho Panhandle National Forest, which has recommended their portion of the Mallard Larkins area, approximately 80,200 acres, as recommended wilderness. The Meadow Creek-Upper North Fork and Rawhide recommended wilderness areas share boundaries with both the Idaho Panhandle and Lolo National Forests and do not have additional areas recommended as wilderness on those National Forests. The Hoodoo recommended wilderness area shares a border with the Lolo National Forest for approximately 47 miles. The Hoodoo, or Great Burn as it is referred to on the Lolo, has an additional 89,530 acres recommended as wilderness on that National Forest. The East Meadow Creek recommended wilderness area boarders the Bitterroot National Forest portion of the Selway Bitterroot Wilderness area, with about 19 miles of shared boundary. The Rapid River recommended wilderness area borders the Payette National Forest for approximately 6 miles. The current Payette National Forest plan does not recommend the bordering area for wilderness.

Table 432. Recommended wilderness areas (RWA) bordering other forests

RWA name	Nez Perce Clearwater acres (varies by Alternative)	Adjoining National Forest RWA acres	Total RWA acres (varies by Alternative)
East Meadow Creek	72,795	0	72,795
Hoodoo, aka Great Burn	101,000-151,000	89,530	190,530-240,530
Mallard Larkins	77,139-91,000	80,200	157,339-171,339
Meadow Creek-Upper North Fork	42,000-43,000	0	42,000-43,000
Rawhide	5,861	0	5,861
Rapid River	21,000	0	21,000

Data Source: Nez Perce-Clearwater GIS data.

Effects to Resource from Other Resources

Management Area Allocations

Management area allocations vary between alternatives. Wilderness, ecological, and social characteristics that provide the suitability for inclusion in the National Wilderness Preservation System would be protected and maintained under the No Action Alternative and Alternatives W, Y, Z, and the Preferred Alternative.

Fire Management

All alternatives allow wildland fire to be used as a restoration tool to protect and/or enhance the wilderness characteristics of these areas. This provides options for the restoration of recommended wilderness areas. Wildfire is managed to play its natural role while managers evaluate point protection of values at risk. Following minimum impact suppression tactics would also serve to protect wilderness characteristics.

Fuel treatments including timber cutting, sale, and removal and other mechanical silvicultural treatments may occur to the extent permitted in the Idaho Roadless Rule (Part II 36 CFR 294, 2008) and to preserve or improve wilderness character. However, it is not anticipated that any timber harvest would be proposed in recommended wilderness.

Vegetative Management

These lands are not suitable for timber production; as stated above, timber cutting, sale, and removal may occur to the extent permitted in the Idaho Roadless Rule (Part II 36 CFR 294, 2008) to preserve or improve wilderness characteristics. However, it is highly unlikely that any timber harvest would be proposed in recommended wilderness. Most lands within recommended wilderness are within inventoried roadless areas that have high to outstanding wilderness characteristics, primarily due to restrictions on road building and timber harvesting not occurring in much of these areas. Inventoried roadless areas are identified as not suitable for timber production; therefore, there are very few acres within recommended wilderness where timber production would have been considered suitable. Refer to the Timber section for more information.

Vegetation management options would change in the future if recommended wilderness areas were designated as wilderness. Refer to the Forestlands section, the At-Risk Plant section, and the Fire Management section for additional information on these effects to vegetation management.

Recreation and Access

Alternative W contains the greatest amount of recommended wilderness, and all identified areas would be managed under a summer recreation opportunity spectrum classification of primitive or semi-primitive non-motorized in addition to prohibiting modes of mechanized transport. This would represent a decrease of 285 miles of trails currently open to wheeled motorized use and a decrease of 648 miles of trails currently open to mechanized transport. Additionally, recommended wilderness areas under Alternative W would be managed with a winter recreation opportunity spectrum classification of semi-primitive non-motorized, reducing the amount of acreage open to motorized over snow travel by 578,556 acres. Conversely, this alternative contains the greatest acreage and trail miles suitable only for non-motorized and or non-mechanized transport, such as hiking, skiing, and stock use.

Alternative X includes no recommended wilderness areas. However, the recommended wilderness areas in the 1987 Forest Plan, closed to motorized use in the 2017 travel management decision, would be in a summer recreation opportunity spectrum classification of semi-primitive non-motorized. Therefore, there would be no change in miles of trails open to wheeled motorized use in these areas as compared to the No Action alternative. However, these recommended areas would be opened to mechanized transport and this alternative offers an increase of 328 miles of trails. Under this alternative, the areas that were managed as recommended wilderness would be opened to winter motorized use and would be managed with the winter recreation opportunity spectrum of semi-primitive motorized. This would be an increase of 278,390 acres.

Alternative Y includes four areas totaling 309,332 acres of recommended wilderness. All identified areas would be managed under a summer recreation opportunity spectrum classification of primitive or semi-primitive non-motorized in addition to prohibiting modes of mechanized transport. This would represent a decrease of 42 miles of trails currently open to wheeled motorized use and a decrease of 59 miles of trails currently open to mechanized transport. This would be the third smallest reduction of trails open to motorized and mechanized transport of all alternatives. Additionally, recommended wilderness areas under Alternative W would be managed with a winter recreation opportunity spectrum classification of semi-primitive non-motorized, reducing the amount of acreage open to motorized over snow travel by 30,937 acres. This is the second smallest reduction of all action alternatives.

Alternative X, which recommends no areas for wilderness consideration, would not affect the amount of trail miles open for motorized use. The summer recreation opportunity spectrum would remain primitive or semi-primitive non-motorized. However, these recommended areas would be opened to mechanized transport and this alternative offers an increase of 328 in miles open to mechanized transport. Under this alternative, the areas that were managed as recommended wilderness would be opened to winter motorized use and would be managed with the winter recreation opportunity spectrum of semi-primitive motorized. This would be an increase of 278,390 acres.

The Preferred Alternative areas would be managed under a summer recreation opportunity spectrum classification of semi-primitive non-motorized, in addition to determining modes of mechanized transport as unsuitable. The Preferred Alternative has more acres of recommended wilderness than the No Action Alternative and Alternative X and less than Alternatives W, Y, and Z. There would be a decrease in the number of trails currently open to wheeled motorized use by 2 miles and 14 miles of trails currently open to mechanized transport. These minimal changes in motorized and mechanized access are due in large part to determining the Sneakfoot Meadows and North Fork Spruce-White Sand roadless areas suitable for motorized and mechanized access while eliminating them from recommended wilderness areas, representing an increase of 58 miles in these areas. Additionally, the reduction of mechanized access is influenced by the removal of Trail 738, the Stateline Trail, from the Hoodoo recommended wilderness area. This exclusion represents approximately 31 miles of trail opened to mechanized transport that is currently closed. Mechanized use along this trail could result in sights and sounds that reduce opportunity for solitude or primitive recreation within the Hoodoo recommended wilderness as do adjacent roads, motorized trails and even hiking trails that increase opportunity for human encounters from outside of the recommended area. Such intrusions are dependent on many factors but are usually localized and of short duration except where major highways or primary routes provide regularly occurring traffic.

Recommended wilderness areas under the Preferred Alternative would be managed with a winter recreation opportunity spectrum classification of semi-primitive non-motorized. The Preferred Alternative has more acres of recommended wilderness than the No Action Alternative and a reduction of winter motorized recreation opportunity spectrum classes with a corresponding decrease in the amount of acreage suitable to motorized over snow travel by 117,641 acres.

Of all the action Alternatives, the Preferred Alternative would have the lowest impact on the number of trail miles that are currently open to motorized and mechanized summer travel and winter motorized over snow travel. Under this alternative the summer recreation opportunity spectrum would be managed as primitive or semi-primitive non-motorized. There would be a 2-mile decrease in trail miles open to motorized summer use, mostly in the Pot Mountain recommended wilderness area, and a 14-mile decrease in mechanized transport opportunities. Winter opportunities under the recreation opportunity spectrum of semi-primitive motorized would decrease by 112,494 acres under this alternative.

Alternative Z contains the second largest amount of recommended wilderness, less than Alternative W and more than No Action and Alternatives X , Y, and the Preferred Alternative. Under this alternative the summer recreation opportunity spectrum would be managed as primitive or semi-primitive non-motorized. However, these lands would be open to mechanized transport, unlike Alternatives W, Y and the Preferred Alternative. This will cause a decrease in the amount of trail miles open to wheeled motorized use by 146 miles and an increase in the amount of trail miles open to mechanized transport by 325 miles. Since this alternative would have a winter recreation opportunity spectrum of semi-primitive motorized across all recommended wilderness areas, there would be an increase of 278,383 acres open to motorized over snow travel; a similar increase as Alternative X and half the increase of Alternative W.

Under all alternatives new road construction or reconstruction would not be suitable in recommended wilderness areas and very limited in Idaho Roadless Rule areas, which limits the amount of new access on the Nez Perce-Clearwater. Since all recommended wilderness areas are within Idaho Roadless Rule areas, effects from road construction and reconstruction would be minimal compared to current conditions. Therefore, road construction in Idaho Roadless Areas is expected to have little to no impact on recommended wilderness areas. Recommended wilderness boundaries with Management Area 3 lands could provide from sights and sounds associated with road construction not congruent with wilderness character.

Recommended wilderness is not suitable for developed recreation facilities that provide for user comforts such as picnic tables, fire grills, and vault toilets. These areas are generally in the primitive recreation opportunity spectrum setting, providing challenges and predominantly unmodified landscapes, and are managed for adventure and quiet solitude away from roads, people, and development.

Wildlife and Fish Management

Recommended wilderness areas are characterized by a natural environment where ecological processes such as natural succession, wildfire, and insects and disease function with a limited amount of human influence. Impacts from visitation do not detract from the natural setting. However, recommended wilderness is suitable for restoration activities where the outcomes will protect the wilderness character of the area if the ecological and social characteristics that provide the basis for each area's suitability for wilderness recommendation are preserved. Restoration activities or management activities for wildlife and fish could include monitoring; relocation of animals; habitat improvements, such as use of prescribed fire; removal of non-native fish species; and stream improvements. Refer to the 'Wildlife' and 'Aquatic Ecosystems and Fisheries' sections for additional information. If these practices are implemented while maintaining wilderness characteristics they will enhance these values. Close collaboration between managing agencies is necessary to the success of these practices.

Minerals Management

Mineral activities, as allowed, may only be to the extent permitted in the Idaho Roadless Rule (36 CFR 294.25- Mineral Activities in Idaho Roadless Areas). This would not change if an area became recommended wilderness. Therefore, there would be no changes in cumulative effects from current condition because of any alternative. There are currently no claims for leasable minerals within these areas. Sights, sounds, and ecosystem impacts of mining and mineral related activities interior and proximate to the recommended area could reduce the apparent naturalness and opportunity for solitude and primitive and unconfined recreation. It could also potentially impact ecological and geological, and historical features. Manageability could be affected by established rights associated with mining activity in a recommended area.

Summary of Effects

Table 433 provides a summary of effects to recommended wilderness by alternative.

Table 433. Recommended Wilderness Area indicator values by alternative (Alt)

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Acres of recommended wilderness	197,695	856,932	0	309,332	569,755	263,357
Change in miles of trails open to wheeled motorized use	0	-285	0	-42	-146	-2
Change in acreage of suitable motorized over-snow vehicle areas	0	-578,556	+278,390	-30,937	+278,383	-117,641
Change in miles of trails open to nonmotorized mechanized transportation	0	-648	+328	-59	+325	-14
Change in commercial rental (buildings and structures) units	0	0	0	0	-1	0
Acres of underrepresented ecological groups of the National Wilderness Preservation System	94,335	503,305	0	174,723	333,078	142,065

Data Source: Nez Perce-Clearwater GIS data.

The recommended wilderness areas offer vast landscapes that possess a high level, although to varying degrees, of wilderness attributes in terms of their wilderness characteristics and character. Activities that may be permitted in or near these areas have potential to enhance or diminish these values. The same could be said for every Wilderness and recommended wilderness in the Bitterroot ecosystem. While such impacts may occur, these recommended wilderness areas offer unbounded opportunity for natural processes to proceed untrammeled, areas that will remain natural in their state largely unaffected by external activities, and vast enough, quite enough, and challenging enough to find solitude and unconfined recreation limited only by one’s abilities, skills, and quest for adventure.

Wild and Scenic Rivers (Eligible and Suitable)

Beginning in 2017, under the direction of the 2012 Planning Rule, a Wild and Scenic River eligibility and suitability study was conducted on the Nez Perce-Clearwater. The 2017 eligibility process, as outlined in FSH 1090.12 Ch. 80, included a review of all named rivers and streams, collectively referred to as rivers, within and bordering the Nez Perce-Clearwater. These rivers were assessed to determine whether they were free flowing, had outstandingly remarkable values and had unimpaired water quality. All rivers found eligible were then analyzed for their suitability status, as outlined in FSH 1909.12 Chapter 80, under the direction of the 2012 Planning Rule which states “eligible river segments may be evaluated for their suitability for inclusion in the Wild and Scenic River System during the plan revision process” . The eligibility and suitability studies are included in Appendix F. This process identified 88 streams as eligible. The suitability status of these eligible rivers varies by plan alternative, as outlined below under environmental consequences.

For eligible and suitable rivers, a corridor of a quarter mile on either side of the river mean high water mark, 320 acres, will serve as the defined area of that river or segment. For management purposes, identified eligible and suitable Wild and Scenic River segments are classified as wild, scenic, or recreational.

- Wild - Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.
- Scenic - Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped but accessible in places by roads.
- Recreational - Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

Changes between draft and final environmental impact statement

Glover Creek was inadvertently identified as eligible and included in the Draft EIS. Its eligibility was based solely on the presence of the Coeur d'Alene salamander. The Coeur d'Alene salamander was reviewed for its potential as a wildlife species outstandingly remarkable value but was determined not to be a wildlife species that warrants designation as an outstandingly remarkable value. This species did not meet the screening criteria as a wildlife ORV for the following reasons: the species is water dependent but not river dependent; it is not a species of conservation concern and therefore was not identified as having regional or national significance; while it has narrow habitat characteristics it has an area of distribution from the Selway River north into Southern British Columbia, including parts of Western Montana; and, a study by the Idaho Department of Fish and Game determined that populations were present at 95% of previously surveyed locations and the populations are stable. Five percent are of unknown status (Cassirer et al. 1994).

Since the Coeur d'Alene salamander was the only element that determined Glover Creek's eligibility, and this species was not a wildlife outstandingly remarkable value, Glover Creek was removed from eligible status, and no further analysis of eligibility or suitability was conducted.

Consistent with Forest Service Handbook 1909.12, Chapter 80, 83.11, river segments previously found suitable through earlier study but not yet congressionally designated do not need to be reevaluated unless changed circumstances warrant consideration of a change in river status. Upon review as documented in the Final Environmental Impact Statement Appendix F, there are no changed conditions in the Salmon River segment that would warrant further consideration. Given that there are no changed conditions, Bureau of Land Management affirmation of suitability, and congressional direction to manage the lower Salmon under Wild and Scenic guidelines, this segment of the lower Salmon River retained its status as suitable for inclusion in the National Wild and Scenic Rivers System. Therefore, the eligible status identified for the Salmon River in the Draft Environmental Impact Statement was changed to suitable status in the Final Environmental Impact Statement.

Relevant Laws, Regulations, and Policy

Laws and Regulations

Organic Administration Act of 1897: This act states that one aspect of the mission of the national forests is to "provide favorable conditions of water flow."

Department of Agriculture Organic Act of 1944: This act provides direction on the establishment and protection of water rights.

Clean Water Act: The Federal Water Pollution Control Act, or Clean Water Act, is the principal law regulating discharges of pollutants to the waters of the United States. It provides direction intended to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Multiple-Use Sustained-Yield Act of 1960: Congress has affirmed the application of sustainability to the broad range of resources over which the Forest Service has responsibility. The Multiple-Use Sustained-Yield Act confirms the Forest Service's authority to manage the national forests and grasslands "for outdoor recreation, range, timber, watershed, and wildlife and fish purposes" (16 U.S.C. § 528) and does so without limiting the Forest Service's broad discretion in determining the appropriate resource emphasis or levels of use of the lands of each national forest and grassland.

Wild and Scenic Rivers Act of 1968: States the policy that certain selected rivers, with their immediate environments, shall be preserved in free-flowing condition and protected for the benefit and enjoyment of present and future generations. The Act established the National Wild and Scenic River System, designated initial rivers in that system, and prescribed methods and standards for the addition of rivers.

Endangered Species Act of 1973, as amended: Section 7(a)(1) supports biotic sustainability by requiring that "all . . . federal agencies shall . . . utilize their authorities in furtherance of the purposes of this act by carrying out programs for the conservation of endangered species and threatened species." Section 7(a)(2) includes direction that federal agencies, in consultation with the U.S. Fish and Wildlife Service, will not authorize, fund, or conduct actions that are likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitat.

The National Forest Management Act (16 U.S.C. 1600–1614, August 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, and 1990): This act directs the Forest Service to manage for a diversity of habitats to support viable populations (36 CFR § 219.19), and recognizes the fundamental need to protect and, where appropriate, improve the quality of soil, water, and air resources (Section 5(C)).

36 CFR part 219, subpart A: This regulation provides integrated resource management for multiple use. It states the responsible official shall consider "Aesthetic values, air quality, cultural and heritage resources, ecosystem services, fish and wildlife species, forage, geologic features, grazing and rangelands, habitat and habitat connectivity, recreation settings and opportunities, riparian areas, scenery, soil, surface and subsurface water quality, timber, trails, vegetation, viewsheds, wilderness, and other relevant resources and uses."

36 CFR 219.20: Requires conservation and protection of soil and water resources.

36 CFR 219.8 – Sustainability - (a)(4): Requires the Chief of the Forest Service to establish requirements for national best management practices for water quality in the Forest Service Directive System.

36 CFR 251.9: Authorizes the Chief of the Forest Service to enter into agreements with municipalities to restrict the use of National Forest System lands from which water is derived to protect the municipal water supplies.

2001 Roadless Area Conservation Rule (36 CFR § 294 subpart B; 66 FR 3244-3273): This rule includes a prohibition on road construction and road reconstruction in inventoried roadless areas and prohibits timber cutting, sale, or removal except in certain circumstances.

2012 Planning Rule: The rule requires Forests to maintain the diversity of plant and animal communities and support the persistence of native species within the plan area. Forests are directed to use a “complementary ecosystem and species-specific approach to provide for the diversity of plant and animal communities” and to maintain species persistence in their planning.

Policy

Forest Service Manual 1920: Land Management Planning, 1924 – Wild and Scenic River Evaluation: Establishes the policy for identification and management of eligible and suitable rivers to protect the values that provide the basis for their inclusion in the NWSR system as required by the 2012 Planning Rule.

Forest Service Handbook 1909.12: Land Management Planning, Chapter 80 – Wild and Scenic Rivers: Provides guidance on the determination of eligibility, suitability, and recommendation for designation of wild and scenic rivers for legislatively mandated or Forest Service-identified study rivers.

Forest Service Manual 2670: As an implementing rule of the 1976 National Forest Management Act: Requires federal land managers to maintain viable populations of all native and desirable non-native species, with special care taken to assure that federally listed species can recover. Actions that may cause a species to become listed as threatened or endangered are to be avoided.

Forest Service Manual 2380: This manual outlines Forest Service policy and direction for the management of scenic resources.

Forest Service Manual section 2380.31: This manual requires the use of the basic concepts, elements, principles, and variables defined in the ‘Agriculture Handbook 701 – Landscape Aesthetics: A Handbook for Scenery Management’ (U.S. Department of Agriculture 1995b), referred to as the scenery management system (SMS).

Snake River Recovery Plan (Snake River Basin Steelhead and Snake River Spring/Summer Chinook Salmon): The National Marine Fisheries Service has released final recovery plans for Snake River spring and summer Chinook salmon and steelhead in 2017 (National Oceanographic and Atmospheric Agency 2017).

Columbia River Bull Trout Recovery Plan and Recovery Unit Implementation Plans: The Columbia River bull trout recovery plan was completed in 2015. Recovery actions were developed in cooperation with federal, state, tribal, local, and other partners.

PACFISH and INFISH Amendments: In the early 1990s, concerns about stream habitat degradation in the Western United States, as well as the potential loss of salmon, trout, and char populations, increased (Nehlsen et al. 1991, Rieman and McIntyre 1993). In response, the Forest Service and Bureau of Land Management completed three broad reaching documents that amended forest plans across the west to improve their conservation function.

Nez Perce Tribe Department of Fisheries Resource Management Plan (2013–2028): The Nez Perce Tribe’s Fisheries Resource Management Plan includes a set of management goals and management objectives to achieve those goals. Management objectives include those related to achievement of escapement goals for anadromous fish, including habitat management of key populations within the Nez Perce-Clearwater such as Lolo Creek, the Potlatch River, the Upper South Fork Clearwater River, the Lochsa River, Meadow Creek, Moose Creek, and the Upper Selway River. Habitat management objectives include emphasis on watershed restoration within a "ridge-to-ridge" management philosophy where stream habitat is degraded. Fish management goals are consistent with those described in the Idaho Department of Fish and Game five-year management plan and within the Snake River recovery and implementation plans (National Oceanographic and Atmospheric Agency 2017), as the Nez Perce Tribe has worked closely with these agencies.

State and Local Laws

Idaho State Water Plan, November 2012: Provides a set of policies that guide the use, management, development, and conservation of water for all citizens.

Idaho Comprehensive State Water Plans for the North Fork Clearwater and South Fork Clearwater Rivers: These provide river-specific guidance for the development, management, and protection of the water and related resources.

Idaho Department of Fish and Game Five-year Fisheries Management Plan (2019): This management plan includes statewide principles related to management of fisheries and habitat; public involvement; rules such as fishing regulations; access; importation and introductions; cooperation with other agencies, Indian Tribes, outfitters and guides; habitat restoration and protection; and mitigation.

Methodology

Information sources and analysis

The information source is the Nez Perce-Clearwater geographic information system. See Appendix F for detailed information on the sources used.

Analysis area

The geographic scope of the analysis is the lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects, and the temporal scope is the life of the plan.

Measurement Indicators

- Miles and acres of eligible and suitable wild and scenic rivers

Affected Environment

Eligible Rivers

The 1987 Clearwater Forest Plan identified three stream segments as being potentially eligible for Wild and Scenic River designation. The forest plan was amended in 1990 to add four more stream segments, for a total of seven. Management direction for these streams is contained in forestwide management direction provided in the 1987 Clearwater National Forest Plan, as amended, and the Forest Service Handbook. Eligible Wild and Scenic River segments within the Clearwater National Forest are listed in Table 434**.**

Table 434. Eligible Wild and Scenic Rivers on the Clearwater National Forest

Stream	Section	Miles	Potential Classification	Primary ORV	Source
Cayuse Creek	Mouth to Silver Creek	31.5	Scenic	Not listed	1987 Forest Plan
Fish Creek	Mouth to Hungry Creek	4.7	Recreation	Not listed	1990 Forest Plan amendment no. 2
Hungery Creek	Entire length	13.8	Wild	Fisheries	1990 Forest Plan amendment no. 2
Kelly Creek	Mouth to bridge on Forest Road 581	11.2	Recreation	Recreation	1987 Forest Plan
Kelly Creek	Bridge on Forest Road, 581 to North and Middle Fork Kelly Creek confluence	15.0	Wild	Recreation	1987 Forest Plan
Little North Fork River	Clearwater NF River portion	4.3	Defer to Idaho Panhandle National Forest	Recreation	1990 Forest Plan amendment no. 2
North Fork Clearwater River	Dworshak high pool to Kelly Creek	62.8	Recreation	Recreation	1987 Forest Plan
White Sand Creek (aka Colt Killed Creek)	Mouth to Wilderness boundary	13.7	Recreation	Not Listed	1990 Forest Plan amendment no. 2

Data Source: Clearwater 1987 Forest Plan and Nez Perce-Clearwater GIS data.

The 1987 Nez Perce Forest Plan identified nineteen river segments, totaling 376 miles, as being potentially eligible for Wild and Scenic River designation. Eligible Wild and Scenic Rivers do not have a unique management area designation in the Nez Perce Forest Plan. Management direction for these streams is contained in the forestwide management direction provided in the 1987 Nez Perce Forest Plan, as amended by Forest Plan Amendment Number 1, and the Forest Service Handbook.

It should be noted that the previous Land Management Plan process recommended that two stream segments, Bear Creek Complex and Three Links Creek, be dropped from eligibility. Because no decision was issued for Land Management Plan, those streams remain eligible Wild and Scenic River segments.

Following the 1987 Forest Plan, additional analysis was conducted on the 15 tributaries of the Upper Selway River, including Running Creek, Bear Creek Complex, Moose Creek Complex, Three Links, and West Fork Three Links creeks and Gedney and West Fork Gedney creeks, to determine suitability for designation. An environmental impact statement was prepared in 1995, yet no decision was issued, and the streams' status as eligible rivers remains as described in the 1987 Clearwater National Forest Plan. Eligible Wild and Scenic River segments within the Nez Perce National Forest are listed in Table 435.

Table 435. Eligible Wild and Scenic Rivers on the Nez Perce National Forest, and their potential Outstandingly Remarkable Values

Stream	Section	Potential Classification	Miles	Potential ORVs	Source
Bargamin Creek	Mouth the headwaters	Wild	25.6	C, F, R, S, T&E, V, W	1987 Forest Plan
Bear Creek Complex	Mouth to headwaters, including Cub Creek, Brushy Fork Creek, Paradise Creek, and Wahoo Creek	Wild	71.0	C, F, G, R, S, T&E, V, W	1987 Forest Plan
Johns Creek	Mouth to headwaters	Wild	18.4	F, R, S, W	1987 Forest Plan
Lake Creek	Headwaters to wilderness boundary	Recreation	3.9	C, G, R, S, T&E, V, W	1987 Forest Plan
Lake Creek	Wilderness boundary to Crooked Creek	Wild	9.8	C, G, R, S, T&E, V, W	1987 Forest Plan
Meadow Creek	Mouth to Slims Campground	Recreation	1.2	C, G, R, S, T&E, V, W	1987 Forest Plan
Meadow Creek	Headwaters to Slims Campground	Wild	43.1	C, G, R, S, T&E, V, W	1987 Forest Plan
Moose Creek Complex	Mouth to headwaters, including East Fork, North Fork, West Fork, and Rhoda creeks	Wild	84.6	C, F, G, R, S, T&E, V, W	1987 Forest Plan
Running Creek	Mouth to headwaters	Wild	16.9	F, G, R, W	1987 Forest Plan
Salmon River	Confluence with Little Salmon River to Long Tom Bar	Recreation	26.2	C, F, R, S, W	1987 Forest Plan
Slate Creek	Wilderness boundary to mouth	Recreation	16.0	C, F, G, R, S	1987 Forest Plan
Slate Creek	Headwaters to Wilderness Boundary	Wild	6.3	C, F, G, R, S	1987 Forest Plan
South Fork Clearwater	Mouth to confluence with Red River	Recreation	62.9	F, G, R. S	1987 Forest Plan
White Bird Creek	Confluence of North Fork and South Fork to Salmon River	Recreation	5.8	C, F, G	1987 Forest Plan
Three Links Creek	Mouth to headwaters, including West Fork	Wild	20.7	C, F, G, R, S, V	1987 Forest Plan
West Fork Gedney Creek	Headwaters to wilderness boundary	Wild	5.0	C, F, G, R, S, V	1987 Forest Plan

Potential Outstanding Remarkable Values (ORVs): C = Cultural, F = Fisheries, G = Geologic, R = Recreation, T&E = Threatened and Endangered Species or Habitat, S = Scenic, V = Vegetation, W = Wildlife

Data Source: Nez Perce 1987 Forest Plan and Nez Perce-Clearwater GIS data.

Environmental Consequences

Effects Common to the No Action Alternative, Alternatives W, Y, and Z, and the Preferred Alternative

Rivers found eligible within the No Action Alternative, suitable within Alternatives W, Y, and Z, or eligible or suitable under the Preferred Alternative would continue to be managed according to Forest Service policy regarding eligible and suitable Wild and Scenic Rivers, including the quarter mile area on either side of each rivers high water mark. Alternatives W, Y, and Z and the Preferred Alternative would also be managed according to Management Area 2 guidance to protect their free-flowing condition and outstandingly remarkable values, maintain water quality, and continue to meet their preliminary classification of "recreational", "scenic", or "wild." Both eligible and suitable rivers are given the same interim protection measures as outlined by Forest Service Handbook (FSH) 1909.12 Chapter 80.

Effects to the No Action Alternative

Under the No Action Alternative, the Nez Perce-Clearwater will continue to manage all eligible rivers as determined by the 1987 amended forest plans as eligible and consistent with management direction found in FSH 1909.12 Chapter 80. This alternative identified 29 stream segments as eligible, totaling 574.4 miles with 183,808 acres. The No Action Alternative provides protection for several stream segments that are not found in any of the other alternatives. Slate Creek, Whitebird Creek, and Lake Creek are only covered by the No Action Alternative. Additionally, although overlapping portions are covered in other alternatives, the No Action Alternative includes several river segments that are off forest and were not evaluated under the action alternatives. This includes portions of the North and South Forks of the Clearwater River, Salmon River, Slate Creek and Whitebird Creek. These river segments that are outside of the administrative boundary of the Nez Perce-Clearwater, not including acreage on other forests, amount to 10,954.8 acres, or 34.2 miles.

Although the No Action Alternative encompasses the greatest acreage and river miles, these river segments are further away from final designation decision than rivers considered in other alternatives. This alternative would maintain the status of these rivers as eligible and defer a suitability study to a later date. A suitability study provides the basis for determining which eligible rivers or river segments should be recommended to Congress as potential additions to the National System. Due to the unknown outcome of a future suitability determination on rivers in the No Action Alternative, a direct comparison to the action alternatives is unwarranted, as it would be speculative.

Effects that Vary by Action Alternative

Alternative W

Under Alternative W, suitable wild and scenic rivers would be managed according to Forest Service policy and Management Area 2 direction and would be managed to sufficiently protect free flow and the identified outstandingly remarkable values.

This alternative would place 12 streams in suitable status, encompassing a total of 232.7 stream miles with 74,464 acres. Of this, 114.3 stream miles encompassing 36,576 acres would be managed as a recreational or scenic river under Forest Service policy and Management Area 2c direction (Table 436). A total of 118.4 additional miles encompassing 37,888 acres would be managed as wild under the above listed direction (Table 437). Alternative W has more river miles classified as suitable wild and scenic than Alternative X but less than Alternatives Y and Z.

Table 436. Summary of Alternative W Suitable Recreational and Scenic River segments

Stream	Classification	Miles	Acres	ORVs
Cayuse Creek	Scenic	4.5	1,440	R, F
Cayuse Creek	Recreation	1.7	544	R, F
Fish Creek	Scenic	20.2	6,464	F, W
Fish Creek	Recreation	0.9	288	F, W
Hungery Creek	Scenic	5.6	1,792	F
Kelly Creek	Recreation	11.2	3,584	R, S, F, C, NP, W
Meadow Creek	Recreation	2.0	640	R, C, NP, F, W
Meadow Creek	Scenic	16.5	5,280	R, C, NP, F, W
Salmon River	Recreation	23.2[1]	7,424[1]	R, S, W
Weitas Creek	Scenic	28.5	9,120	NP
Total	n/a	114.3	36,576	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

[1]Includes lands administered by the Payette National Forest.

Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Table 437. Summary of Alternative W Suitable Wild River segments

Stream	Classification	Miles	Acres	ORVs
Cayuse Creek	Wild	29.7	9,504	R, F
Hungery Creek	Wild	8.2	2,624	F
Johns Creek	Wild	18.3	5,856	S, F
Kelly Creek	Wild	15.0	4,800	R, S, F, C, CNPT, W
Little North Fork Clearwater	Wild	4.3	1376	S, B
Meadow Creek	Wild	25.9	8,288	R, C, NP, F, W
Middle Fork Kelly Creek	Wild	4.9	1,568	S
North Fork Kelly Creek	Wild	5.9	1,888	S
South Fork Kelly Creek	Wild	6.2	1,984	F
Total	n/a	118.4	37,888	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

Data Source: Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Alternative X

Under Alternative X, no rivers were found suitable and would be managed under other Land Management Plan directions and in accordance with the Idaho Comprehensive State Water Plans. There are two State Water Plans that cover the area managed by the Nez Perce-Clearwater: one for the North Fork Clearwater drainage and one for the South Fork Clearwater drainage. These plans provide some level of protection but are not as encompassing as Forest Service policy for rivers found eligible or suitable. For example, eligible or suitable wild and scenic rivers are given an interim boundary of a quarter mile from the mean high-water mark, whereas state identified natural and recreation rivers only extend protections into the riparian area. State designated natural rivers have prohibitions on the construction or expansion of dams or impoundments, hydropower projects, and water diversion works. Additionally, new dredge or place mining activities and sand and mineral extraction within the stream bed, as well as stream bed alteration, would be prohibited. For state designated rivers classified as recreational, those same prohibitions would apply except for stream bed alteration for the purposes of maintenance and construction of bridges and culverts and the instillation of fisheries enhancement structures. Furthermore, mineral, sand, and gravel extraction and recreational suction dredging are allowed on the North and South Fork(s) of the Clearwater River(s).

For a full list of rivers covered by Idaho State Comprehensive Water Plans and their values and designations see Appendix K.

Under this alternative, all rivers will be afforded protections derived from other plan components that protect waterways and riparian areas. These components buffer the streams by 300 feet, which is significantly less than the quarter mile corridor for suitable wild and scenic rivers.

Alternative Y

Under Alternative Y, suitable wild and scenic rivers would be managed according to Forest Service policy and Management Area 2 direction and would be managed to sufficiently protect free flow and the identified outstandingly remarkable values.

This alternative would place 14 streams in suitable status, encompassing a total of 346.1 stream miles with 110,752 acres. Of this, 219.5 stream miles encompassing 70,240 acres would be managed as a recreational or scenic river under Forest Service policy and Management Area 2c direction (Table 438). Additionally, 126.6 miles encompassing 40,512 acres would be managed as wild under the above listed direction Table 439). Alternative Y has more river miles classified as suitable wild and scenic than Alternative W and X but less than Alternative Z.

Table 438. Summary of Alternative Y Suitable Recreational and Scenic segments

Stream	Classification	Miles	Acres	ORVs
Cayuse Creek	Scenic	4.5	1,440	R, F
Cayuse Creek	Recreation	1.7	544	R, F
Fish Creek	Scenic	20.2	6,464	F, W
Fish Creek	Recreation	0.9	288	F, W
Hungery Creek	Scenic	5.6	1,792	F
Kelly Creek	Recreation	11.2	3,584	R, S, F, C, NP, W
Meadow Creek	Recreation	2.0	640	R, C, NP, F, W
Meadow Creek	Scenic	16.5	5,280	R, C, NP, F, W
Salmon River	Recreation	23.2[1]	7,424	R, S, W
Weitas Creek	Scenic	28.5	9,120	NP
South Fork Clearwater	Recreation	34.5	11,040	R, S, C, NP, F, W
North Fork Clearwater	Recreation	70.7	22,624	R, S, C, NP, F, W, B
Total	n/a	219.5	70,240	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Table 439. Summary of Alternative Y Suitable Wild River segments

Stream	Classification	Miles	Acres	ORVs
Cayuse Creek	Wild	29.7	9,504	R, F
Hungery Creek	Wild	8.2	2,624	F
Johns Creek	Wild	18.3	5,856	S, F
Kelly Creek	Wild	15.0	4,800	R, S, F, C, NP, W

Little North Fork Clearwater	Wild	4.3	1,376	S, B
Meadow Creek	Wild	25.9	8,288	R, C, NP, F, W
Middle Fork Kelly Creek	Wild	4.9	1,568	S
North Fork Clearwater	Wild	8.2	2,624	R, S, C, NP, F, W, B
North Fork Kelly Creek	Wild	5.9	1,888	S
South Fork Kelly Creek	Wild	6.2	1,984	F
Total	n/a	126.6	40,512	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Alternative Z

Under Alternative Z, suitable wild and scenic rivers would be managed according to Forest Service policy and Management Area 2 direction and would be managed to sufficiently protect free flow and the identified outstandingly remarkable values.

This alternative would place 37 streams in suitable status, encompassing a total of 455.48 stream miles with 145,757.3 acres. Of this, 122.81 stream miles encompassing 39,302.2 acres would be managed as a recreational or scenic river under Forest Service policy and Management Area 2c direction (Table 440). Additionally, 332.67 miles encompassing 145,757.3 acres would be managed as wild under the above listed direction (Table 441). Alternative Z has more river miles classified as suitable wild and scenic than all other action alternatives.

Table 440. Summary of Alternative Z Suitable Recreational and Scenic River segments

Stream	Classification	Miles	Acres	ORVs
Colt Killed Creek	Scenic	13.7	4,384	R, S, F, W
Crooked Fork Creek	Recreational	18.8	6,016	F, W
East Fork Meadow Creek	Scenic	7.0	2,240	F
Fish Creek	Scenic	20.2	6,464	F, W
Fish Creek	Recreational	0.9	288	F, W
Hungery Creek	Scenic	5.6	1,792	F
Kelly Creek	Recreational	11.2	3,584	R, S, F, C, NP, W
Meadow Creek (Selway)	Scenic	16.5	5,280	R, C, NP, F, W
Meadow Creek (Selway)	Recreational	2.0	640	R, C, NP, F, W
Running Creek	Scenic	1.9	608	NP
Salmon River	Recreational	23.2[1]	7,424[1]	R, S, W
Silver Creek	Scenic	0.5	160	NP
Silver Creek	Recreational	3.9	1,284	NP
Upper Lochsa	Recreational	1.8	576	R, F, W
Weitas Creek	Scenic	28.5	9,120	NP
Total	n/a	155.7	49,824	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

[1] Includes lands administered by the Payette National Forest.

Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Table 441. Summary of Alternative Z Suitable Wild River segments

Stream	Classification	Miles	Acres	ORVs
Bargamin Creek	Wild (2 segments)	22.8	7,296	F
Bear Creek	Wild	22.8	7,296	S, C, F, W
Big Sand Creek	Wild	19.9	6,368	S, F
Bostonian Creek	Wild	5.0	1600	F
Boundary Creek	Wild	3.1	992	F
Brushy Fork Creek (S)	Wild	8.0	2,560	S
Buck Lake Creek	Wild	12.0	3,840	F
Caledonia Creek	Wild	0.5	160	F
Colt Killed Creek	Wild	9.6	3,072	R, S, F, W
Crooked Fork Creek	Wild	4.4	1,408	F, W
Cub Creek	Wild	16.6	5,312	S
East Fork Moose Creek	Wild	34.6	11,072	S, C, F
Graves Creek	Wild	2.0	640	F
Hungery Creek	Wild	8.2	2,624	F
Johns Creek	Wild	18.3	5,856	S, F
Kelly Creek	Wild	15.0	4,800	R, S, F, C, NP, W
Little North Fork Clearwater	Wild	4.3	1,376	S, B
Meadow Creek (Selway)	Wild	25.9	8,288	R, C, NP, F, W
Middle Fork Kelly Creek	Wild	4.9	1,568	S
Moose Creek	Wild	3.8	1,216	S, C, F
North Fork Kelly Creek	Wild	5.9	1,888	S
North Fork Moose Creek	Wild	20.8	6,656	S, C, F
North Fork Storm Creek	Wild	3.2	1,024	S
Rhoda Creek	Wild	16.3	5,216	S, F
Running Creek	Wild (2 Segments)	15.0	4,800	NP
Sabe Creek	Wild	15.3	4,896	F
Silver Creek	Wild	7.9	2,528	NP
South Fork Kelly Creek	Wild	6.2	1,984	F
South Fork Storm Creek	Wild	3.7	1,184	S
Storm Creek	Wild	10.2	3,264	S
West Fork Moose Creek	Wild	8.2	2,624	F
Wounded Doe Creek	Wild	9.2	2,944	F
Total	n/a	363.6	116,352	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Preferred Alternative

Under the Preferred Alternative, eligible and suitable wild and scenic rivers would be managed according to Forest Service policy and Management Area 2 direction and would be managed to sufficiently protect free flow and the identified outstandingly remarkable values.

This alternative would place 11 rivers in suitable status, encompassing a total of 233.4 river miles with 74,687 acres. Of this, 128 river miles, encompassing 40,959 acres, would be managed as a recreational or scenic river under Forest Service policy and Management Area 2 direction (Table 442). Additionally, 105.4 miles, encompassing 33,728 acres, would be managed as wild under the above listed direction (Table 443).

Table 442. Summary of Preferred Alternative Suitable Recreational and Scenic River segments

Stream	Classification	Miles	Acres	ORVs
Cayuse Creek	Scenic	4.5	1,440	R, F
Cayuse Creek	Recreation	1.7	544	R, F
Colt Killed Creek	Scenic	13.7	4,383	R, S, F, W
Fish Creek	Scenic	20.2	6,464	F, W
Fish Creek	Recreation	0.9	288	F, W
Hungery Creek	Scenic	5.6	1,792	F
Kelly Creek	Recreation	11.2	3,584	R, S, F, C, NP, W
Meadow Creek	Recreation	2.0	640	R, C, NP, F, W
Meadow Creek	Scenic	16.5	5,280	R, C, NP, F, W
Salmon River	Recreation	23.2	7,424	R, S, W
Weitas Creek	Scenic	28.5	9,120	NP
Total	n/a	128	40,959	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

[1] Includes lands administered by the Payette National Forest

Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Table 443. Summary of Preferred Alternative Suitable Wild River segments

Stream	Classification	Miles	Acres	ORVs
Cayuse Creek	Wild	29.7	9,504	R, F
Colt Killed Creek	Wild	9.6	3,072	R, S, F, W
Hungery Creek	Wild	8.2	2,624	F
Kelly Creek	Wild	15.0	4,800	R, S, F, C, NP, W
Meadow Creek	Wild	25.9	8,288	R, C, NP, F, W
Middle Fork Kelly Creek	Wild	4.9	1,568	S
North Fork Kelly Creek	Wild	5.9	1,888	S
South Fork Kelly Creek	Wild	6.2	1,984	F
Total	n/a	105.4	33,728	n/a

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

Data Source: Data Source: Appendix F and Nez Perce-Clearwater GIS data.

This alternative would also place one river in eligible status, encompassing a total of 4.3 river miles with 1,376 acres that would retain wild and scenic river interim protection measures. This 4.3 river miles would be managed as wild (Table 444). The Preferred Alternative has more river miles classified as suitable wild and scenic than Alternative W and X, but less than Alternatives Y and Z. The Preferred Alternative has more miles classified as eligible with interim protections than Alternatives W, X, Y, and Z.

Table 444: Summary of Preferred Alternative Eligible[1] Wild River segments

Stream	Classification	Miles	Acres	ORVs
Little North Fork Clearwater River	Wild	4.3	1,376	R, S, NP, F, B

ORV (Outstandingly Remarkable Value) key: R= recreation, S= scenery, F= fish, C= cultural, NP= cultural Nez Perce Tribe, W= wildlife, G= geology, B= botany.

1 This river will retain W&SR interim protection measures.

Data Source: Data Source: Appendix F and Nez Perce-Clearwater GIS data.

Cumulative Effects

Cumulative effects are the potential impacts to wild and scenic rivers from the alternatives when combined with past, present, and reasonably foreseeable actions. The lands within the Nez Perce-Clearwater boundary, and the named rivers and streams contained therein, form the geographic scope for evaluating cumulative effects. The temporal bound is the life of the Land Management Plan.

To integrate the contribution of past actions to the cumulative effects of the proposed action and alternatives, existing conditions are used as a proxy for the impacts of past actions. This is because existing conditions reflect the aggregate impact of all prior actions that have affected wild and scenic rivers and might contribute to cumulative effects. Water-related activities, such as fishing, rafting, kayaking, and similar uses, are expanding as the population in the nearby urban and rural areas increases and access points are developed. These activities have been steadily increasing and occur mostly at dispersed sites and some developed recreation sites, such as along the North Fork and South Fork of the Clearwater River, and Salmon River.

Management direction for eligible and suitable rivers is found in FSM 1909.12, Chapter 80, Section 84. Management activities generally take place outside of suitable wild and scenic river corridors, unless an action is needed to help protect the identified outstandingly remarkable value, improve the free flow characteristics, or maintain existing access and infrastructure. For example, if invasive weeds were discovered in an eligible or suitable river corridor, there might be a need to take some action, such as hand pulling or herbicide application, to eradicate or prevent further spread.

Effects to Resource from Other Resources

The following are consequences to eligible and suitable wild and scenic rivers from Land Management Plan components associated with other resource programs or management activities.

Fire Management

Natural, unplanned ignitions and prescribed fires are used as tools to maintain ecological conditions within river corridors. These fire management components may be used so long as they maintain the outstandingly remarkable values and free flowing nature of the identified rivers. In a wild segment, prescribed fire and wildfires managed to meet resource objectives may be used to restore or maintain habitat for threatened, endangered, or sensitive species or restore the natural range of variability. In scenic and recreational segments, plan components for fire management would encourage an appropriate management response to wildfires and provide opportunities for natural fire to promote and/or enhance the characteristics of these areas.

Vegetative Management

For rivers found eligible or suitable and classified as wild, the cutting of trees and other vegetation is not allowed within the corridor except when needed to maintain a primitive recreation experience, to protect users, or to protect outstandingly remarkable values. For this reason, there would be minimal effects from timber harvest on these segments. On eligible or suitable rivers classified as scenic or recreational, a range of vegetation management and timber harvest is allowed within the corridor if these practices are designed to protect users or protect, restore, or enhance the river environment and its outstandingly remarkable values. For this reason, there would be minimal effects from timber harvest on these segments.

Recreation and Access

Eligible and suitable wild rivers and their corridors will have restricted development of recreation facilities and infrastructure. New major public-use areas, such as development level 4 and 5 campgrounds, interpretive centers, or administrative headquarters, should not be constructed in these river corridors. Minimum facilities, such as toilets, should be constructed only where necessary to protect and enhance water quality or outstandingly remarkable values. All facilities should be located and designed to harmonize with the primitive character and natural and cultural settings of the river corridor and be screened from view from the river to the extent possible. Additionally, roads, airfields, and railroads are generally not compatible with wild river classification and would not be authorized. Plan components would prevent actions that would preclude classification of the river as wild. New trail construction should generally be designed for non-motorized uses. Motorized travel on land or water is generally not compatible with a wild classification. However, it may be permitted when deemed to be necessary if it is carefully defined and the effects are mitigated.

Eligible and suitable rivers classified as scenic will allow for new roads or railroads to occasionally parallel the river or bridge the river if such construction protects outstandingly remarkable values, including the rivers free-flowing character. Bridge crossings and other roads leading to river access are allowed. Recreational classified rivers allow for roads and railroads to parallel the river if construction protects outstandingly remarkable values and the rivers free-flowing character. New facilities in scenic river corridors, such as development level 3 campgrounds, toilets, and boat ramps, are allowed within the river corridor if they are located and designed to harmonize with their natural and cultural settings, protect outstandingly remarkable values, and be screened from view from the river to the greatest extent possible.

Rivers classified as recreational may have new recreation, administrative, and river access facilities located in the river corridor close to the river. These facilities will be designed to harmonize with their natural and cultural settings, protect outstandingly remarkable values, and be screened from view from the river to the greatest extent possible. Additionally, new roads, railroads, and airfields would be permitted to parallel the river if such construction fully protects free flow and river values.

For rivers classified as recreational or scenic, motorized travel on land and water may be permitted, prohibited, or restricted to protect the outstandingly remarkable values and free flow.

Mineral Development

Saleable Minerals: On eligible and suitable wild river segments, collection and disposal of saleable minerals would be prohibited. On eligible and suitable rivers classified as scenic or recreational, saleable mineral disposal will be allowed if the outstandingly remarkable values, water quality, and free flow are protected. Mineral materials are present and could potentially be used for construction purposes but, generally, proposals for development of mineral materials do not occur and allowing such development would be at the discretion of the Nez Perce-Clearwater.

Leasable Minerals: On all eligible and suitable wild and scenic rivers, leases, licenses, and permits under mineral leasing laws must include conditions necessary to protect the values of the river corridor that make it suitable for inclusion into the National System. The potential for leasable minerals is low across most of the Nez Perce-Clearwater and, currently, there are no permits or operating plans for exploration within the eligible and suitable corridors.

Locatable Minerals: Existing or new mining activity on eligible and suitable rivers classified as wild, scenic, or recreational are subject to regulations in 36 CFR part 228 and must be conducted in a manner that minimizes surface disturbance, sedimentation, pollution, and visual impairment.

Anticipated effects from minerals management would be low under all alternatives. Eligible and suitable rivers potentially classified as wild, scenic, or recreational are not withdrawn from mineral entry and are suitable for mineral exploration and development as long as the outstandingly remarkable values for which the river was deemed eligible are maintained and protected.

Summary of Effects

A summary of Wild and Scenic River indicator values among alternatives are presented in Table 445.

Table 445. Eligible and Suitable Wild and Scenic Rivers indicator values by alternative (Alt)

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Number of suitable or eligible wild and scenic rivers segments	29	12	0	14	37	11 suitable 1 eligible
Total miles	574.4	232.7	0	346.1	519.3	237.6
Total acres	183,808	74,464	0	110,752	166,176	76,032

Data Source: Data Source: Appendix F and Nez Perce-Clearwater GIS data.

3.6.3 Research Natural Areas

Research natural areas are permanently established to maintain areas of natural ecosystems and areas of special ecological significance. These protective designations were made in an attempt to maintain natural ecosystem components and processes and are cooperatively identified and managed with the U.S. Department of Agriculture Forest Service Rocky Mountain Research Station. These areas form a long-term network of ecological reserves established as baseline areas for non-manipulative research and the maintenance of biodiversity. They are administratively designated by the U.S. Forest Service Northern Region Regional Forester, with research station director concurrence. In some cases, stewardship management is needed to maintain or restore the target plant communities in research natural areas, including actions such as invasive weed control or prescribed fire. These management activities are also coordinated between the national forests and the research station.

The Nez Perce-Clearwater has 18 designated research natural areas and two proposed research natural areas (pRNA) that were first proposed in the 1987 Forest Plan and continue to be proposed under all alternatives. An additional two candidate research natural areas (cRNA) and the expansion of an existing research natural area would be formally proposed under the action alternatives.

- Designated research natural areas are those that have been formally established by a decision signed by the regional forester, with concurrence of the research station director, after being vetted through the Nez Perce-Clearwater and Rocky Mountain Research Station via forest planning, during revision, or by amendment.
- Proposed research natural areas have been vetted through the Nez Perce-Clearwater and Rocky Mountain Research Station via forest planning, either in revision or by amendment, but have not been established by a regional forester decision.
- Candidate research natural areas have not been fully vetted by the Nez Perce-Clearwater and the Rocky Mountain Research Station and have not been included in a forest plan decision.

Research Natural Areas serve three important functions:

- **Reference Areas —** Research natural areas serve as benchmarks for monitoring and evaluating the sustainability and impacts of land management practices on lands with similar ecosystems. To determine the impact of management on an area, it is useful to have, as a control, a similar area maintained in natural condition for comparison. Research natural areas contribute to ecosystem management by providing these controls.
- **Biological Diversity —** Research natural areas provide protection for biological diversity. A representative research natural areas system provides some degree of assurance that a wide array of plant and animal species will be afforded a high degree of protection in the future. This protection may be most important for soil microorganisms, fungi, insects, and other forms of biological diversity on which ecosystems often depend the most but about which we know the least. Research natural areas also can be selected to help protect specific populations of threatened, endangered, or sensitive species.
- **Research —** Research natural areas provide sites for research into how ecosystems function since the ecological and evolutionary processes influencing them are functioning in a relatively natural state. They serve as sites for monitoring long-term change in ecosystems, such as global climate change and shifting patterns in the landscape, that result from such disturbances as fire, floods, and insect epidemics. Research projects in an identified research natural area can greatly increase our understanding of particular ecosystems and improve the quality of ecosystem management. Research natural areas also serve an important educational function by providing excellent examples of ecosystems in a relatively natural condition, with functioning ecological processes.

Relevant Laws, Regulations, and Policy

Federal Laws

Organic Administration Act of June 4, 1897 (16 U.S.C. 477-482, 551): This act authorizes the Secretary of Agriculture to issue rules and regulations for the occupancy and use of the National Forests.

National Forest Management Act of 1976 (16 U.S.C. 1600): This act states that the Secretary of Agriculture shall "promulgate regulations" under the principles of the Multiple-Use Sustained-Yield Act of 1960 to "provide for the diversity of plan and animal communities based on the suitability and capability of the specific land area" and to maintain tree species diversity within the context of multiple-use objectives.

Agency Regulations

36 CFR 219.7 — Special Designations: This regulation states that, in developing a proposed plan revision, the responsible official shall identify existing designated areas and determine whether to recommend any additional areas for designation. Forest plans must include components for appropriate management of existing or proposed designated areas. Furthermore, the planning rule requires Forests to maintain the diversity of plant and animal communities and support the persistence of native species within the plan area. Forests are directed to use in their planning a "complementary ecosystem and species-specific approach to provide for the diversity of plant and animal communities" and to maintain species persistence. These requirements are partially filled by the inclusion of research natural areas based upon high species diversity.

36 CFR 219.9 — Diversity of Plant and Animal Communities: This regulation states that the responsible official will evaluate whether the plan components provide the ecological conditions necessary to contribute to the recovery of federally listed species, conserve proposed and candidate species, and maintain a viable population of species of conservation concern in the plan area. Evaluation would consider components that provide for ecosystem integrity and diversity and species-specific components. This requirement is partially filled by the inclusion of research natural areas that often have numerous occurrences of at-risk species.

Policy

Forest Service Manual 4063: This policy directs management of research natural areas as part of a national network of ecological areas allocated in perpetuity for research and education and to maintain biological diversity on National Forest System lands. Research natural areas are co-managed by the appropriate national forest and the U.S. Forest Service Research Station.

Forest Service Manual 4063.03: This policy states forest plans shall include analysis of, and recommendations for, the establishment of any proposed research natural areas.

Northern Region Natural Areas Assessment: This policy provides an assessment of plant community types needed to fulfill the regional spectrum of types to be placed in research natural area status in the U.S. Forest Service Northern Region (Chadde et al. 1996).

Establishment records for each research natural area

These records provide information on the natural features, plant communities, and species present in each research natural area, as well as management guidance.

State and Local Plans

Representativeness Assessment of Research Natural Areas on National Forest System lands in Idaho (Rust 2000).

Methodology

Spatial Scale

The geographic scope of the analysis is the lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects.

Temporal Scale

The temporal scope is the life of the plan.

Past, Present, and Future Activities used in the Analysis

Research natural areas provide reference conditions or settings that are reserved to represent the range of plant communities and species in the region. As such, they are generally ecologically intact and have had few, if any, past activities that have had meaningful impacts to these resources. Some research natural areas have seen peripheral recreational use, grazing activity, or fire. Research natural areas are generally excluded from management activities, but some uses may occur in the future as directed by the establishment records or on a case-by-case basis after review by Nez Perce-Clearwater officials and the U.S. Forest Service Research Station to establish need and policy compliance. Vegetation management, weed control, and grazing are examples of activities that potentially could occur in the future management of some research natural areas on the Nez Perce-Clearwater. Unplanned disturbances would likely be from wildfire or low-levels of recreational use.

Methods and Assumptions

Specialists from the Nez Perce-Clearwater and U.S. Forest Service Northern Regional Office, with research scientists from the Rocky Mountain Research Station, have identified the lands on the Nez Perce-Clearwater that possess characteristics that make them suitable for research natural area establishment. Information and management guidance for each research natural area are provided within the establishment records. A guidebook on research natural areas also provides a synopsis of the natural features protected in each research natural area and information about use of the areas for research (Evenden et al. 2001).

Measurement Indicators

- Number of research natural areas
- Number of proposed research natural areas
- Number of candidate research natural areas
- Number of research natural area expansions
- Acres of research natural areas
- Acres of proposed research natural areas
- Acres of research natural area expansion
- Supports research natural area values

Affected Environment

Existing Condition

The National Forest Management Act of 1976 directs the Forest Service to establish research natural areas typifying important forest, shrubland, grassland, alpine, and aquatic ecosystems. In addition to their value as reference areas for research and monitoring, research natural areas help maintain biological diversity by conserving assemblages of common and rare species, plant communities relatively undisturbed by human actions, and unique landscape features. The *1983 Northern Region Guide* (U.S. Department of Agriculture 1983) included a matrix of habitat types, community types, and aquatic features targeted for inclusion in the Northern Region's research natural area system. Major revision of this 1983 regional guide for research natural areas was completed in 1996 (Chadde et al. 1996), giving new targeted plant communities and other features for inclusion in research natural areas. Many research natural areas have been formally established over the past 30 years, including 18 on the Nez Perce-Clearwater. Two proposed research natural areas that were in the current forest plan, one expansion of a designated research natural area, and two new candidate research natural areas are included under the action alternatives. Target assignments from the 1996 assessment yet filled on the Nez Perce-Clearwater are not included in this document but could be added in the future as information and opportunity arise.

The established research natural areas on the Nez Perce-Clearwater are permanently designated for the purpose of conserving biodiversity, conducting non-intrusive research and monitoring, and fostering education. They serve as high-quality representative areas of the major forms of vegetative variability found in the Nez Perce-Clearwater, and they present reference areas for the study of natural ecological processes, including disturbances and climate change. Table 446 lists the 18 existing research natural areas on the Nez Perce-Clearwater, with a brief description of each following the table. Two long-proposed research natural areas, Fenn Mountain and Rhodes Peak, are also included. Upper Hemlock Creek, Mud Springs Ridge, and expansion of the Bull Run research natural areas were not formally included in the 1987 plan or with an amendment to the plan so these are listed as candidate research natural areas in the existing condition.

Table 446. Designated, Proposed and Candidate Research Natural Areas

Research Natural Areas	Designated	Proposed	Candidate	Acres[1]
Aquarius	●			3,709
Bald Mountain	●			369
Bull Run Creek	●			383
Bull Run Creek Expansion			●	370
Chateau Falls	●			198
Dutch Creek	●			302
Elk Creek	●			6,957
Fenn Mountain		●		603
Fish Lake	●			753
Four-Bit Creek	●			392
Grave Peak	●			379
Lochsa River	●			1,508
Moose Meadow Creek	●			940
Mud Springs Ridge			●	288
No Business Creek	●			1,385
O'Hara Creek	●			7,049
Rhodes Peak		●		307
Sneakfoot Meadow	●			1,946
Square Mountain Creek	●			704
Steep Lakes	●			797
Fred Rabe Upper Hemlock Creek			●	1,378
Upper Newsome Creek	●			1,192
Warm Springs Creek	●			537

[1]Acre values are derived from close Geographic Information System mapping following the boundary descriptions included in the research natural areas establishment records. The acre values given in the records are often estimates based upon older mapping methods; thus, the values given here are considered most accurate.

Existing Research Natural Areas

Aquarius Research Natural Area

Aquarius Research Natural Area is located along the North Fork of the Clearwater River at the upper end of Dworshak Reservoir. This section of the North Fork is a low elevation canyon characterized by relatively warm temperatures and high precipitation. This combination of climatic factors, which is rather unusual in the Northern Rocky Mountains, is responsible for an extraordinary assemblage of disjunct and endemic plant and animal taxa and unique vegetation types found in the area. The Aquarius Research Natural Area encompasses a cross section of the canyon that contains many of these rare and unique elements and is widely considered by scientists as the most unique biological area in the Northern Rocky Mountains. Some of the plant associations present at Aquarius fill regional assignments for representative habitat types.

Bald Mountain Research Natural Area

Bald Mountain Research Natural Area is located along the divide separating the North Fork Clearwater basin from that of the Lochsa River. Uncommon, open habitats caused by snow transfer and droughty soils are the primary features of this research natural areas. Represented habitats are green fescue and beargrass with forested habitats in the mountain hemlock and subalpine fir forest types.

Bull Run Creek Research Natural Area

This area is in the Bull Run Creek drainage approximately four air miles south-southwest of Elk River on the Palouse Ranger District. This research natural area was designated for highly diverse vegetation that includes a variety of mesic forest types growing over basalt, with ponds, grasslands, scree, several plant species of conservation concern, coastal disjunct plants, basalt outcrops, and an arid plant component not found in the Clearwater Basin. The vegetative diversity of the juxtaposed arid and mesic communities is unparalleled on the Nez Perce-Clearwater.

Chateau Falls Research Natural Area

The Chateau Creek basin was selected as a research natural area for the presence of several waterfalls. The numerous falls range from a few feet to as high as 65-feet. These require very steep topography with geologic strata of differing resistance to erosive forces that provide aquatic and geologic features of scientific value. In addition to the cascades, the research natural area contains small grasslands, shrublands, and forests in early to mid-succession following several wildfires in the early 1900s that provide opportunities for forest succession and recovery studies.

Dutch Creek Research Natural Area

Dutch Creek was the site of several high severity wildfires in the early 1900s. The fires were hot enough to damage soils and remove the seed source of conifers typical for the area. As a result, the research natural area is largely composed of northwest paper birch that rarely forms extensive stands in the local forest types. There is opportunity for long-term successional studies and investigation of this species effects on forest soils.

Elk Creek Research Natural Area

The major feature of the Elk Creek Research Natural Area is the extreme range in elevation, 6,371 feet, which provides a diverse assemblage of vegetation along a steep elevational gradient in the Idaho Batholith. Especially good examples of the more xeric grassland, mountain mahogany, and Ponderosa pine types are found at lower elevations. As elevation increases, the forests support Douglas-fir and grand fir that give way to subalpine fir and whitebark pine in the higher elevations. These diverse forests fulfill target habitats identified for representation within research natural areas on the Nez Perce-Clearwater. There are also two subalpine lakes, one with fish, and a large population of a rare, endemic plant species.

Fish Lake Research Natural Area

The Fish Lake Research Natural Area is situated in a steep-walled glacial trough that contains a mid-elevational, 29-acre, productive, morainal lake that contains grass and sedge wetland communities, as well as native fish. This lake provides excellent opportunities to study moose lentic productivity interrelationships. The local forests contain several cool forest habitats, at least two of which were assigned for research natural areas inclusion. Also, a depositional boulder field moraine is found below the lake.

Four-Bit Creek Research Natural Areas

The Four-Bit Creek Research Natural Area in the Eldorado basin of the Clearwater Mountains is representative of the most productive forest lands in the Northern Rocky Mountains. Western redcedar habitat types occupied by mixed species in an advanced stage of succession dominate the research natural area providing almost every habitat type that occurs in that forest series in Idaho. The Lewis and Clark National Historic Trail and the Lolo Trail National Historic Landmark pass immediately adjacent portions of the research natural areas adding historical interest.

Grave Peak Research Natural Area

The Grave Peak Research Natural Area is a raw, glacially carved, fire scarred, rocky subalpine cirque basin in the Selway-Bitterroot Wilderness. The park-like basin supports five small lakes and open forests of subalpine fir, whitebark pine, spruce, and uncommon subalpine larch over mountain heather and other high-elevation plants. There are also small sedge meadows and wetlands. The research natural area is representative of subalpine country of low biological productivity but high-water yield and scenic value.

Lochsa River Research Natural Area

The Lochsa River Research Natural Area is located on both sides of the Lochsa River and includes Apgar and Glade Creek. Designation is primarily for one of the few refugia of coastal disjunct species that are of very limited distribution. Included are three permanent high-energy streams through a dense mesic forest canopy, which have a high diversity of habitats that yield a highly diverse macroinvertebrate assemblage.

Moose Meadow Creek Research Natural Area

Moose Meadow Creek Research Natural Area was designated to include moderately high elevation wet meadows and poor fens containing interesting and unusual plant species, a moderate gradient stream, and forests of subalpine fir, spruce, and lodgepole pine that are comprised of habitat types not included in other research natural areas.

No Business Creek Research Natural Area

The No Business Creek Research Natural Area includes a significant altitudinal range of 4,680 feet. As a result, it contains a great diversity of plant associations and forest types. It provides one grand fir habitat type and three subalpine forest habitat types that were assigned by regional direction for research natural areas. In addition, it contains several other forest types including Douglas-fir, Ponderosa pine, and mountain mahogany, one of which is the largest know specimen in Idaho. Other noteworthy inclusions are Pacific yew, white alder, and possibly the only maidenhair fern occurrence in the Salmon River basin. Tailed frogs are also present. The geology is granite in the upper elevations and limestone below and the water is of unusually high alkalinity.

O’Hara Creek Research Natural Area

O’Hara Creek provides one of the largest research natural areas on the Nez Perce-Clearwater. It contains at least seven forest habitat types assigned to the Nez Perce-Clearwater for inclusion in the research natural area system, as well as a complete aquatic system containing first to fifth order streams. These streams include several waterfalls and contain beaver ponds and wet riparian meadows. The rich forest includes several coastal disjunct plant communities that also support rare and endemic species, several of which are species of conservation concern.

Sneakfoot Meadow Research Natural Area

Sneakfoot Meadow provides examples of low gradient meandering streams and an extensive diverse graminoid and forest wetland complex that includes sphagnum bogs and fens. The surrounding forest provide three subalpine habitat types in various stages of succession. The meadows provide habitat for important moose and elk populations throughout the year.

Square Mountain Creek Research Natural Area

This research natural area was established to contribute several subalpine forest habitat types to the research natural area system. Also included are extensive subalpine aquatic systems, including streams, meadows, and a lake. It is the type locality for an endemic sensitive plant species and supports the federally threatened whitebark pine.

Steep Lakes Research Natural Area

Steep Lakes Research Natural Area features a pair of subalpine lakes of similar characteristics, except that the lower lake contains golden trout while the upper lake is fishless. This situation provides a long-term research opportunity as baseline lakes that could be used to monitor chemical and biological conditions and the effects of a fish population on the invertebrate community. There are also four subalpine fir forest habitat types and three mountain hemlock habitat types, some of which are assigned targets for research natural areas inclusion. Some of the mountain hemlocks are in an old growth state. The two primary basins have different fire histories that provide an opportunity for comparative successional studies. Additional vegetative diversity is found in wet subalpine meadows and Sitka alder stands.

Upper Newsome Creek Research Natural Area

This research natural area was selected due to its old growth climax stands of grand fir with an understory of Pacific yew. Grand fir reaches excellent development in this part of Idaho. The rich forest types are often referred to as the Grand Fir Mosaic, which requires planning and management to maintain productivity. These forest types are important for wildlife and include occurrences of at least two rare plant species.

Warm Springs Creek Research Natural Area

Warm Springs Creek Research Natural Area was established for the presence of two thermal springs and a diverse array of forest communities. Included are two habitat types assigned to the Nez Perce-Clearwater for inclusion in the research natural area system.

Proposed Research Natural Areas

Fenn Mountain Proposed Research Natural Area

This previously proposed research natural area is located 18 air miles east-northeast of Lowell, Idaho, in the Selway-Bitterroot Wilderness of the Lochsa-Powell Ranger District. Selection is based upon Regional Office direction to include high elevation aquatics, subalpine vegetation communities, and rocky habitats not represented in the research natural area system. This research natural area was formally proposed by the 1987 Forest Plan and retained here.

Rhodes Peak Proposed Research Natural Area

This previously proposed research natural area is located 11.5 air miles north-northwest of Powell, Idaho, in the Hoodoo, also known as Great Burn, roadless area on the Lochsa-Powell Ranger

District. Selection is based upon Regional Office direction to include high subalpine and alpine habitats and uncommon vegetative communities not represented in the research natural areas system. This research natural area was formally proposed by the 1987 Forest Plan and retained here. A preliminary establishment record has been written but has not been formally completed.

Candidate Research Natural Area

Bull Run Creek Expansion

See the general description provided under the Bull Run Research Natural Area in the above Existing Research Natural Areas discussion. The best representation of many of these features were excluded at the time of original designation because they occurred on adjacent private land. In the mid-1990s, this ground came to the Forest Service in a land exchange. Internal and external interest have been calling for an expansion to include these areas since that time. With this expansion, the total acreage of the Bull Run Research Natural Area will be 753 acres.

Mud Springs Ridge Proposed Research Natural Area

This candidate research natural area on the Salmon River Ranger District is approximately 3.5 air miles northwest of Lucile, Idaho. The intact and unusually diverse grassland communities of Mud Springs Ridge are not represented in the research natural areas system. One federally threatened plant species, one sensitive species, and at least four local endemic plant species are well represented here. The site also includes under-represented Ponderosa pine forests and shrub communities. This area is the site of ongoing monitoring and provides substantial opportunities for range and invasive species research.

Fred Rabe Upper Hemlock Creek Proposed Research Natural Area

This candidate research natural area is in the Hemlock Creek basin, within the Big Horn-Weitas roadless area of the North Fork Ranger District, approximately 10 miles east of Pierce, Idaho. The proposal is based upon aquatics and various meadow communities within the Grand Fir Mosaic forest, as well as a core, high priority vegetative community called for in the regional research natural areas assessment. This research natural area was recommended in the mid-1990s with local vetting completed at that time; however, proposal in a forest plan or an amendment to such has never occurred.

Environmental Consequences

Effects Common to All Alternatives

Under all alternatives, the 18 existing research natural areas would maintain their designations. In these areas, direction in the establishment records and Forest Service Manual 4063 would be followed to conserve the plant associations or other features for which they were established.

The two existing proposed research natural areas listed under the 1987 Forest Plans, Fenn Mountain and Rhodes Peak, could be recommended to become established through a separate decision by the regional forester. Final establishment would take place upon completion of the establishment records and the Research Station Director’s concurrence.

The potential for additional research natural areas in the future would exist under any alternative. *The Northern Region Status and Needs Assessment for Research Natural Areas* (Chadde et al. 1996) recommended additional unrepresented plant associations on each national forest in the U.S. Forest

Service Northern Region so that the entire range of associations could be represented in the research natural areas network.

All research natural areas are directed to be managed to perpetuate natural ecosystems and encourage scientific research with minimum human interference. Each research natural area is managed in accordance with its establishment record.

Effects to No Action Alternative

The existing 1987 Forest Plans include components for research natural areas that would apply to the No Action Alternative. The research natural areas included in this alternative are the 18 designated and 2 proposed research natural areas, as listed in the 1987 Plans. Potential research natural areas at Mud Springs Ridge, Upper Hemlock Creek, and the expansion of the Bull Run Research Natural Area would be recommended as candidates. The expected effects from plan components for existing research natural areas under the 1987 Plans are summarized in Table 447.

Table 447. Summary of existing plan components for research natural areas.

Plan component	Expected effects
Clearwater National Forest Management Area 1	The standards for Management Area 1 would ensure that within research natural areas the following activities would not occur: fish and wildlife improvements; livestock grazing; timber harvest; mineral development; special use permits; developments of trails; roads or facilities; utility corridors; and general motor vehicle use, except where research natural areas values would not be adversely affected. The visual quality objective would be retention. Insect and disease levels would not be controlled unless included within a congressionally designated area that reflects such management. Unplanned ignitions would burn under prescribed conditions unless there is a threat to persons, property, or uniqueness of the area.
Nez Perce National Forest Management Area 6	The standards for Management Area 6 would ensure that within research natural areas the following activities would not occur: recreational activities that could interfere with research; timber harvest; grazing unless necessary to maintain vegetation for which the research natural areas was established; mineral development; no roads or trails unless necessary for objectives or commensurate with use; building construction unless needed for research natural areas objectives; and utility corridors. Fire management would follow fire management plans and prescribed fire would be allowed only to perpetuate vegetation for which the research natural areas were established. There would be no debris removal, fire hazard reduction or planting of trees. Insect and disease would not be controlled unless adjacent suitable lands were severely threatened.

Effects Common to Action Alternatives

The action alternatives would be the same as the No Action Alternative with respect to the designated research natural areas. The retention of the Fenn Mountain and Rhodes Peak proposed research natural areas are also the same across all alternatives. The action alternatives include the items contained in the existing condition with the addition of the formal proposal Upper Hemlock Creek and Mud Springs Ridge to proposed research natural area status. Also, the expansion of the existing Bull Run research natural area is proposed under revision. These proposals have all been vetted with local and agency interests but have not been included in forest planning until this revision. The plan components and effects of the action alternatives would be as described above under Effects Common to All Action Alternatives because the existing and proposed research natural areas are included in each action alternative without variation. The effects of the new plan components may vary slightly in respect to effects as compared to the components of the 1987 Forest Plans. This would primarily be due to more emphasis on following establishment record direction and policy with less emphasis on detailed plan components.

The candidate research natural areas, Mud Springs Ridge and Upper Hemlock Creek, and the Bull Run expansion have been reviewed and would be formally proposed by this plan revision under all action alternatives. All could be recommended to become established through a separate decision by the regional forester. Final establishment would take place upon completion of the establishment record based on the Research Station Director's concurrence.

All action alternatives include the plan components and potential effects on research natural areas listed in Table 448.

Table 448. Summary of proposed plan components' potential effects on research natural areas.

Plan component	Potential effects
MA2-DC-RNA-01	Designated and proposed research natural areas maintain a representation of natural systems found on the Nez Perce-Clearwater as a baseline for research, monitoring, and education by the agency, academia, and public interests. Wildfire, insects, and pathogens, along with other processes and disturbances, continue to affect vegetation, reflecting the dynamic nature of the systems they represent. Research natural areas contribute to ecological sustainability and biological diversity.
MA2-STD-RNA-01	Within designated and proposed research natural areas, do not authorize the collection of forest products for commercial purposes and personal use purposes, including firewood.
MA2-STD-RNA-02	Do not authorize uses that threaten or interfere with the objectives or purposes for which a Research Natural Area is established.

Cumulative Effects

The existing vegetation conditions within the designated areas reflect the contributions of past management actions and ecological processes. Management activities are very limited within research natural areas and restricted to management activities needed to maintain the features for which the research natural area was established. Management activities will generally continue to take place outside of the existing and proposed research natural areas, and it is unlikely that these activities would influence the research natural areas. Control of invasive weeds is an action that may have occurred in the past within research natural areas, and it is the most likely management activity to occur within research natural areas in the future, in coordination with the Rocky Mountain Research Station. This would have a positive effect through the control of invasive weeds or prevention of their spread and would not result in any change to research natural area designations. Prescribed fire or other vegetation management may occasionally be used to maintain features for which the research natural area was established. Such activities would also only be conducted in coordination with the Rocky Mountain Research Station and would also have a positive effect that would not result in any change to the designation.

Under all alternatives, the network of research natural areas would contribute to the understanding of key ecosystems and plant communities by being part of the broader array of sites that are designated across other national forests in the region. This network would continue to contribute to the conservation of biological diversity and provide for research and educational opportunities in the plan area. Similar designations are not known to occur on lands of private ownership, nor on state lands in the area, increasing the importance of maintaining them on National Forest System lands.

Effects to Resource from Other Resources

Aquatic Ecosystems and Soil Management

Activities related to watershed, soil, riparian, or aquatic habitat would generally not occur in research natural areas, and there would be little to no effect related to the management of these resources.

Fire Management

Desired conditions for research natural areas state that these lands are generally naturally appearing, with natural processes, including fire, functioning naturally with limited human influences. One of the purposes of research natural areas is to serve as baseline areas for the study of these processes and their effects on ecosystems. Management of unplanned wildfire ignitions in or near research natural areas would be guided by the direction provided in each individual research natural area's establishment record, the Forest Service Manual 4063, and other regulatory documents and consultation with Rocky Mountain Research Station scientists to ensure that natural fires are allowed to burn only within a prescription designed to accomplish objectives specific to the research natural areas. If the values associated with the research natural area are at risk of degradation or loss due to fire, fire management strategies would likely include measures aimed at protecting those values, if possible. On the other hand, fire as a natural process may be desired and allowed to occur within a research natural area to perpetuate natural ecological processes within these areas depending upon the nature of the fire and the habitats potentially affected in the research natural area. Prescribed fire would only be implemented to serve or maintain values for which the research natural areas was established.

Timber and Vegetation Management

Under all alternatives, research natural areas are not suitable for timber production. The existing forest plans prohibit timber harvest for any purpose in these areas and timber management should have no effect. The Land Management Plan allows that some vegetation treatments could occur where consistent with site establishment records and plans. In such cases, the forest supervisor, with the concurrence of the research station director, may authorize management practices that are necessary for invasive weed control or to preserve the vegetation for which the research natural area was created (Forest Service Manual 4063.3). As stated in the manual, limited use of vegetation management may occur within research natural areas in situations where the vegetative type would be lost or degraded without management. The criterion is that management practices must provide a closer approximation of the naturally occurring vegetation and the natural processes governing the vegetation than would be possible without management. These practices may include prescribed burning.

Livestock Grazing and Management

The Land Management Plan, under the action alternatives, allows for grazing to occur where consistent with site establishment records and plans. Generally, site records would preclude this. Therefore, grazing would have minimal impact.

Wildlife management

Activities related to wildlife management would generally not occur within research natural areas and there would be little to no effect.

Recreation and scenery management

Generally, managing for primitive recreation opportunities would not result in substantial impacts to the natural vegetation and natural processes in these areas. Motorized use generally is not permitted within research natural areas but in some cases is allowed on roads or trails that are adjacent to or may form a portion of the unit's boundary. Such uses are established by precedent, the establishment record, or through the forestwide travel planning that incorporates research natural areas considerations and policies. Motorized routes allowed through this travel planning are not expected to impact values associated with these areas under any alternative.

Cultural, historic, and tribal resource management

Activities related to cultural, historic, and tribal resources would generally not occur in research natural areas and there would be little to no effect.

Road access and infrastructure

All action alternatives are similar in terms of plan components for road access and infrastructure. New road and trail construction or other infrastructure and facilities would not generally occur in research natural areas under any alternative because Forest Service Manual 4063 prohibits new roads, trails, fences, or signs on an established research natural area unless they contribute to the objectives or protection of the area.

Minerals management

Research natural areas are available for minerals activities unless withdrawn for mineral entry. However, per Forest Service Manual 4063, proposals to offer federal mineral, oil, and gas leases would be evaluated by the regional forester, with concurrence of the Research Station Director, using standards set forth in Forest Service Manual 2820. The proposal with recommendation is forwarded by the regional forester to the Chief for the final decision.

Other plan components

Research natural areas are primarily intended to provide reference condition to support research and support other unique elements. They are frequently used for public education by a number of public entities.

Summary of Consequences

Table 449 provides the number and acres of research natural areas and proposed research natural areas among alternatives. The indicator evaluating the effects of Land Management Plan direction and support for research natural areas values are also included. All alternatives fulfill this indicator, with the action alternatives providing more proposed research natural areas to better fulfill regional assignments and the purpose of the program.

Table 449. Summary of potential consequences to research natural areas (RNA) by alternative.

Indicator	No Action Alternate	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternate
# of RNAs	18	18	18	18	18	18
# of proposed RNAs	2	4	4	4	4	4
# of candidate RNAs	2	0	0	0	0	0

Indicator	No Action Alternate	Alternate W	Alternate X	Alternate Y	Alternate Z	Preferred Alternate
# of RNA expansions	0	1	1	1	1	1
RNA acres	29,500	29,500	29,500	29,500	29,500	29,500
Proposed RNA acres	910	2,576	2,576	2,576	2,576	2,576
Candidate RNA acres						
Acres RNA expansion	0	370	370	370	370	370
Supports RNA Values	Yes	Yes	Yes	Yes	Yes	Yes

Conclusion

All action alternatives provide for a network of research natural areas across the Nez Perce-Clearwater by including the existing designations of 18 research natural areas equaling 29,490 acres and 4 proposed research natural areas on 2,576 acres and 1 expansion of an existing research natural area totaling 370 acres. The 1987 Forest Plans more explicitly prohibit management activities within research natural areas than does the revised plan, which allows for slightly more flexibility when uses are consistent with the site establishment record and standards in Forest Service Manual 4063.

3.6.4 Special Areas

Special areas are a category of administratively designated areas defined as an area or feature managed to maintain its unique special character or purpose (36 CFR 219.19), including those that may be botanical, geological, recreational, scenic, zoological, paleontological, or historical in nature. Such areas are protected and managed for public use and enjoyment and are identified due to their unique or special characteristics. Special areas are not congressionally designated but are administratively designated by the Chief of the Forest Service, regional forester, or forest supervisor (Forest Service Manual 2372). The 1987 Clearwater Forest Plan lists 12 special areas, while the Nez Perce Forest Plan includes none. One special area is no longer designated and three will be rescinded with this plan. Four new special areas are proposed.

Special areas are classified as follows, depending upon their special characteristics or unique values(s):

- **Scenic Area** – a unit of land with outstanding natural beauty that requires special management to preserve this beauty.
- **Geologic Area** – a unit of land with outstanding formations or unique geological features of the Earth's development, such as caves, fossils, dikes, cliffs, or faults.
- **Botanical Area** – a unit of land that contains plant specimens, plant groups, or plant communities that are significant because of their form, color, occurrence, habitat, location, life history, arrangement, ecology, rarity, or other features.
- **Zoological Area** – a unit of land that contains animal specimens, animal groups, or animal communities that are significant because of their occurrence, habitat, location, life history, ecology, rarity, or other features.

- **Paleontological Area** – a unit of land that contains fossils of plants and animals, shellfish, early vertebrates, coal swamp forests, early reptiles, dinosaurs, and other prehistoric plants or animals.
- **Historical Area** – a unit of land possessing a significant site or a concentration of sites, buildings, structures, or objects united historically or prehistorically by plan or physical development. Memorial areas are included in this definition.
- **Recreational Area** – a unit of land that has been administratively designated for particular recreation opportunities or activities, such as hiking, rock hounding, recreational mining, photography, or other special activity.

The Nez Perce-Clearwater includes special areas that are classified as Geologic, Botanical, Historical, and Recreational, some with a dual classification.

Relevant Laws, Regulations, and Policy

Federal Laws

Organic Administration Act of June 4, 1897 (16 U.S.C. 477-482, 551): This act authorizes the Secretary of Agriculture to issue rules and regulations for the occupancy and use of the National Forests.

The National Forest Management Act of 1976: This act states that the Secretary of Agriculture shall "promulgate regulations" under the principles of the Multiple-Use Sustained-Yield Act of 1960 to "provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area" and to maintain tree species diversity within the context of multiple-use objectives.

Agency Regulations

36 CFR 219.7: *This regulation s*tates that in developing a proposed plan revision, the responsible official shall identify existing designated areas and determine whether to recommend any additional areas for designation. Forest plans must include components for appropriate management of existing or proposed designated areas. Furthermore, the 2012 Planning Rule requires forests to maintain the diversity of plant and animal communities and support the persistence of native species within the plan area. Forests are directed to use in their planning a "complementary ecosystem and species-specific approach to provide for the diversity of plant and animal communities" and to maintain species persistence. The 2012 Planning Rule also states that, in plan revision, the responsible official shall identify existing designated areas and determine whether to recommend any additional areas for designation. Forest plans must include components for appropriate management of existing or proposed designated areas. This requirement is partially filled by the inclusion of special areas based upon high species diversity.

36 CFR 219.9: *This regulation s*tates that the responsible official will evaluate whether the plan components provide the ecological conditions necessary to contribute to the recovery of federally listed species, conserve proposed and candidate species, and maintain a viable population of species of conservation concern in the plan area. Evaluation would consider components that provide for ecosystem integrity and diversity and species-specific components.

Policy

Forest Service Manual 2372: *This policy c*ontains purpose, policy, and guidance for administrative designation and management of special areas.

Forest Service Handbook 1909.12.5: The directives provide specific information regarding implementation of the 2012 Planning Rule, including identifying at-risk species and guidance for development of plan components to provide ecological sustainability for at-risk species. The directives state that plan components developed for ecosystem integrity are expected to provide conditions that will maintain the persistence or contribute to the recovery of native species within the plan area. They also state that if components for ecosystem diversity are not adequate to do that for at-risk species, then species-specific plan components should be developed. The establishment of special areas for botanical purposes contributes to the fulfillment of direction.

Methodology

Spatial Scale

The geographic scope of the analysis is the lands administered by the Nez Perce-Clearwater. All lands within the Nez Perce-Clearwater boundary form the geographic scope for cumulative effects.

Temporal Scale

The temporal scope is the life of the plan.

Past, Present, and Future Activities used in the Analysis

Special areas provide areas of unique and special character for public use and enjoyment. The noteworthy features are often unique habitats or conditions that generally represent natural features that are generally ecologically intact and have had few, if any, past activities that have had meaningful impacts to these resources. Some special areas have seen past uses but these have not contributed to a condition that has compromised the features for which the area is designated. Future management activities may occur in special areas if they do not compromise the features for which the special areas exist or the public's ability to enjoy these areas. Thus, there are a number of potential management activities that could occur depending upon the resources present and possibly the magnitude of the potential disturbance. Generally, special areas include features that are not conducive to many management activities, but some could potentially host various vegetation management, weed control, and grazing activities. Some historical or cultural areas could be subjected to human uses, such as plant utilization or recreation. Unplanned disturbances would likely be from wildfire or recreational use. Human uses and impacts could increase as population increases in the future.

Methods and Assumptions

Specialists from the Nez Perce-Clearwater and Regional Office, with input from various public interests, have identified the lands on the Nez Perce-Clearwater that possess characteristics that make them suitable for special area establishment. Documentation of conditions within the special areas comes from reports and records for individual areas, where available, and from local and regional Forest Service resource specialist knowledge. The areas acknowledge and highlight the special natural features of the Nez Perce-Clearwater, as well as provide the opportunity for public appreciation, education, and enjoyment.

Measurement Indicators

- Number of special areas
- Acres of special areas
- Supports special areas direction

Affected Environment

Existing Condition

No special areas were designated in the 1987 Nez Perce Forest Plan. The 1987 Clearwater National Forest plan included 12 special areas. One of these areas, Oviatt Creek Fossil Beds on the Palouse Ranger District, is no longer designated as a special area. It was transferred out of public ownership as part of a land exchange with Amendment 11 in 1994. The remaining 11 special areas encompass 584 acres, as outlined in Table 450.

Table 450. Currently designated special areas

Special Interest Area Name	District	Classification	Acres
Colgate Licks	Lochsa and Powell	Geologic or Historic	50
Devoto Cedar Grove	Lochsa and Powell	Botanical or Historic	20
Elk Butte Mountain Hemlock	Palouse	Special Feature	118
Giant Cedar Grove	Palouse	Botanical	23
Giant Western White pine	Palouse	Special Feature	20
Grand Fir and Subalpine Fir Record Trees	Lochsa and Powell	Special Feature	40
Heritage Cedar Grove	North Fork	Botanical	50
Lewis and Clark Cedar Grove	Lochsa and Powell	Historic	30
Morris and Perkins Cedar Grove	Palouse	Botanical	33
Séewisníme (Place of Mussels)[1]	Lochsa and Powell	Historic	50
Walde Mountain Botanical Area	Lochsa and Powell	Botanical	150

Source: Acres from the 1987 Forest Plan.

[1] Formerly designated Special Area Musselshell Meadows in 1987 Plan. The Revised Land and Resource Management Plan would change the name to séewisníme.

Six additional areas are currently proposed for special areas designation; two under classification as botanical areas, one of which is classified as both botanical and historical, two under historical, and one as recreational. These are as described as follows:

Clear Creek Basalt Glades Botanical Area

These basalt outcrops and glades are located approximately five miles southeast of Syringa, Idaho, on the Moose Creek District. The area provides unique botanical communities, including several rare and uncommon species and unusually intact and weed free arid grasslands composed of an uncommon form of rhizomatous bluebunch wheatgrass. The floral displays provide intense coloration of the landscape that change dramatically with changes in moisture through the spring and summer. These botanically significant communities abruptly merge into a western redcedar grove with unusually large Pacific yew, small wetlands, and riparian shrub habitats.

Elk Creek Falls Recreational Area

Elk Creek Falls is located approximately three miles south of the town of Elk River, Idaho, on the Palouse District. The highly popular area consists of three main waterfalls located within a natural setting of moist forests and grassland bluffs. Since 1977, the area has been managed for nonmotorized, dispersed recreation associated with hiking and viewing the waterfalls. This area is included as a special area because the special management area it fell under in the 1987 Forest Plan is not included in the new plan.

Wispin'iitpe Botanical and Historical Area

Wispin'iitpe; which means: As one travels out of the timber, upon coming over the divide; begins at Lolo Pass and includes Packer Meadow. This extensive meadow system includes a wide variety of habitats, including grasslands, moist meadows, sedge flats, shrub swamps, peatlands, diverse forb, and cold forest communities. Several rare and uncommon plant species grow here including carnivorous plants. It also supports a substantial stand of camas that is popular for viewing during bloom periods and provides cultural values for Native Americans. The Lewis and Clark trail passes through these meadows and the expedition camped here.

The Lolo Pass Visitor Center is a historical landmark site on the Lewis and Clark Highway, bordering Montana and Idaho. It is located near the area where Meriwether Lewis and William Clark took eleven days in September of 1805 to traverse the grueling Lolo Pass through the Bitterroot Mountains. The dangerous terrain, harsh weather conditions, and near-starvation resulted in the most arduous portion of the entire expedition in which the men resorted to eating some of their own horses to survive. The visitor center is also located on the Nez Perce National Historic Trail, a path followed by a band of Nez Perce Indians while fleeing from the U.S. Calvary in 1877 to avoid being forced onto a reservation.[27]

Sing Lee Fen Botanical Area

This botanical area is approximately ten miles northwest of Elk City, Idaho, on the Red River District. It was first suggested as a botanical area in 2002 with the Newsome Creek Ecosystem Analysis at the Watershed Scale. The fen is a complex of sphagnum peatlands that support many unique community elements and are of fragile nature. Tertiary sediments along Sing Lee Creek contribute to the prevalence of perched water areas and unusual hydrology of the area. The acidic environment is inhospitable to tree species and help the fen resist encroachment. The diverse botanical community supports the many unusual or rare species present, including carnivorous plants and at least four species of sphagnum moss. Habitats include fens, sedge flats, a pond, and coniferous swamp within a grand fir forest. Tailed frogs have been identified in Sing Lee Creek.

Colt Killed Creek Campsite Historical Area

The Colt Killed Creek Campsite is located on the grounds of the Powell Ranger Station, within the Nez Perce-Clearwater National Forests. The probable site of the encampment has been developed to include a helipad, parking area, and numerous outbuildings. The creek branch described by William Clark of the Corps of Discovery was filled in by the USFS sometime after the 1950s, but the "Small Island" in the Lochsa River remains intact.

By Clark's account, September 14, 1805, was a miserable slog. Persevering through rain, hail, and snow, the fatigued expedition struggled over steep mountainsides made nearly impassable by a plethora of fallen tim-ber. They ended the day "Encamped opposit a Small Island at the mouth of a branch on the right side of the river which is at this place 80 yads wide, Swift and Stoney, here we wer compelled to kill a Colt for our men & Selves to eat for the want of meat & we named the South fork Colt killed Creek, and this river we Call Flathead River." The horsemeat was a welcome addition to the paltry food rations. Gass wrote, "none of the hunters killed any thing except 2 or 3 pheasants; on which, without a miracle it was impossible to feed 30 hungry men and upwards, besides some Indians. So Capt. Lewis gave out some portable soup, which he had along, to be used in cases of necessity. Some of the men did not relish this soup, and agreed to kill a colt; which they

[27] https://www.nps.gov/places/lolo-pass-visitor-center.htm

immediately did, and set about roasting it; and which appeared to me to be good eating."
https://www.nps.gov/places/colt-killed-creek-campsite.htm

Smoking Place Historical Area

Smoking Place is located within the Nez Perce-Clearwater National Forests, along Forest Road 500, also known as the Lolo Motorway.

On June 27, 1806, the expedition proceeded east on the rugged Lolo Trail. Clark wrote, "we halted by the request of the Guides a fiew minits on an ellevated point and Smoked a pipe on this eminance the nativs have raised a conic mound of Stons of 6 or 8 feet high and erected a pine pole of 15 feet long. from hence they informed us that when passing over with their families some of the men were usually Sent on foot by the fishery at the enterance of Colt Creek to take fish and again meet the party at the quawmash glade on the head of Kooskoske river. from this place we had an extencive view of these Stupendeous Mountains principally Covered with Snow like that on which we Stood; we were entirely Serounded by those mountains from which to one unacquainted with them it would have Seemed impossible ever to have escaped […] after haveing Smoked the pipe and Contemplating this Scene Sufficient to have dampened the Spirits of any except Such hardy travellers as we have become, we continued our march."

The rock cairn originally described by Clark is no longer extant; a smaller cairn now marks the landscape. The site is a component of the Lolo Trail National Historic Landmark.
https://www.nps.gov/places/smoking-place.htm

Environmental Consequences

Effects Common to All Alternatives

All special areas are directed to be managed for public use and enjoyment of the special or unique features for which they are designated. Under all alternatives, eight existing special areas would maintain their designations. These special areas include Colgate Licks, Devoto Cedar Grove, Giant Cedar Grove, Heritage Cedar Grove, Lewis and Clark Grove, Morris and Perkins Grove, Musselshell Meadows, and Walde Mountain. Direction in the establishment records and Forest Service Manual (FSM) 2372 would be followed in these areas to conserve the features for which they were established.

The potential for additional special areas in the future would exist under any alternative. As areas with special characteristics or unique values are identified they could be designated following criteria outlined in the Forest Service Manual 2372.

Effects Common to Action Alternatives

All action alternatives would retain eight special areas from the 1987 Clearwater Forest Plan and rescind designation for three special areas (FSM 2372.2). In addition, six new special areas will be designated, including the Clear Creek Basalt Glades, Elk Creek Falls, Wispin'iitpe, Colt Killed Creek Campsite, Smoking Place, and Sing Lee Wetland. Special area designation for the action alternatives is summarized in Table 451.

Table 451. Special Areas under the action alternatives

Special Area Name	District	Classification	Acres
Clear Creek Basalt Glades	Moose Creek	Botanical	267

Special Area Name	District	Classification	Acres
Colgate Licks	Lochsa and Powell	Geological and Historical	39
Devoto Cedar Grove	Lochsa and Powell	Botanical and Historical	15
Elk Creek Falls	Palouse	Recreational	443
Giant Cedar Grove	Palouse	Botanical	44
Heritage Cedar Grove	North Fork	Botanical	153
Lewis and Clark Cedar Grove	Lochsa and Powell	Historical	58
Morris and Perkins Cedar Grove	Palouse	Botanical	48
séewisníme (Musselshell Meadow)	Lochsa and Powell	Historical	163
Wispin'iitpe	Lochsa and Powell	Botanical and Historical	336
Sing Lee Fen	Red River	Botanical	25
Walde Mountain	Lochsa and Powell	Botanical	82
Colt Killed Creek Campsite	Lochsa and Powell	Historical	159
Smoking Place	Lochsa and Powell	Historical	173

Source: Acres from current GIS mapping.

It should be noted that the acre values given here are different from those listed under the Existing Condition, which were taken from the existing forest plans. This is in part due to more precise mapping in some cases. In others, the original maps may not exist, or current mapping exercises have placed boundaries that may be adjusted based upon refined information or purpose. Completion of specific management plans may alter boundaries slightly in the future and would be adjusted through a plan amendment if necessary.

Table 452 provides a summary of potential effects on Special Areas from proposed plan components under all action alternatives.

Table 452. Summary of proposed plan components' potential effects for Special Areas under action alternatives

Plan component	Potential effects
GA-DC-SA-01	Special Areas provide for public use and enjoyment and protect areas with scenic, geological, botanical, zoological, paleontological, archaeological, or other special characteristics or unique values on the Nez Perce-Clearwater. Education and interpretation of these areas promote public awareness of these special features.
FW-DC-SCENERY-01	The Nez Perce-Clearwater's scenery reflects the natural and cultural range of variability within the landscape's varied ecological regions in relation to viewing contexts and expectations for the viewsheds. This is reflected in the scenic character descriptions.
FW-DC-SCENERY-02	The Nez Perce-Clearwater's scenery, as described by the scenic integrity objectives (Table 19 in the LMP), reflects a range of variation that considers social and economic values, ecosystem processes, resilient landscapes, and communities.

Plan component	Potential effects
FW-DC-ED-01	Interpretation and educational opportunities enhance the visitor's understanding and appreciation for the rich natural and cultural history of the Nez Perce-Clearwater and build support for public lands. Interpretive and educational opportunities focus on relevant themes (for example, heritage and cultural resources, ecosystem processes and restoration, invasive species, wildlife [including human interactions with wildlife], sustainable public lands, and the history of Nez Perce-Clearwater associated with logging, mining, trapping, settlement, and rivers).
FW-DC-ED-02	A variety of educational and interpretive opportunities are available, as appropriate, for the development scale of sites through a variety of methods to reach the broadest audience. New and emerging technologies (for example, electronic media, mobile device based) are a source of interpretation to reach a variety of people of different ages and cultures.

Forest Service Manual 2372 provides direction in the management of these areas and provides the basis for site-specific management plans where they exist. Specific policy guiding management of special areas is provided in Forest Service Manual 2372.03 and Forest Service Manual 2372.4, which guides potential developments, occupancy, and use of an area.

Effects under the No Action Alternative

The existing Clearwater Forest Plan includes components for the 11 existing special areas that would apply to the No Action Alternative. The expected effects from plan components are summarized in Table 453. In general, special areas are to be managed under similar restrictive direction as research natural areas in the 1987 Plan; the Elk Creek Falls Recreational Area is under the direction of Management Area A2 of the 1987 Plan.

Table 453. Summary of existing plan components' potential effects to special areas under the no action alternative

Plan component	Potential effects
Management Direction, Special Areas Objectives	Protection of special areas will be similar to research natural areas but designed primarily for public use and interpretation.
Management Area A2, Elk Creek Falls Recreational Area	Provide opportunities to view waterfalls and maintain a natural appearing setting. Manage foreground to meet visual quality objectives of retention, middle and background, to meet or exceed partial retention. Design facilities to meet visual quality objectives of retention. Manage for old growth dependent and nongame wildlife; prohibit livestock grazing; timber producing land is classified as unsuitable; timber is only harvested for salvage following catastrophic events or to achieve specific vegetation management objectives to reduce fire, disease, public safety; enhance visual quality or ensure long term maintenance of desire vegetation. Maintain quality and quantity of water to maintain recreational attraction. Do not permit extraction of common minerals and only allow limited access for other minerals. Acquire adjacent lands to increase potential recreation. Limit special use permits limited to those consistent with management of the area. Designate as an avoidance area for potential utility corridors. Rehab all roads except for the main access road, maintain trails to easy standards, and prohibit motorized vehicles on or off trail. Prescribed fire and insect and disease control is allowed if needed. Control wildfires at one-tenth acres or less per fire.

Selection of the No Action Alternative would retain three special areas that no longer contain the features or fulfill the purpose for which the special areas were established in the 1987 Plan. In addition, five proposed special areas – the Clear Creek Basalt Glades, Wispin'iitpe, Colt Killed Creek Campsite, Smoking Place, and Sing Lee Fen – would not be designated.

The action alternatives would differ from the No Action Alternative with respect to the number and acres of designated special areas. Three of the currently designated areas will not be retained as special areas under the action alternatives of the new plan. These include the grand fir and subalpine fir state record trees and the giant western white pine. The special features, which the special areas were based upon, are of uncertain location and/or are known or expected to be dead. The Elk Butte hemlock stand is not retained because the valued feature of this stand is minor compared to others on the forest. Also, exemplary forest communities are better represented as components of research natural areas than special features of special areas.

The four new special areas would be included with similar acreages in each of the action alternatives. These include the three new special areas, Clear Creek Basalt Glades, Wispin'iitpe, and Sing Lee Fen, as well as the Elk Creek Falls Recreational Area, which will change from Management Area A2 of the 1987 Plan to a special area in the revised plan. cheThe action alternatives increase the total acreage of special areas over the No Action Alternative by 1,421 acres to 2,005 acres total. Much of the addition occurs because of converting the existing Elk Creek Falls Recreational Area to a special area designation.

The effects of the action alternatives would be as described above under the Effects Common to All Action Alternatives because all special areas are included in each action alternative without variation. Benefits to special areas under the Land Management Plan would result from numerous plan components that would maintain or improve general vegetation and ecological processes across the landscape as discussed in the effects above. The 1987 Forest Plans had fewer such benefits but applied general research natural areas protections to special areas on the Clearwater National Forest. The revised Land Management Plan follows special areas policy provided in the Forest Service Manual, which is less restrictive and provides better flexibility in meeting the management needs and public use of these areas.

Cumulative Effects

The existing conditions within the designated areas reflect the contributions of past management actions and ecological processes. Management activities generally have been very limited within most special areas, restricted to management activities that have supported or have not detracted from the features for which the area was established. Some special areas have seen more substantial management in the past. Such activities could continue so long as these activities do not adversely affect the features and public use for which the special areas were established.

Management activities generally take place outside of special areas simply because the unusual habitats or features generally are areas that support manageable resources. In most cases, it is unlikely management would have an effect due to distance of the activities from the special areas and various plan components that protect soils, water, and other resource values forestwide. Exceptions may be when an action is needed to protect or preserve the unique features of the area. Examples might include treating weeds in a botanical area that may be necessary to prevent the loss of natural vegetative, rare species, or active fire suppression may be desirable to preserve a cedar grove from wildfire. Fuel treatments may occur within or adjacent to a special area to maintain special features or to reduce fuels, which could be desirable to reduce severity of potential future fires that could harm an area. In any case, where vegetative treatments may occur within a special area, site planning to incorporate the needs of the special area's resources would eliminate or adequately mitigate management conflicts. Thus, it is unlikely that any management action would alter any special areas in a harmful or undesirable manner.

Effects to Resource from Other Resources

Aquatic Ecosystems and Soil Management

Management activities related to watershed, soil, riparian, or aquatic habitat would generally not occur in special areas and there would be little to no effect related to the management of these resources. If such event occurred, it would be for the maintenance or enhancement of the features for which the special areas was designated.

Fire Management

Desired conditions within special areas are to maintain or enhance an ecosystem that primarily reflects the influence of natural processes or special features for public benefit. In some areas, fire could be a natural process suitable for this purpose; however, often wildfires would require suppression measures for the purposes of protecting values both within and outside the special areas. Cedar groves, for example, would need to be protected from wildfire to maintain the desired condition of such special areas. Prescribed fire is allowed within special areas for the purposes of maintaining natural processes and desired vegetation conditions when applicable. Impacts from fire management are expected to be low.

Timber and Vegetation Management

Special areas are generally not suitable for timber production or the commercial removal of special forest products due to the habitats present. Vegetation management, including timber harvest, may be allowed in special areas when used as a tool to maintain or restore the values for which the area was designated as a special area or do not negatively affect those values and the ability of the public to use the area. Thus, impacts from vegetation management activities are expected to be very low.

Livestock Grazing

There are few livestock allotments within most of the special areas; thus, there would be no grazing effects at these sites. Livestock do graze at the proposed Clear Creek Basalt Glades Special Area (267 acres of the Tahoe-Clear Creek Allotment), where cattle use the road into that area and adjacent flat grass and shrublands. Additionally, Lewis and Clark Grove Special area contains 58 acres of the Cedar Allotment and Séewisníme Special Area includes 163 acres of the Musselshell Allotment. This is an ongoing use of the area that contributes to an existing condition that is desirable for special areas inclusion. Negative effects would occur at limited, isolated sites and most of the area's features for which the special area is established are completely unused.

Wildlife

Activities related to wildlife management would generally not occur within special areas and there would be little to no effect. Where such activities might occur, they would generally be for the benefit of species or habitat.

Recreation and Access

Effects of recreational use and management within special areas are anticipated to be low. Hiking and other activities occur but the impacts can be expected to be minimal since they are generally of low intensity. Exceptions would include high use areas such as Elk Creek Falls, Giant Cedar, and Devoto Grove, where use is limited to well established and maintained trails. Trail maintenance work can be expected to have little impact on special areas. Developed recreation sites are unlikely, although trailhead and sanitation facilities can be expected in some recreational areas. Where these facilities are most needed, they are generally already in place. Any new developments would follow direction in the Forest Service Manual 2372.

Access and recreational uses would be limited within special areas to protect the features associated with designation. Motorized travel would only be allowed on designated routes; however, over-snow vehicle use could occur in some special areas where snow would protect the ground. This use would not interfere with the special area features or use and are identified on the over-snow vehicle use map.

Cultural, Historic, and Tribal Resource Management

Activities related to cultural, historic, and tribal resources would generally not occur in special areas and there would be little to no effect. An exception would be camas harvest at Séewisníme and potentially at Wispin’iitpe. In both cases, such use and management would be to maintain this resource for which both of these special areas are partially designated.

Minerals Management

Anticipated effects from minerals management would be low for all alternatives. Potential for leasable minerals is low across most of the Nez Perce-Clearwater and currently there are no permits or operating plans for exploration within any special areas. Although potential for locatable minerals does exist, there are no current permits or operating plans for mineral exploration within these areas.

Invasive Plant Species

Control of invasive species could occur in some special areas depending on ground conditions and control methods. Generally, most special areas consist of habitats that are of low susceptibility to weed invasion. However, the open grasslands or transitional habitats at the Clear Creek Basalt Glades, Elk Creek Falls, and Colgate Licks are more susceptible and do host some weed occurrences. In open, moist habitats, reed canary grass is an undesirable presence at Séewisníme, with some potential to inhabit Sing Lee Fen and Wispin’iitpe. Weed treatments would be expected to have a positive effect through the maintenance of the vegetative communities and features for which these areas were designated. Treatments could be mechanical, biological, or chemical and would be subject to forestwide direction and mitigations.

Summary of Consequences

Table 454 provides indicator values across the alternatives. All alternatives fulfill these indicators, with the action alternatives providing more proposed special areas, to better fulfill agency policy of public use and enjoyment (Forest Service Manual 2372). Under all action alternatives, the network of special areas would continue to contribute to the conservation of biological diversity and provide for public use, enjoyment, and educational opportunities in the plan area. The action alternatives better fulfill the purpose of special areas compared to the No Action Alternative through increased public opportunities and more diverse and appropriate designated areas. Similar designations are not known to occur on lands of private ownership, nor on state lands in the area, increasing the importance of maintaining them on National Forest System lands.

Table 454. Summary of special area indicator values by alternative (Alt)

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Number of special areas	11	12	12	12	12	14

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Acres special areas	584	1,673	1,673	1,673	1,673	2,005
Supports special areas direction	Yes	Yes	Yes	Yes	Yes	Yes

Conclusion

All action alternatives provide for a network of special areas across the Nez Perce-Clearwater through designation of 14 units comprising 2,005 acres that provide the public with a diverse opportunity for enjoyment and education concerning some of the more unique features of the Nez Perce-Clearwater National Forest. The 1987 Forest Plan referred to research natural area plan components that more explicitly prohibit management activities within special areas than does the revised plan, which allows for more flexibility when uses are consistent with the site establishment records and standards in Forest Service Manual 2372.

3.7 Risk Management and Safety

The focus of this analysis concerns the effects of each proposed alternative as it relates to life safety with respect to long-term management of Nez Perce-Clearwater lands. Through the lens of life safety, the analysis considers known risk to employees, communities, and visiting publics and how each alternative effects this risk. Additionally, it assumes that we will simultaneously address risk to communities and the visiting public by addressing future risk to employees. By managing for a landscape that lessens exposure to high-risk hazards in the future, we will lessen the risk to communities and the public in the long-term as well. The concept that a fire-adapted and resilient landscape equally reduces risk to employees and communities in and adjacent to National Forest System lands is congruent with the National Cohesive Fire Management Strategy and other national level plans, initiatives, and acts, such as the National Fire Plan, Healthy Forest Initiative, and Healthy Forest Restoration Act.

This analysis incorporates a blend of quantitative and qualitative data and information. It uses modeling outputs, injury and fatality records, and Incident Learning Reviews from accident investigations to develop a system to evaluate each alternative relative to life, risk, and safety. This analysis is an attempt to quantify risk in the long-term and there is an irreducible component of uncertainty that is inherent.

An unavoidable tenet of risk management is that choices made today affect all future options. Successful risk management not only minimizes unnecessary exposure but also depends on how well we can recover from or tolerate the consequences of undesirable outcomes. When applying a *Life Safety* lens of risk management to land management planning, we must recognize how the choices we make now will affect the safety of employees, wildland fire responders, forest visitors, and local communities today and into the future. Accepting increased risk today with a capacity to manage exposure is preferable to transferring risk into the future and hoping that those who inherit our decisions are adequately equipped to deal with the consequences, whatever they might be.

Latent risk associated with management of Nez Perce-Clearwater lands and resources involves the loss of life and property of individuals and communities exposed to hazard trees, hazardous fuels accumulation, wildfire and other natural events exacerbated by a landscape that has severely departed from its natural condition. In this context, risk also involves the loss of options available to land managers for restoring and maintaining fire resilient landscapes and safely and effectively responding to a variety of natural events. Managing this risk in the near term, while at the same time reducing risk in the long-term, is in and of itself full of uncertainty and in conflict.

The need to assume some level of risk now to lessen future risk regarding life safety in the management of public lands is at its core a “wicked problem.” A wicked problem is a problem that is difficult to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. Moreover, because of interrelated and interdependent parts, the effort to solve one aspect of a wicked problem may reveal or create other problems. Fundamental to this is that land management organizations ultimately are sociotechnical systems that are complex and adaptive. Adapting to demands in one area may create unexpected outcomes in another, whether positive or negative. These systems are characterized by uncertainty, meaning it is an identifying trait of the system and is irreducible. Uncertainty in our Forest Service system cannot be eliminated (U.S. Department of Agriculture 2016d).

Risk is essentially a measure of the probability and consequence of uncertain events and always has been an inevitable element of forest and grassland management. Forest Service managers face risks created by natural phenomena, as well as risks that are introduced when actions are taken (Thompson et al. 2016). More specifically, in this analysis, risk is considered as the estimated probability that a particular proposed land management plan alternative will contribute to increased or decreased exposure of employees and communities to hazardous conditions in the long-term. The long-term is defined as twenty plus years from today.

Principles of risk management include integrating risk principles into all organizational processes and decisions and embracing an uncertain world. An understanding of probability, using the best available information, and a commitment to organizational learning is necessary to facilitate continual improvement. Risk management organizations are proactive and invest time and resources upstream in assessment and planning. As a result, employees are less susceptible to the vagaries of uncertain, time-pressured decision environments (Thompson et al. 2016).

The Forest Service has adopted a risk management approach to life safety, recognizing that hazards and associated risks are inherent in our work. There is no “zero risk” alternative to accomplishing the multitude of objectives required of Forest Service land management. This is especially true in the context of managing natural resources for multiple use, while at the same time restoring natural processes to the landscape.

The implementation of a formal risk management process will allow the Forest Service to enhance employee capacity to identify, evaluate, and mitigate risks across the full spectrum of work activities and improve the ability to accomplish objectives as safely and efficiently as possible. The following is an excerpt from the Forest Service Operational Risk Management Guide and expands upon the various levels of risk management and their application (U.S. Department of Agriculture 2019c).

- **Enterprise Risk Management (ERM):** This level begins with defining the agency mission and identifies national and agency-wide influencers affecting the ability to attain mission objectives. Enterprise Risk Management involves an assessment of system level fundamentals that affect how strategic, operational, and time-critical risk management choices are made.
- **Strategic Risk Management (SRM):** This level provides a risk management process to a long-term project or plan where resources are available to invest in significant analysis and research of available data. It is used in the long-term planning of complex operations, such as for introducing new equipment, new procedures, or new policies. Examples of projects where

Strategic Risk Management is applicable include Forest Land Management Planning, a watershed restoration project, or a long-term wildfire event.

- **Operational (Deliberate) Risk Management (ORM):** Operational Risk Management relies on clear objectives and each step should be documented. It primarily uses experience and brainstorming to identify hazards and develop controls and is most effective when done in a group. Examples of Operational Risk Management applications include planning upcoming projects to implement the Land Management Plan, developing an incident management plan, or implementing a prescribed burning plan.
- **Real-Time (Time-Critical) Risk Management:** This level incorporates an "on the run" mental or verbal review of the situation using the risk management process with or without recording the information. Employees implement the real-time process to consider risk when making intuitive decisions in a time-compressed situation. It is particularly helpful in choosing the appropriate course of action when an unplanned event occurs.

In the past, there has been little integration of a formal risk management process with the specific intent of addressing life safety in National Environmental Policy Act (NEPA) documents. Integrating risk management concepts focus on life safety at the project planning level of NEPA could be a particularly positive way to address safety concerns regarding project implementation earlier in the process. This would be an example of Operational Risk Management being applied as it is intended. Unfortunately, life safety issues are often left unaddressed until project implementation, which can lead to a multitude of problems concerning life safety and project design. Operational Risk Management has a specific goal to enhance an employee's ability to anticipate hazards and reduce the potential for loss, thereby increasing the probability of a successful outcome (U.S. Department of Agriculture 2019c) . Combined with the principles of Human and Organizational Performance Operational Risk Management represents a systems approach to Risk Management. The principles of Human and Organizational Performance were developed by Institute of Nuclear Power Operators and Department of Energy in response to managing the risk of organizational accidents in high-risk environments in the wake of the Three Mile Island Incident.

Human and Organizational Performance is a set of concepts and principles associated with a performance model that illustrates human performance in the context of the organization. The model contends that human performance is a product of organizational and individual elements that work together to produce repeatable outcomes. Human and Organizational Performance encompasses organizational factors, job-site conditions, individual behavior, and results. The system approach puts new perspective on human error; it is not a cause of failure but rather the symptom of deeper trouble in the system. Human error is not random; it is systematically connected to features of people's tools, the tasks they perform, and the operating environment in which they work (U.S. Department of Energy 2009).

The concept of high reliability organizations has been of interest to the federal wildland fire community in recent years. High reliability organizations provide real examples of organizations that operate successfully while almost never experiencing an unwanted event. By definition, high reliability organizations operate under very trying conditions all the time and yet manage to have very few accidents. Examples of high reliability organizations include aircraft carriers, air traffic controllers, power grid dispatch centers, nuclear submarines, airline cockpit crews, nuclear power plants, and offshore platforms, among others. Human and Organizational Performance is one approach toward achieving the attributes evident in high reliability organizations.

Principles of Human and Organizational Performance: Five simple statements, listed below, are referred to as the principles or underlying truths of human and organizational performance. Excellence in human performance can only be realized when individuals at all levels of the organization accept these principles and embrace concepts and practices that support them. Integrating these principles into management and leadership practices, worker practices, and the organization's processes and values will be instrumental in vectoring the organization towards a highly reliable organization (U.S. Department of Energy 2009)

- People are fallible, and even the best people make mistakes. Error is universal. No one is immune, regardless of age, experience, or educational level. The saying "to err is human" is indeed a truism. It is human nature to be imprecise—to err. Consequently, error will happen. No amount of counseling, training, or motivation can alter a person's fallibility.
- Error-likely situations are predictable, manageable, and preventable. Despite the inevitability of human error in general, specific errors are preventable. Just as we can predict that a person writing a personal check at the beginning of a new year stands a good chance of writing the previous year on the check, a similar prediction can be made within the context of work at the job site. By changing the work situation to prevent, remove, or minimize the presence of conditions that provoke error, task and individual factors at the job site can be managed to prevent, or at least minimize, the chance for error.
- Individual behavior is influenced by organizational processes and values. Organizations are goal-directed and, as such, their processes and values are developed to direct the behavior of the individuals in the organization. Work is achieved, however, within the context of the organizational processes, culture, and management planning and control systems. It is exactly these phenomena that contribute to most of the causes of human performance problems and resulting events.
- People achieve high levels of performance because of the encouragement and reinforcement received from leaders, peers, and subordinates. The organization is perfectly tuned to get the performance it receives from the workforce. All human behavior, whether good and bad, is reinforced by immediate consequences or by experience.
- Events can be avoided through an understanding of the reason mistakes occur and application of the lessons learned from past events (or errors). Traditionally, improvement in human performance has resulted from corrective actions derived from an analysis of facility events and problem reports—a method that reacts to what happened in the past. Learning from our mistakes and the mistakes of others is reactive—after the fact—but important for continuous improvement. Human performance improvement today requires a combination of both proactive and reactive approaches.

In summary, integrating the principles of Risk Management and Human and Organizational Performance into land management planning and operations establishes a system view of safety. A system view of safety can improve employee health and safety by reducing the incidence of fatalities related to underlying conditions both in the organizational and physical work environment. While there is no "zero risk" alterative, in the long-term, it is possible to further reduce risk to employees, communities, and publics in and adjacent to the Nez Perce-Clearwater by managing for a fire adapted and resilient landscape while at the same time meeting the multiple management objectives outlined in the land management plan.

3.7.1 Relevant Laws, Regulations, and Policy

Federal Laws

Occupational Safety and Health Act of 1970 (sec. 19 and 24), as amended (Title 29 U.S.C., sections 668 and 673 (29 U.S.C. 668 and 673)). This regulation states each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this act which are applicable to an employee's own actions and conduct.

Occupational Safety and Health Administration (OSHA) Title 29, CFR, Part 1910 (29 CFR 1910). This regulation contains occupational safety and health standards which have been found to be national consensus standards or established federal standards.

Occupational Safety and Health Standards, 29 Part 1926, Construction Standards (29 CFR 1926). This part sets forth the safety and health standards promulgated by the Secretary of Labor under Section 107 of the Contract Work Hours and Safety Standards Act.

Occupational Safety and Health Programs and Related Matters, 29 CFR Part 1960 (29 CFR 1960). This regulation provides basic program elements for federal employees. The regulation contains special provisions to assure safe and healthful working conditions for federal employees. Under this section, it is the responsibility of the head of each federal agency to establish and maintain an effective and comprehensive occupational safety and health program which is consistent with the standards promulgated under Section 6 of the Act.

Executive Order 12196, February 26, 1980. This order explains the required occupational safety and health programs for federal employees.

Healthy Forest Restoration Act of 2003 (Public Law 108–148, as amended): This act is aimed at expediting the preparation and implementation of hazardous fuels reduction projects on federal land; encouraging collaboration between federal agencies and local communities; requiring courts to balance effects of action versus no-action prior to halting implementation; and requires federal agencies to retain large trees under certain conditions.

2002 President's Healthy Forest Initiative: This initiative emphasizes administrative and legislative reforms to expedite fuels treatments and post-fire rehabilitation actions.

Policy

Forest Service Handbook 6700.11 - The Health and Safety Code Handbook. This policy is the primary source of standards for safe and healthful workplace conditions, project inspections, and operational procedures and practices in the Forest Service. The policy is in addition to the standards and regulations of the Occupational Safety and Health Administration (OSHA).

National Cohesive Wildland Fire Management Strategy 2014: The National Cohesive Wildland Fire Management Strategy is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress towards three goals:

- Resilient Landscapes
- Fire Adapted Communities
- Safe and Effective Wildfire Response

Interagency Standards for Fire and Fire Aviation Operations (National Fire Equipment System 2724): This reference guide documents the standards for operational procedures and practices for the Forest Service fire and aviation management program.

State and Local Plans

The following plans provide guidance for sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Mitigation activities pertaining to wildfires, hazard fuels, and zonal planning may be implemented prior to, during, or after an incident.

- Lewis County, Idaho Multi Hazard Mitigation Plan (Northwest Management 2011b)
- Clearwater County, Idaho Multi Hazard Mitigation Plan (Clearwater County 2017b)
- Idaho County, Idaho Revised Wildland Urban Interface Wildfire Mitigation Plan (Idaho County Commissioners 2009b, a)
- Latah County, Idaho Multi Hazard Mitigation Plan (Northwest Management 2011a)
- Nez Perce County, Comprehensive Plan (Nez Perce County 2018)

3.7.2 Methodology

Spatial Scale

The analysis area is those lands administered by the Nez Perce-Clearwater, as well as the land of other ownership within and adjacent to the Nez Perce-Clearwater or in which the Nez Perce-Clearwater has operational responsibility for wildfire suppression operations.

We used the Parameter-elevation Regressions on Independent Slopes Model (PRISM) and Simulating Patterns and Processes at Landscape Level Scales (SIMPPLLE) models interactively to analyze vegetation conditions. Wildfire disturbances were first modeled in SIMPPLLE. Resultant disturbance levels were then input into the PRISM model as acres of projected wildfire. The PRISM model was then run, and the outputs from PRISM were input into the SIMPPLLE model to allow for integration with the ecological processes and disturbances as modeled within SIMPPLLE for fire, insect, disease, and succession and with the spatial analysis of the change in vegetation conditions over time.

Temporal Scale

The temporal scale of this analysis is 200 years. It utilizes employee fatality data and vegetative condition modeling both forward and backward in time from present year. The selection of this temporal scale was based on documented employee fatalities and the projected time to future desired conditions modeled for each of the action alternatives. Employee fatality data from Line of Duty Deaths for the Nez Perce-Clearwater dates to 1919, 11 years after the establishment of the Nez Perce National Forest and Clearwater National Forest in 1908 and 9 years after the 1910 fires of Idaho, Montana, and Washington that prompted National Forest Land Managers, with the support of Congress, to establish an aggressive doctrine toward fire suppression and prevention on National Forest System lands.

Methods and Assumptions

Through the lens of life safety

This analysis is an attempt to quantify risk in the long-term. There is an irreducible component of uncertainty that is inherent. Risk to life safety in this analysis is the relative risk of fatality and severe life altering injury to employees, whether permanent, seasonal, volunteer, cooperator, or contractor; communities; and the visiting public that can be attributable to landscape conditions and organizational capacity to manage towards future desired conditions.

Desired conditions will result in a less hazardous environment

Fundamentally, this analysis is based on the premise that a fire adapted and resilient landscape within the natural range of vegetative condition is ultimately less hazardous to life safety than a landscape skewed in either direction from the natural range of vegetative condition. A return to natural range of vegetative condition can result in a reduction of extreme fire events moderated by more frequent intervals of fire being restored to the landscape. Mechanical fuels treatments and timber harvest that supplements natural and prescribed fire will further contribute to reaching desired conditions on the Nez Perce-Clearwater. Increased use of planned and unplanned ignitions in the action alternatives would lead to greater fuels reduction and the forest vegetation would be more resilient (Parks, Miller, Holsinger, et al. 2016). While not eliminating hazards encountered on National Forest System lands, desired conditions represent a landscape more favorable of reduced risk to employee, community, and public life safety.

Long-term versus near-term perspective

Short-term considerations of fire risk typically result in aggressive suppression, which in some contexts has led us down the wildfire paradox path of less fire today equals more severe fire in the future (Calkin et al. 2014). Through use of wildland fire to achieve land management objectives, the Nez Perce-Clearwater is well on its way to breaking the cycle of an increasingly challenging wildfire management environment and greater risk to both natural and human resources. Additionally, mechanical treatments to restore forests and vegetation to a condition of historic ranges could further address long-term risk in management areas where mechanical treatments and timber harvest are allowed.

Fatalities are most often a tragic outcome of normal work

Fatalities are outliers in the respect that they are an emergent phenomenon in normal work. The work is considered “normal” because it was routine, typical, or within the scope of the mission of the organization. Through a complex set of conditions and chance interactions within the organizational system of work, the conditions that lead to the fatality unfortunately materialized. These same conditions and interactions that lead to fatalities occur frequently but almost always lead to a successful outcome or less frequently a minor incident. It is for this reason that typical methods to prevent injuries applied “harder” hoping to prevent fatalities are limited in their efficacy.

Wildland firefighter fatalities (LODDs) can serve as a surrogate for the rest of the population

An underlying premise of this analysis is that the same type of exposures that contribute to wildland firefighter fatalities are typically the same exposures that contribute to employee, communities, and publics that are within the operational purview of the Nez Perce-Clearwater. While wildland firefighters may be exposed to particular risks for longer periods of time on a given day, the hazards to which they are exposed are not significantly different as to what any employee, community, or visitor may find themselves exposed to. For example, fire weakened, dead or diseased trees are a significant hazard to wildland firefighters engaged in wildland fire operations. In turn we have instances where other employees have suffered significant injury or death from being struck by falling trees. Wildland firefighter fatalities were chosen as a surrogate due to similar hazard exposure as other field going forest employees and because of the extensive documentation and review of wildland firefighter fatality incidents. Compilation of employee fatalities on the Nez Perce-Clearwater date back to 1919 and suggest similar trends and causes for fatalities of employees on the job as national studies on wildland firefighter fatalities suggest.

It may be possible to reduce the risk of on-the-job fatalities of all employees by addressing the issues that commonly are identified as contributors to incidences of wildland firefighter fatalities. Spending more time on “high end” influences with a systemic focus would likely have more broad scale implications to improve employee safety than consistently focusing on “low end” influences with an individual focus. This would be especially important in addressing long-term trends.

Organizations must balance resources of time and effort with being efficient or thorough and organizations typically trend towards efficiency over time

It is a basic attribute of human and organizational performance that the resources needed to do something often, if not always, are insufficient. The most frequent shortcomings are lack of time and funding but other resources, such as information, workforce, and social license to operate, may be in short supply. Nevertheless, in most cases, organizations manage to do what they should by adjusting how they do it to meet the current conditions. In practical terms they manage to establish and maintain a continuous balance between demands and resources. This is what is referred to as the Efficiency Thoroughness Tradeoff Principle (Hollnagel 2012).

This reflects the fact that organizations, as part of what they do frequently if not always, must make a trade-off between the resources, primarily time and effort, they spend on preparing and monitoring an activity and the resources, again primarily time and effort, they spend on doing it (Hollnagel 2012). If safety is the dominant concern, then a trade-off may favor thoroughness over efficiency. Conversely, if throughput and output are the dominant concerns, the trade-off may favor efficiency over thoroughness. It is a basic premise of the principle that it is impossible to maximize efficiency (production) and thoroughness (safety) at the same time. One is maximized at the expense of the other. This is where all levels of risk management come into play. The gap between efficiency and thoroughness represents the level of risk that is ultimately accepted by the organization and, as equally if not more important, the individual worker. Consequently, the organization tends to move towards efficiency over time, especially when positive outcomes reinforce the rewards of efficiency. This is also referred to as Practical Drift or what has become to be recognized in part as the Normalization of Risk.

“Efficiency” means that the resources used or needed to achieve a stated goal or objective are kept as low as possible. The resources may be expressed in terms of time (to completion), materials, money, psychological effort (workload), physical effort (fatigue), and manpower (number of people) (Hollnagel 2012).

“Thoroughness” means that an activity only is carried out if the individual or the organization has verified that the necessary and sufficient conditions are in place so that the activity will achieve its objective without creating unwanted side-effects. More formally, thoroughness means that the pre-conditions for an activity are in place, that the execution conditions (resources, tools, and competence) can be ensured, and that performance is monitored and controlled so that the outcome will be the intended one (Hollnagel 2012).

Relative Risk Matrix Development

Each alternative was analyzed using the following primary indicators:

- Trajectory towards desired conditions
- Management Flexibility
- Implementation Requirements
- Infrastructure
- Workforce Capacity

Each primary indicator includes a subset of indicators (measurements) that were used in the overall risk ranking of the primary indictors. Each measurement is described in the "Measurement Indicators" section of this report. Each measurement is assigned a risk assessment code (RAC) of either 1 = Low, 2 = Moderate, 3 = High, or 4 = Very High.

Additionally, each measurement was assigned a weighting factor relative to potential effects to life safety in the long-term. For "high-end" measurements, a weighting factor of 2 or 3 was applied, while a weighting factor of 1 was applied to "low-end" measurements. Determination of high-end or low-end measurements was determined through a combination of empirical and quantitative information.

For example: For the primary indicator of Workforce Capacity, the measurement of Acres Prescribed Fire Annually was calculated for Alternative X as:

- Formula: Risk Assessment Code x Weighting Factor = Final Risk Assessment Code
- Example: Moderate RAC (2) x High-end weighting factor (2) = Final Risk Assessment Code (4)

A Total Risk Score (TRS) for each primary indicator was calculated by summing the risk assessment codes for secondary indicators and then plotted by alternative on a radar chart creating a version of a risk assessment tool (RAT). The radar charts reflect relative risk level by alternative to life safety in the long-term. Adapted from Operational Risk Management Guide (U.S. Department of Agriculture 2019c), relative risk scoring for the RAT includes:

- Low = scores of 0-10
- Moderate = scores of 11-20
- High = scores of 21-25
- Very High = scores of 26-30.

SIMMPLLE and PRISM

The SIMPPLLE model was used in this analysis for two purposes: to calculate the natural range of variation for vegetation conditions and to project the landscape conditions of the alternatives into the future for analysis for the Final Environmental Impact Statement. SIMPPLLE takes a landscape condition at the beginning of a simulation, including past disturbances and treatments, and uses logic to grow the landscape through time while simulating processes, such as growth, fire, and insects, that might occur on that landscape, while accounting for the effects of those processes.

Out of necessity, the models simplify very complex and dynamic relationships between ecosystem processes and disturbances, such as climate, fire, and succession, and vegetation, over time and space. Although the best available information, including corroboration with actual data, and professional experience and knowledge is used to build these models, there is a high degree of variability and an element of uncertainty associated with the results because of the ecological complexity and inability to accurately predict the timing and location of future events. These models are tools that provide information useful for understanding vegetation change over time and the relative differences between alternatives. The models are not intended to be predictive or to produce precise values for vegetation conditions.

Information sources

This analysis also draws upon the best available literature citations that were found to be relevant to risk to life safety on the Nez Perce-Clearwater. Literature sources that were the most recent, peer-reviewed, and local in scope or directly applicable to the local ecosystem were selected. In addition, local studies and anecdotal information that is not peer-reviewed is included where appropriate to provide context.

Incomplete and unavailable information

Terrestrial ecosystems are highly complex and contain an enormous number of known and unknown living and non-living factors that interact with each other, often in unpredictable ways. For this reason, the Nez Perce-Clearwater acknowledges that there are gaps in available information and knowledge about ecological functioning and an inability to even evaluate what those gaps may be. These gaps in information may lessen over time as new information or methodology emerges. The Nez Perce-Clearwater’s ability to predict fire or other disturbances into the future is limited and is subject to uncertainty. The level of uncertainty depends on how predictable such factors as natural disturbances, climate change, or human-caused influences may be.

Sociotechnical systems, including the Forest Service, not only contain uncertainty but are characterized by uncertainty, meaning it is an identifying trait of the system and is irreducible. Sociotechnical systems are highly complex and contain an enormous number of known and unknown factors that interact with each other, often in unpredictable ways. For this reason, qualitative and experiential data is heavily relied upon to assess the likelihood of a range of potential outcomes. Ultimately, there are gaps in understanding which result in a failure to predict. As research into complex and adaptive systems progresses, technology may become available that enables the narrowing of these gaps.

Measurement Indicators

All measurement indicators are considered in relation to risk to life safety in the long-term, defined as 20 plus years. This is an application of Strategic Risk Management (SRM), with the assumption that near-term risks to life safety can be mitigated with the incorporation of Operational Risk Management (ORM) at the project level.

Fundamentally, this analysis is based on the premise that a fire adapted and resilient landscape within the natural range of vegetative condition (NRVC) is ultimately less hazardous to life safety than a landscape skewed in either direction from natural range of vegetative conditions. Greater emphasis on fire-resilient landscapes and communities is at the heart of the National Cohesive Strategy for Wildland Fire Management acts and initiatives that have been developed in response to extreme wildland fire incidents that have been responsible for loss of homes in communities, negative impacts to rural economies, and loss of life both in the private and public sector. Increased use of planned and unplanned ignitions and harvest activity in the action alternatives would lead to greater fuels reduction and the forest vegetation would be more resilient (Parks, Miller, Holsinger, et al. 2016).

Trajectory towards Desired Conditions

As measured by acres of restoration and maintenance treatments annually, including projected time to desired conditions by alternative.

- Rate of progress to desired conditions as measured in years by alternative.
- Prescribed fire acres annually, by alternative.
- Restoration acres through timber harvest annually by alternative.
- Restoration and maintenance of ecological role of fire projected acres by alternative.
- Soils and watershed acres improved or restored annually by alternative.

The current fire management system still relies heavily on aggressive fire suppression in all but wilderness or Idaho Roadless designated lands. Regardless of management designation, the negative re-enforcement loop of fire suppression requiring more fire suppression has contributed to an increasingly complex and hazardous environment and represents a transfer of risk into the future. Fire responders are being exposed to extremely dangerous situations, such as complex fuel conditions, climatic changes, and wildland-urban interface challenges. As they pursue multiple objectives, there is an increased exposure to hazards. The Twisp River Fire of 2016 is one example of how these increased risks resulted in fatalities (U.S. Department of Agriculture 2016e).

In addition to increased utilization of wildland fire across all lands to enhance landscape resiliency, timber harvest and mechanical fuels reduction can help move the landscape towards desired conditions. Especially where the risk of management ignited or natural ignitions managed to achieve land management plan objectives are high risk due to a departure of natural vegetative conditions, or fire return intervals, from what natural processes would maintain. However, sole reliance on timber harvest and mechanical fuels reduction projects to move the landscape to desired conditions in Management Area 3 and Management Area 2 would likely not be successful without the inclusion of wildland fire.

Management Flexibility

As measured by acres of land allocations and resources that influence the way vegetation treatments are carried out, as well as managing planned ignitions and unplanned natural ignitions.

- Recommended Wilderness Acres by alternative.
- Wild and Scenic Rivers Eligible and Suitable Acres by alternative.
- National Historic Landmark Heritage Resources as measured by land management objectives compatibility.
- Compatibility of neighboring lands and Nez Perce-Clearwater Land Management Areas with the management of fire that achieves land management plan objectives.

Specially designated management areas potentially can limit options for land managers to utilize techniques and tools otherwise available to them in other management areas. Even if available, land managers may choose not to implement or utilize other techniques and tools to accomplish objectives due to the difficulty of obtaining required authorization. In turn, this may create added exposure and increased risk to employees or communities (U.S. Department of Agriculture 2017b).

A severe injury to a wildland firefighter that occurred during the Freezeout Fire of 2014 is an example of management needing to carefully balance risks of land management strategies between specially designated management areas and adjacent lands managed with different strategies and objectives. This can be viewed as a condition of influence created by two differing land management strategies, potentially compelling land management employees to make decisions that may increase risk to employees and communities (U.S. Department of Agriculture 2014j).

Heritage resources can influence what risks managers are willing to take based on need for protection. Generally, these resources can be protected from land management activities and wildland fire without subjecting employees to high levels of risk. However, there can be challenges in specially designated management areas. Of particular concern in this analysis is the Nez Perce Trail National Historic Landmark, which lies in part on lands designated suitable for timber in the 1987 Clearwater National Forest Land Management Plan. This inadvertently creates the same conditions of influence as discussed relative to compatibility of land management strategies and objectives in the Freezeout Fire example above.

Implementation Requirements

As measured by difficulty, either real or perceived, that influence the way vegetation treatments are carried out, as well as managing planned ignitions and unplanned natural ignitions.

- Slope Restriction as measured by maximum percent slope restriction by alternative.
- Detrimental Soil Disturbance limitation as measured by alternative.
- Snag Retention and Recruitment as measured by number of snags per unit measure and diameter requirements by alternative.
- Snag Retention as measured by number of snags per measurement scale by alternative.
- Live Trees per acre as measured by alternative.
- Recommended Wilderness Acres by alternative.

At times, implementation requirements can be conditional influences that effect outcomes both in positive and negative ways. While their intent is for positive effects or protection of ecosystems and natural resources, they can inadvertently create the conditions for implementation decisions that put employees at risk. Although generally not insurmountable, implementation requirements can create misconceptions about available options and steer management activities away from vegetation treatments that would support achieving desired conditions. A recent example of this occurred during the management of the Lolo Peak Fire in 2017 on the Lolo National Forest in the following excerpt from the Lolo Peak Fire Fatality Learning Review:

The way our policy regarding specially-designated management areas is currently set up has an obvious effect on the way we manage fire: the issues associated with obtaining permissions has tainted much of the wildland fire community's desire to work in them. While utilizing mechanized equipment in a specially designated management area is not an impossible task, obtaining the required approvals can be viewed as a monumental one. Due to these challenges it becomes a task that is very often avoided, creating slides for Fire and Forest leadership that remind them there are fewer available tactical options than what truly exist (U.S. Department of Agriculture 2017b).

Implementation requirements may also create downstream effects to safety and risk in a variety of ways. Leave tree and snag retention requirements can leave snags next to prescribed fire control lines, putting prescribed fire implementation crews at risk by either having to fell the snag or taking the chance it will not cause a problem and leave it be. Either way, risk is assumed on part of the implementer that might have been possible to avoid with more flexible snag retention requirements.

Other examples of implementation requirements that create unintended risk to project implementers are as follows:

- Restrictions on the ability to treat activity slash post-harvest leads to hazardous fuels accumulations or operations that entail a higher degree of risk.
- Ability to treat along roadsides that are adjacent to or within proposed wilderness areas.
- Decommissioning of roads that provide firefighter access to initial attack, as well as decommissioning prior to all activities being completed on a project.

Infrastructure

As measured by miles of roads and trails improved, watershed acres improved or restored annually, and lease of radio communication site.

- Miles of roads maintained and improved as measured by Projected Timber Sale Quantity (per million board feet) by alternative.
- Trails maintained improved as measured by alternative.
- Communication Site (GA Pilot Knob) as retained or removed by alternative.

National Forest appropriations are allocated proportionally to the amount of timber management and recreational use on each Forest. Timber management contracts include road maintenance responsibilities on haul routes, providing additional operators to perform road maintenance on the National Forest System roads. Higher timber volumes result in more road maintenance and positive road modifications, such as curve widening, improved sight distance, and replacement of failing or undersized culverts, which would be sized to pass flows from the 100-year flood event.

Under timber stewardship sales, watershed improvements can be accomplished, such as installation of aquatic organism passage culverts, bridge improvements, additional gravel surfacing, and replacement of additional drainage structures with upsized culverts, retaining walls, landslide repairs, and forestwide road maintenance such as road blading.

Safe and well-maintained forest roads are crucial to supporting land management activities, in addition to reducing risk to visiting public and local communities that utilize forest roads for a variety of activities. Increasingly, forest roads are used as control lines for wildland fire operations. Additionally, forest roads serve as primary emergency egress routes for communities located within the Nez Perce-Clearwater. Forest Service trails also facilitate the management and protection of backcountry resources and are occasionally used as fire control lines. Retained receipts from timber harvest can be used to maintain trails to protect aquatic resources. Projected Timber Sale Quantity (per million board feet) serves as a surrogate for miles of forest roads maintained or improved.

Workforce Capacity

As measured by Projected Timber Sale Quantity (PTSQ), restoration acres through timber harvest and restoration acres through prescribed fire annually by alternative.

- Volume of timber to be sold (PTSQ) annually by alternative.
- Acres timber harvest annually, by alternative.

- Acres prescribed annually, by alternative.

As it relates to risk to life safety, workforce capacity is perhaps the most critical indicator, yet the most difficult to predict, especially with a long-term view relative to reaching desired conditions. While possible to project size and skill set of the workforce needed to comfortably execute any of the proposed alternatives, future budgets, advancements in information technology, and changes in policy create a large degree of uncertainty.

As such, each alternative was analyzed with the assumption that budgets will remain flat or reduced and that, although technological advances will become available, there will remain a gap in workforce capacity that skews the organization towards efficiency and away from thoroughness. This is a fundamental attribute of human and organizational performance where ultimately either efficiency (production) or thoroughness (safety) prevails over the other, known as the Efficiency Thoroughness Tradeoff (Hollnagel 2012).

3.7.3 Affected Environment

Existing Condition

The following information includes excerpts from the most recent *Report on Wildland Firefighter Fatalities in the United States: 2007-2016* (National Wildfire Coordinating Group 2017c). The report includes data from years prior to 2007 as far back as 1990, when the National Wildland Fire Coordinating Group first started producing such reports. The 2007 to 2016 range is the most current National Wildland Fire Coordinating Group ten-year evaluation period. The report was compiled with data from a variety of sources, such as National Wildland Fire Coordinating Group "Safety Grams," National Institute of Occupational Safety and Health (NIOSH) data, and the U.S. Fire Administration Firefighter Fatality database. Wildland firefighter fatalities in the National Wildland Fire Coordinating Group report include any firefighter that is involved in wildland fire operations, including paid municipal firefighters and volunteers with rural fire departments. Additional information on specific protocols for inclusion of firefighter fatalities into the National Wildland Fire Coordinating Group Report can be found within the report.

Between 1990 and 2016, 480 firefighters died during wildland firefighting operations in the United States (Figure 152). According to the previous wildland firefighter fatalities report, fatalities increased by 26 percent during the 1999 to 2006 period when compared with the 1990 to 1998 period. There was a 2 percent decrease in the 2007 to 2016 period, with a total of 107 fatalities.

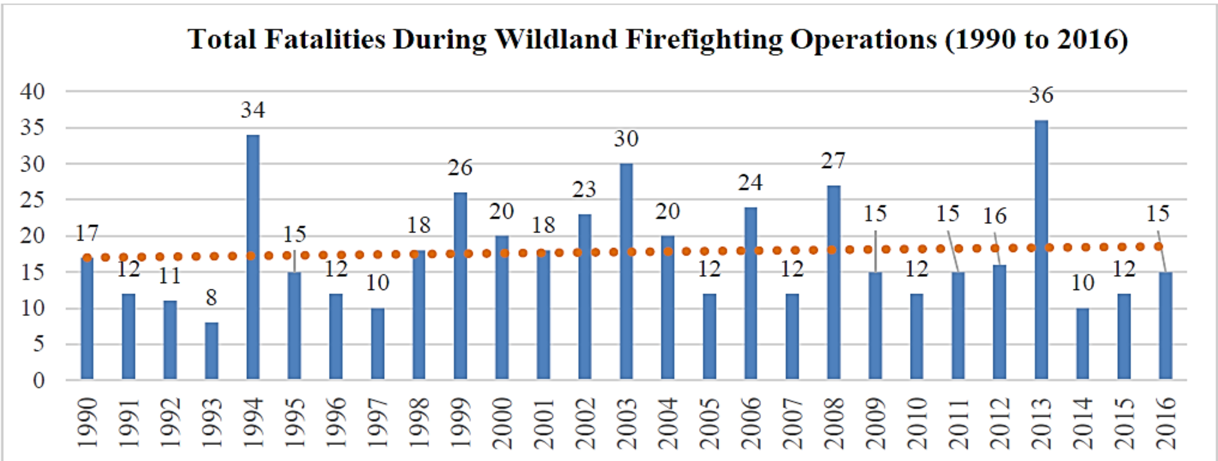


Figure 152. Total annual firefighter fatalities (all causes) during wildland fire operations between 1990 and 2016

Data Source: (National Wildfire Coordinating Group 2017c).

Causes of Death

The most common causes of death of wildland firefighters reported for the most current period between 2007 and 2016 were heart attacks (41 fatalities, 24 percent), vehicle accidents (34 fatalities, 20 percent), aircraft accidents (31 fatalities, 18 percent), and entrapments (28 fatalities, 17 percent) (Figure 153). These causes account for 79 percent of the total number of fatalities.

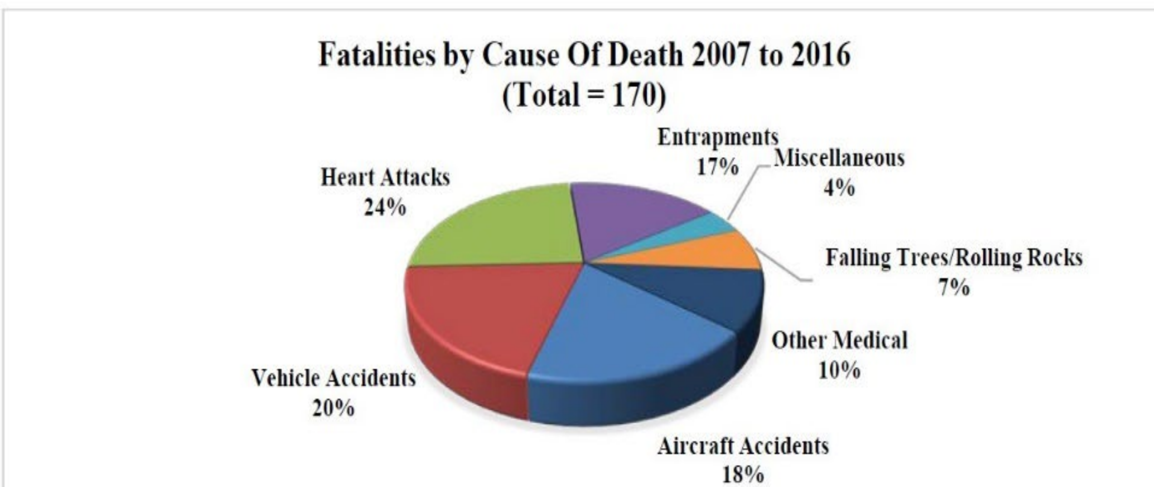


Figure 153. Wildland firefighter fatalities by cause of death from 2007 to 2016

Data Source: (National Wildfire Coordinating Group 2017c).

Federal firefighters account for a large portion of the wildland firefighter workforce, encompassing wildland firefighters from the USDA Forest Service (USFS), Bureau of Land Management (BLM), National Park Service (NPS), Bureau of Indian Affairs (BIA), and Fish and Wildlife Service (FWS), although volunteers make up the largest proportion of fire fatalities (National Wildfire Coordinating Group 2017c).

Thirty-one federal firefighters died during the most recent period (2007 to 2016). These fatalities accounted for 18 percent of all firefighter fatalities, equaling 3.1 fatalities per year. The number of federal firefighter fatalities between 2007 and 2016 was lower than for the period between 1999 and 2006. From 1999 to 2006 there were 37 fatalities, equaling 4.6 fatalities per year.

Between 2007 and 2016, vehicle accidents were the leading cause of death for federal firefighters with eight fatalities (Figure 154), followed by falling trees or rolling rocks with six fatalities (Figure 154), contrasting with volunteer deaths more often caused by heart attacks. Other causes of death for federal firefighters included four heart attacks fatalities, three aircraft accident fatalities, and three other medical caused fatalities.

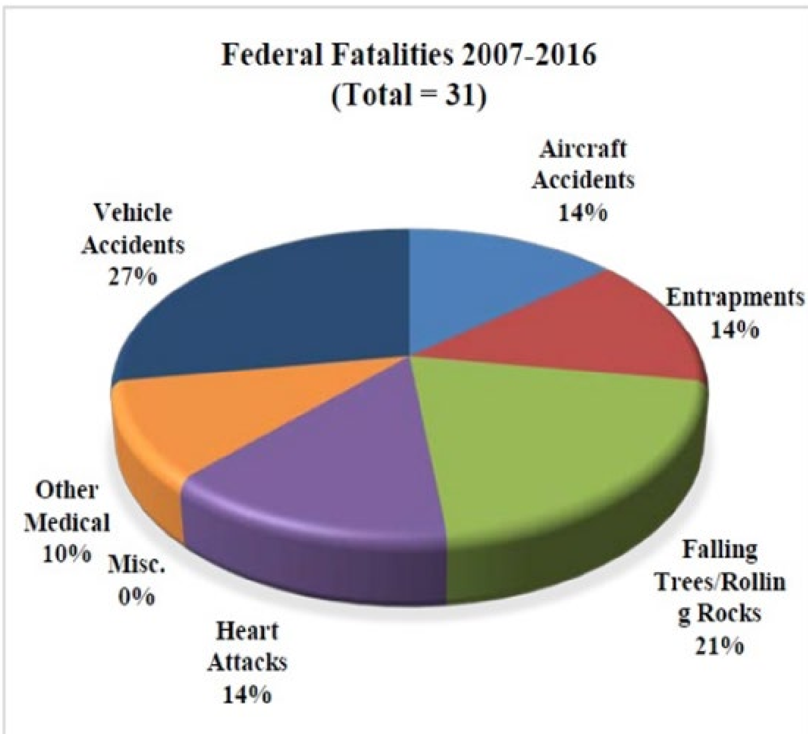


Figure 154. Federal firefighter causes of death, 2007 to 2016

Data Source: (National Wildfire Coordinating Group 2017c).

Falling Trees or Rolling Rocks

Falling trees or rolling rocks claimed the lives of 12 firefighters during the most recent period, equaling 1.2 fatalities per year, compared with 7 firefighters during the period between 1999 and 2006, equaling 0.9 fatalities per year. The total number of firefighter fatalities caused by falling trees or rolling rocks between 2007 and 2016 was equal to the combined total between 1990 and 2006. Four of the deaths during the most recent period occurred in California; two in Kentucky; and one each in Colorado, Oregon, Washington, Idaho, Nevada, and Florida.

On the Nez Perce-Clearwater, falling trees are a particularly important aspect of risk to life safety, accounting for the single largest physical threat to employees working in the field today. Often it is surmised that driving is the biggest threat to employee safety; however, fatality trends on the Nez Perce-Clearwater do not support that. Additionally, in the context of continual advancement and application of automobile safety technology, the likelihood of a person surviving a crash is much higher than ever. Falling trees, however; are different in that there are no reliable controls to protect the employee who is hit by a falling tree. The only controls available are human performance based, which is inherently unreliable.

Falling trees are the second leading contributor to employee fatalities on the Nez Perce-Clearwater over the past 100 years and are increasingly more prevalent as a leading cause of serious injury and fatalities to Forest Service wildland firefighters. In the past eight years, one fatality and two severe employee injuries related to tree strikes have occurred on the Nez Perce-Clearwater during the Steep Corner Fire in 2012 (one fatality, Figure 155), the Nut Hill Fire in 2013 (one severe injury), and the Freezeout Ridge Fire in 2014 (one severe injury).

Figure 155. Steep Corner Fire fatality site on August 12, 2012

Data Source: USDA, Serious Accident Investigation Report - Steep Corner Fire Fatality, North Fork Ranger District, Clearwater National Forest, Idaho, August 12, 2012.

The U.S. Forest Service Office of Human Performance and Innovation and Organizational Learning (HP&IOL) recently performed an internal study of Forest Service wildfire accident statistics over the ten-year period from 2007 to 2016. This study found that getting hit by a rock, log, limb, or tree was the most frequent way Forest Service firefighters were injured (Figure 156). Furthermore, getting hit by a tree was the second most frequent way Forest Service firefighters were killed (National Wildfire Coordinating Group 2018), while aviation accidents were the leading cause by nearly a three to one ratio.

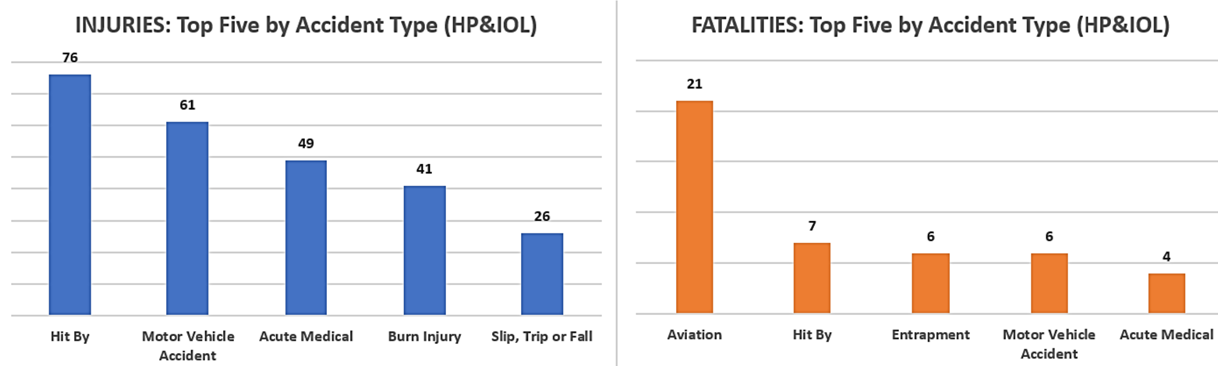


Figure 156. Top accident types for injuries and fatalities for Forest Service wildland firefighters, 2007 to 2016

Data Source: (National Wildfire Coordinating Group 2018).

Examining the Office of Human Performance and Innovation and Organizational Learning study data above, we can surmise that there are instances within each category that the accidents that lead to the injuries or fatalities are often similar in context of exposure as accidents that resulted in fatalities in all federal wildland firefighters. While not comparing "apples to apples," an interesting trend develops when comparing the Office of Human Performance and Innovation and Organizational Learning data with records of fatalities of employees on the Nez Perce-Clearwater's over the past 100 years. Aviation Accidents constitute the largest number of fatalities on the Nez Perce-Clearwater (2019-2019, Figure 157), followed by "Hit by" Tree, Heart Attack "Acute Medical," Burn-over, and Drowning and Driving, with four fatalities each. Driving includes fatalities where an employee was thrown from a horse during incidents that occurred in the 1920s prior to widespread use of motor vehicles and Forest Service roads.

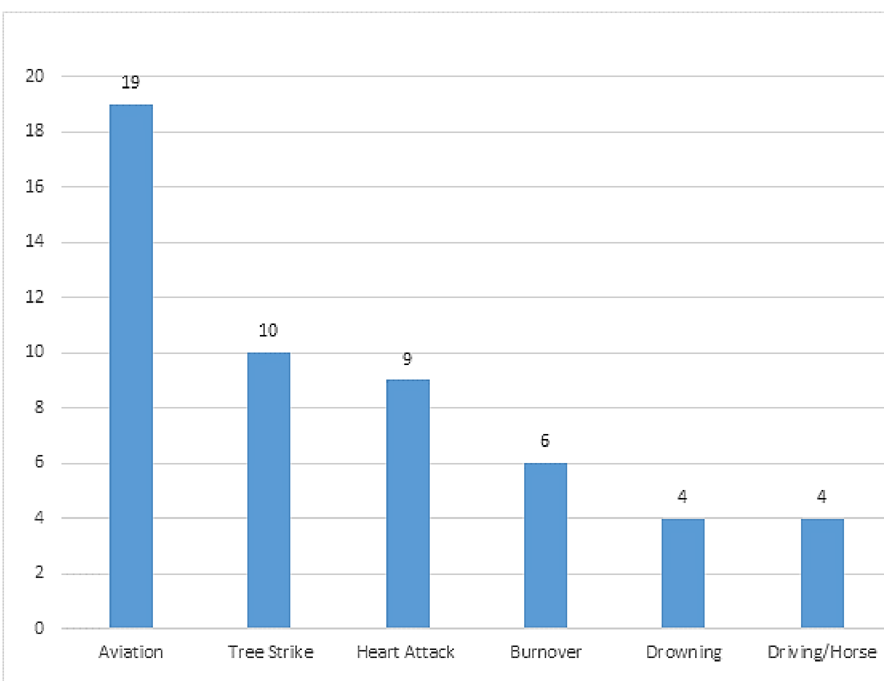


Figure 157. Deaths in line of duty for 1919 to 2019, Nez Perce-Clearwater Employees

Data Source: Adapted from Wildland Firefighter Fatalities, (Nez Perce-Clearwater Safety and Health Manager) and Employees who have lost their lives in the line of duty, Nez Perce National Forest (Schacher, 2009).

Relating the Nez Perce-Clearwater fatality data with the National Wildfire Coordinating Group data reflects the same types of fatalities, although with comparatively different rates. This is likely due to the difference in vegetation types on the Nez Perce-Clearwater (more heavily timbered), the amount of wilderness and roadless areas (aviation transport versus motor vehicle), and the high density of large rivers and streams contributing to drownings. It is important to note that each of the categories for the Nez Perce-Clearwater includes wildland firefighter fatalities.

Tragic Outcomes of Normal Work

Employee fatalities typically do not represent "super accidents" brought about by extreme errors of omission. They represent the tragic outcome of normal work due to ineffective or impossible controls in an inherently hazardous environment. High-risk work with robust controls is not risky but high-risk work that relies on the perfect human performance is extremely risky.

Fatalities are outliers in the sense that the work would have been considered a success, or otherwise normal, had there not been a fatality. The work is considered "normal" because it was routine, typical, or within the scope of the mission of the organization. Fatalities occur in a system of work that almost always produces successful results. They are therefore rare events that continually seem to defy our best efforts to eliminate them. Especially when only our "go to" methods of preventing them are applied. For example, a falling tree that injures an employee is just as deadly as the tree that kills an employee; the only difference was the outcome. In the event of a tree strike that only injures the employee, the Forest Service tends to apply the "lessons learned" of "hazard tree identification" and "maintain situational awareness" as a remedy to prevent future events. When a fatality from a tree strike occurs, traditionally managers apply these same lessons but with a stronger emphasis, including "stand-downs," "additional training," and "ad hoc committees." While well intended, this does little to address the fact that humans are fallible and perfect performance all the time is impossible. Eventually, if enough employees are exposed to hazard trees, there will be a fatality. This is not to say that traditional responses are not important or valid; it is just that they will only get us so far.

There is belief in our ability to recognize and mitigate hazards while weighing the remaining risks against the value of our intended actions. This belief assumes a high degree of control to accurately perceive and control our environment, when in fact, because of the combination of the uncertainty inherent in our system and our limitations as humans, there is much beyond our ability to control (U.S. Department of Agriculture and U.S. Department of the Interior 2011).

The following is excerpted from the Steep Corner Fire Serious Accident Investigation (SIA) report (Foster and Draeger 2013) that further emphasizes the difficulty humans have recognizing and mitigating hazards in an uncertain and dynamic working environment:

An individual's perceptual abilities (What are you looking at? What are you not hearing?) limits their capacity to identify hazards and evaluate risk, as do their notions about which risks are more significant or likely to cause harm. The day of the Steep Corner fatality, firefighters did not specifically identify the strike tree as a hazard tree. It was one potential hazard tree in a forest full of hazard trees. In a sense, everything around was a hazard.

A firefighter's choice, conscious or unconscious, to focus attention on one thing or another is governed by a number of factors. Focusing on one risk may lessen or eliminate a focus on others. People focusing on a felling operation may take a fraction of a second longer to identify and react to *a different threat. People do not "lose situational awareness" because, while conscious, they are always aware of something. In this case, they focused on a felling operation.*

By applying a long-term view, it may be possible to achieve improved life safety results by creating an environment where fires are not as frequently severe, insect and disease outbreaks in forest are moderated, watersheds are restored or protected, roads used to support land management operations are maintained or improved, and workforce capacity is commensurate with work demands.

Wildfire Trends on Nez Perce-Clearwater

Wildland fire trends on the Nez Perce-Clearwater are discussed and summarized in the Fire Management Report for the Final Environmental Impact Statement, a portion of which is excerpted below.

Since 1870, fires over 1,000 acres have been mapped to determine trends associated with climate, fire policy, and suppression success (Figure 158). On average, 314,608 acres of large fires burned per decade from 1870 to 2017. Drought years and ineffective fire suppression from 1870 to 1899 burned approximately 398,601 acres. From 1900 to 1939, fires burned approximately 2,347,828 acres. From 1940 to 1989, fires burned approximately 366,143 acres. From 1990 to present, fires have burned approximately 1,606,552 acres. This trend of increasing acres, exhibited in Figure 159, can be explained by burn cycle. Multiple influences, including fuels, weather (daily, monthly, and long term), ignition sources, and suppression efforts.

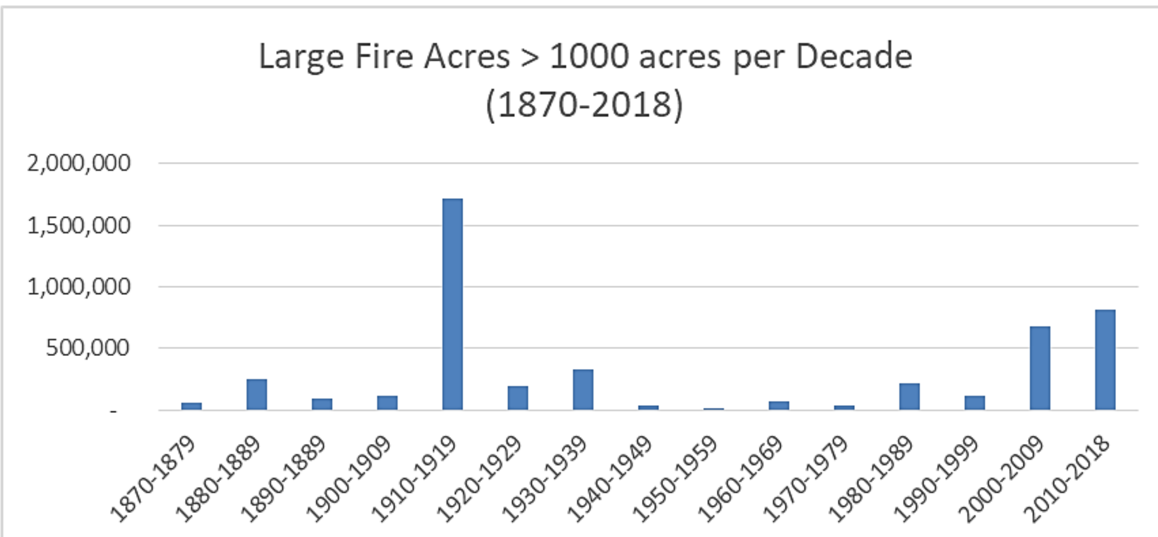


Figure 158. Large fire (>1,000 acres) acres per decade, 1870 to 2018, on the Nez Perce-Clearwater

Data Source: FireStat and FACTS databases.

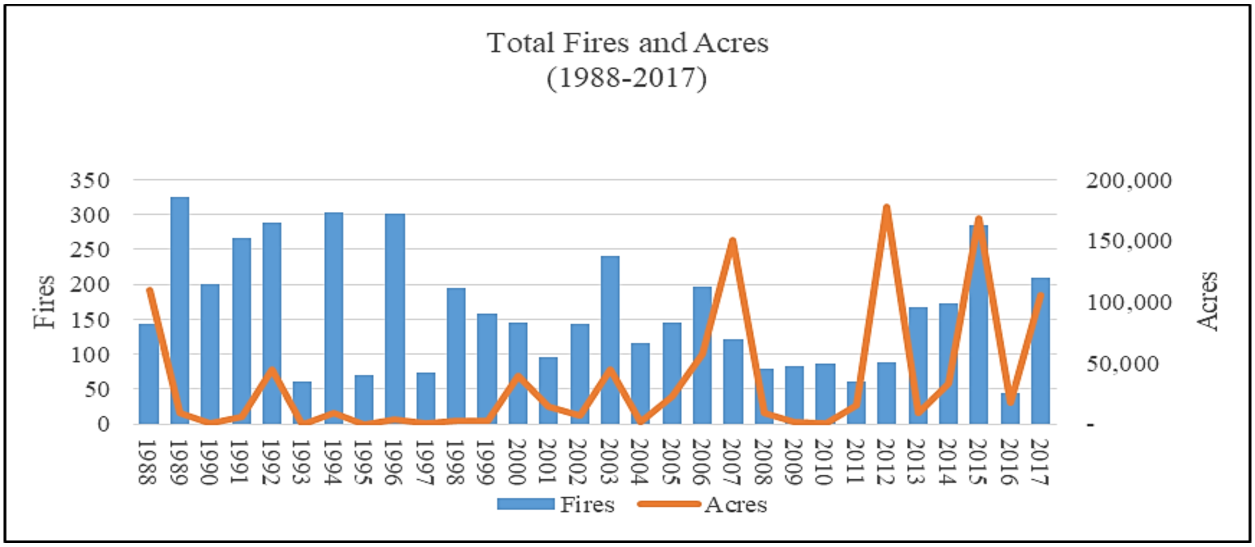


Figure 159. Number of fires per year and fire acres from 1988 to 2017 on the Nez Perce-Clearwater

Data Source: FireStat and FACTS databases

Selway-Bitterroot Wilderness

The Selway Bitterroot Wilderness is a model of a fire resilient landscape in which, to an extent, wildland fire has become self-regulated (Parks, Holsinger, et al. 2015, Wildland Fire Leadership Council 2012). This "regulatory-effect" model is of particular importance to employee and public safety in that it reflects an environment where potential exposure to environmental hazards, such as high intensity fire, a high density of snags, and insect and disease weakened trees, have been moderated by allowing a return to a more natural interval of fire on the landscape (Figure 160). Using mechanical harvest, management ignited fire, and naturally ignited fire to reduce fuels and move toward a fire resilient landscape, these same benefits to life safety can be realized across all management areas on the Nez Perce-Clearwater.

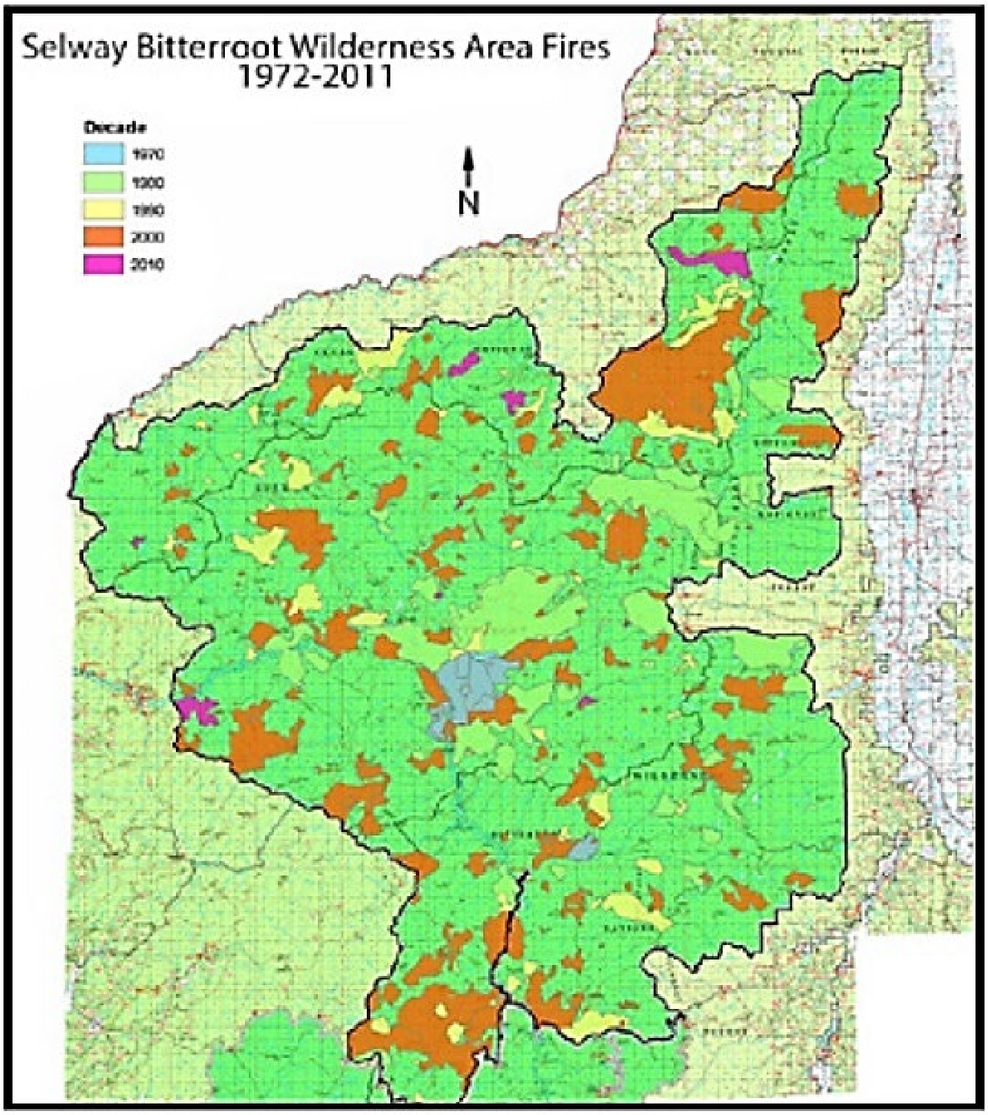


Figure 160. Map of wildland fires in the Selway Bitterroot Wilderness by decade, 1972 to 2021, illustrating the regulatory effect of prior burns through allowing fires to burn on a more natural interval

Data Source: (Wildland Fire Leadership Council 2012)

The Parks et al (2015) study reveals three important findings:

- Wildland fire clearly acts as a fuel break and is a barrier to subsequent fire spread; this effect is strongest immediately after fire and decays over time.
- The ability of wildland fire to act as a fuel break varies geographically, lasting six years in the warmest, driest study area and 14 to 18 years in the cooler, wetter study areas.
- Extreme fire-conducive weather diminishes the ability of fire to act as a fuel break. This supports the intent of the National Cohesive Wildland Fire Management Strategy with its goals of: (1) Resilient Landscapes, (2) Fire Adapted Communities, and (3) Safe and Effective Wildfire Response.

Management of fire in the Selway Bitterroot Wilderness has been a successful model that can be relied upon to meet multiple land management plan objectives by allowing fire to play its natural role on the landscape. The fire suppression paradigm is changing mainly due to the issues surrounding firefighter safety; the high costs associated with fully suppressing a fire, especially in remote, inaccessible areas; and the higher spread rates, intensities, and fire sizes that are being experienced today that have not been witnessed in the recent past (Wildland Fire Leadership Council 2012).

Wildfire has been, and will be, the greatest driver of vegetation change on the Nez Perce-Clearwater (FIRESTAT data, FACTS data) and, under all alternatives, natural unplanned wildfire would be allowed to play its ecological role. Along with prescribed fire, use of wildland fire will help in alleviating the fire deficit (Parks, Holsinger, et al. 2015, Vaillant and Reinhardt 2017), as well as providing many ecological benefits.

3.7.4 Environmental Consequences

Effects of the No Action Alternative

Resource management would continue under the current plans. Time to desired conditions would be close to a 100-year time frame. The No Action Alternative does not account for growth and succession, so is less likely to achieve desired conditions (

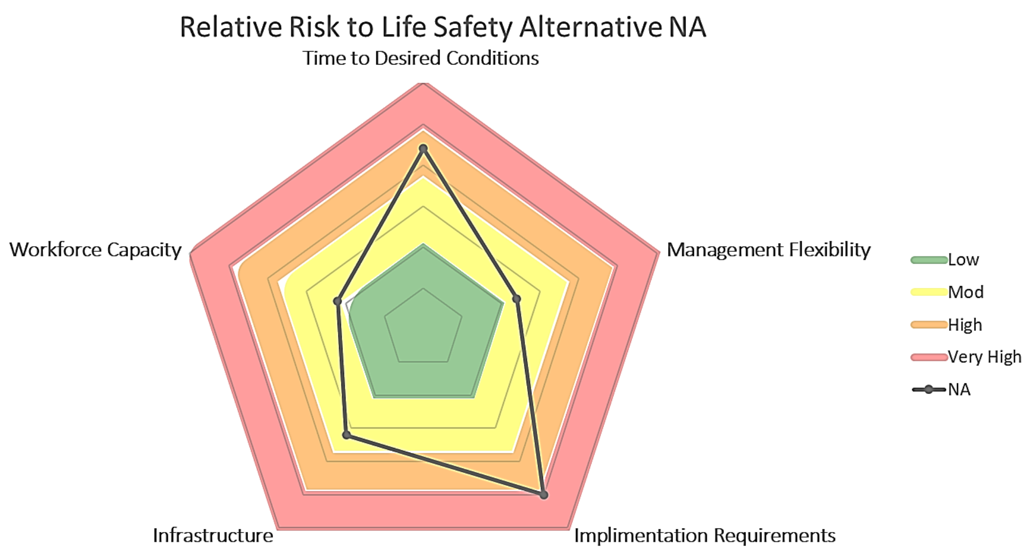


Figure 161).

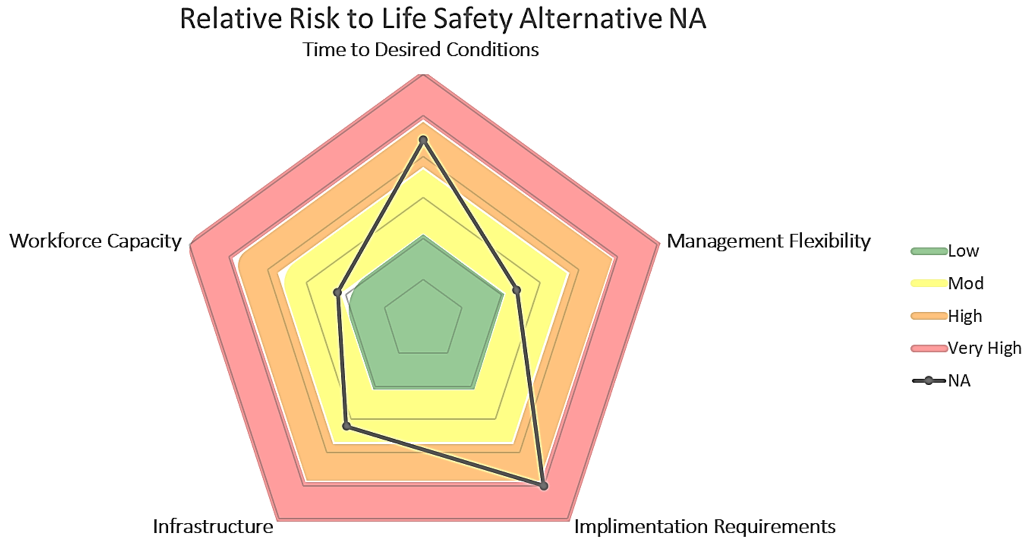


Figure 161. Relative risk to life safety under the No Action Alternative

Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager.

Alternative W

This alternative has higher levels of recommended wilderness and an increased timber output, resulting in moving vegetation toward desired conditions in 30 years. This alternative also increases the resiliency of vegetation by creating patchy landscapes by increasing the use of wildfire, prescribed fire, and mechanical fuels reduction treatments that promote native fire regimes, resulting in barriers to insect and pathogen dispersal and reduced fire severity from future wildfires.

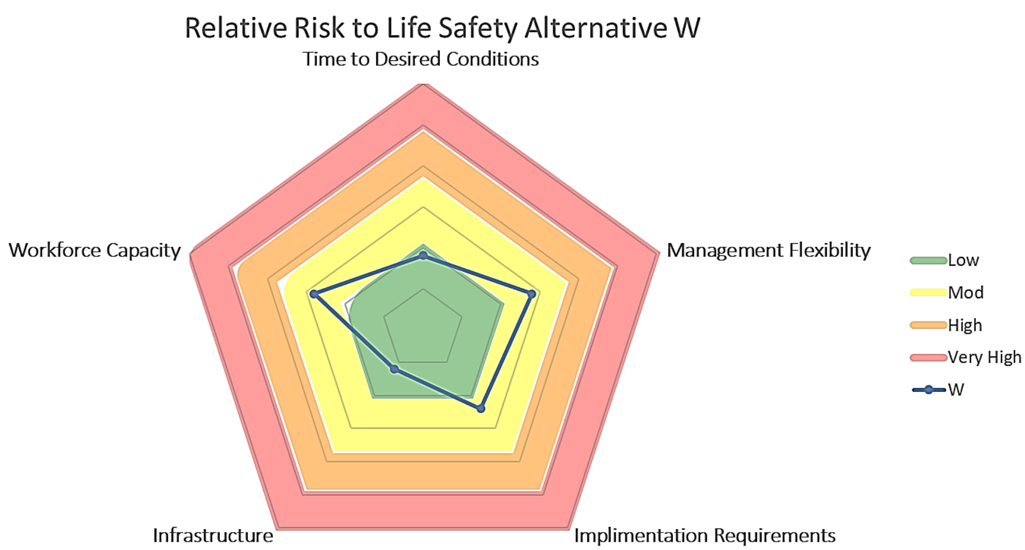


Figure 162. Relative risk to life safety under Alternative W

Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager

Alternative X

This alternative responds to the local and state plans that require fewer areas of recommended wilderness and leans heavily toward workforce capacity (Figure 163). It would move forest vegetation to the lower bounds of the desired condition within the two decades. The number of fires and acres of unplanned ignitions managed for resource objectives toward restoring and maintaining fire regimes would be like Alternative W. Outside of designated wilderness, timber harvest and prescribed fire would increase the number of fire regime acres restored or maintained within each potential vegetation type. This alternative would use more vegetation treatments and potentially fewer acres of natural wildfires than Alternative W to restore and maintain a greater number of acres of each potential vegetation type that are currently departed from the fire regime. Not renewing the lease of the Pilot Knob communication site could contribute to gaps in radio communication coverage and removes a layer of redundancy from the radio network that often relies on the ability to utilize repeaters with overlapping coverage as back-up when a repeater is down.

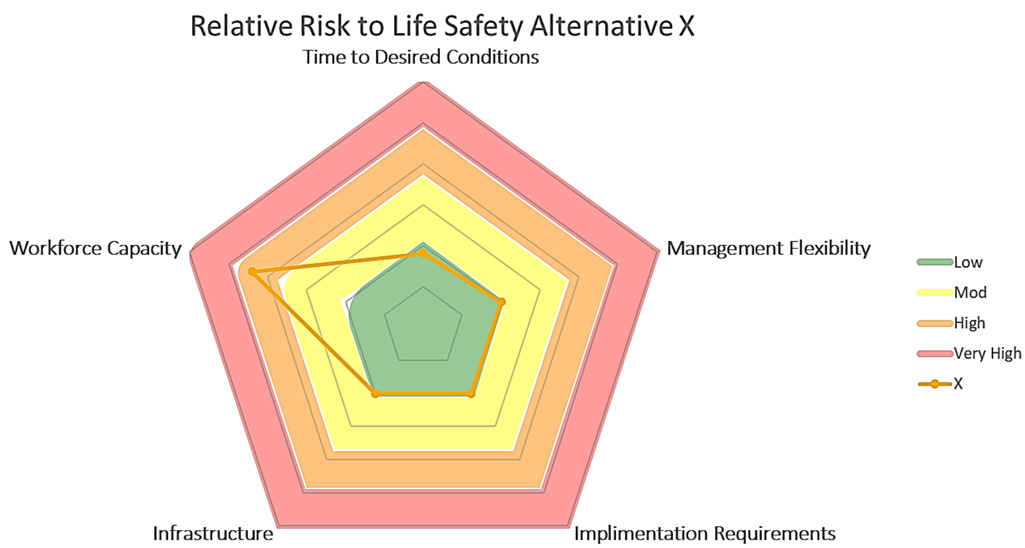


Figure 163. Relative risk to life safety under Alternative X

Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager

Alternative Y

This alternative provides for an intermediate level of recommended wilderness and moves vegetation towards forested desired conditions in 50 years (Figure 164). It also includes major rivers not designated in the Wild and Scenic Rivers Act. The period required to restore and maintain fire regimes would be greater than Alternatives W and X. This alternative would require a longer time to increase the resiliency of vegetation because of less use of prescribed fire and mechanical fuels reduction treatments.

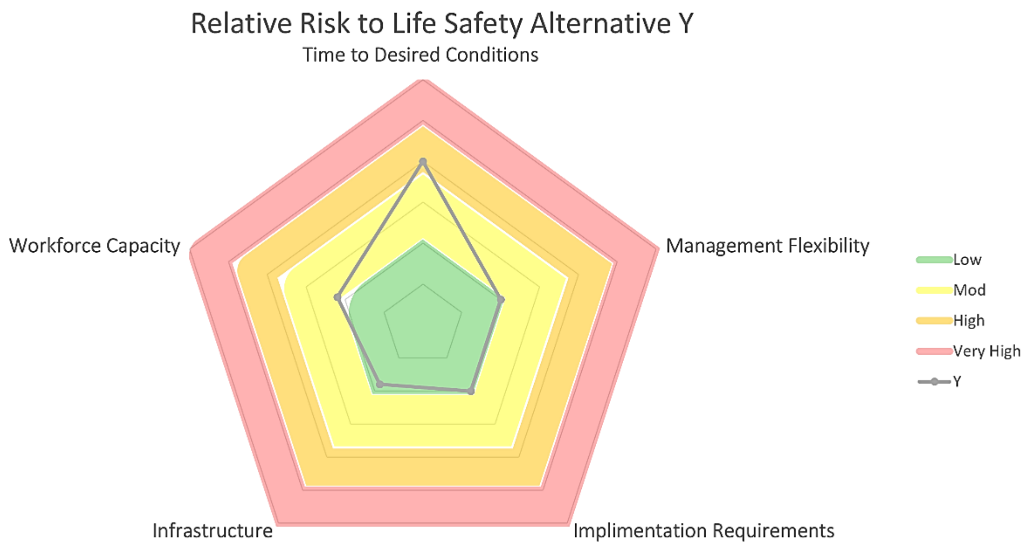


Figure 164. Relative risk to life safety under Alternative Y

Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager.

Alternative Z

This alternative promotes natural processes that dominate over anthropogenic influence (Figure 165). Reliance on natural processes would move vegetation towards desired conditions in 100 years. This alternative would require a longer time to increase the resiliency of vegetation by creating patchy landscapes because of less use of prescribed fire and mechanical fuels reduction treatments that promote native fire regimes resulting in barriers to insect and pathogen dispersal and reduced fire severity from future wildfires. Reliance on natural processes would warrant a slower movement towards forest vegetation desired conditions and is not likely to be achieved due to natural vegetative growth and succession.

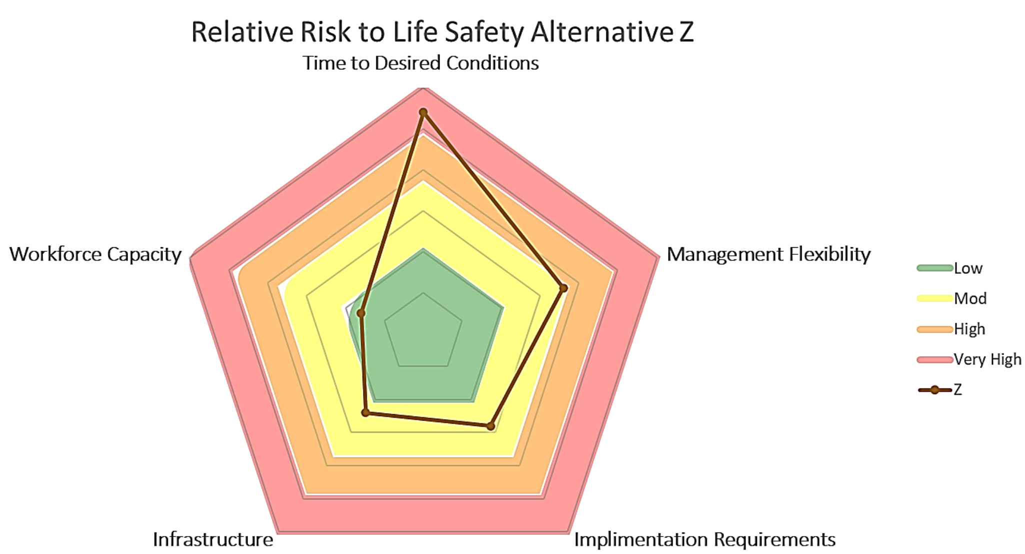


Figure 165. Relative risk to life safety under Alternative Z

Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager.

Preferred Alternative

This alternative has levels of recommended wilderness, lands available to active management , and use of a full range of fire management activities, including both prescribed and natural fire in all management areas that would allow for movement to desired conditions within 30 to 35 years. This also allows for potentially less impact on workforce capacity through utilization of opportunities for allowing fire as a restoration tool across all management areas, however active management activities will still have a sizable impact on workforce capacity. This alternative also allows for maintenance of infrastructure such as roads and administrative sites to provide safe access and egress to wildland fire responders and to communities within community protection zones, and maintenance of trails. Management flexibility is similar to alternatives X and Y, allowing for restoration of fire resilient landscapes utilizing natural and prescribed fire. It also addresses snag retention within community protection zones and egress routes, allowing snags to be removed during fuels mitigation projects within these areas. Pilot Knob communications site will be retained but phased out as suitable technology allows removal of the site.

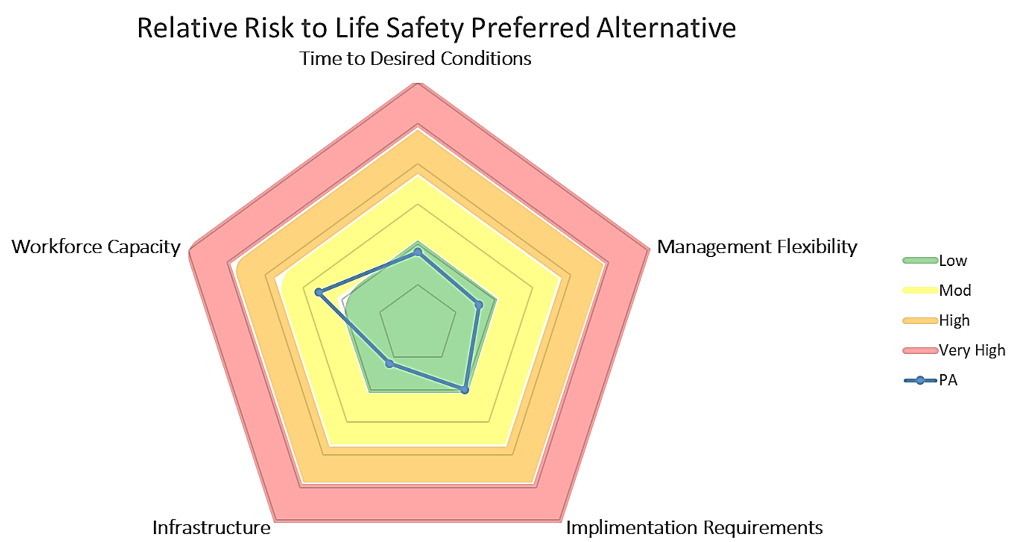


Figure 166. Relative risk to life safety under the Preferred Alternative

Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager.

Cumulative Effects

Human Population Increases and Shifts towards Wildland-Urban Interface

More human development is occurring near the boundary of lands administered by the Nez Perce-Clearwater. This trend is expected to continue in the future and is likely to have effects on forest vegetation. The need for vegetation treatments being implemented within wildland urban interface areas will increase. The wildland urban interface has become the focus of wildfire suppression resources. The future increase in the wildland urban interface will continue to challenge wildfire management during large fire events as “firefighters will likely have to protect dispersed housing over an extremely large area of fire-prone forest" (Gude et al. 2008). Relative to current levels, more wildfire in the future is expected and policies that foster adaptive resilience in the wildland urban interface are needed (Schoennagel et al. 2017).

Increased Regulation and Concern over Smoke Emissions

The ability to use fire to maintain and restore the fire-adapted ecosystems on the Nez Perce-Clearwater, or to use fire to reduce hazardous fuels in the wildland urban interface, is dependent upon air quality regulations. As air quality regulations become stricter, the ability to use fire as a management tool becomes limited. If past trends of increasing regulations and decreasing burn opportunities continue, the effects would likely result in not being able to use fire enough to make meaningful improvements to forest and fuel conditions and meet objectives.

Timber Product Manufacturing Infrastructure and Economics

The ability of the Nez Perce-Clearwater to positively affect forest vegetation is partially dependent upon the ability to sell forest products and to use harvesting processes, including the residual slash disposal activities, as a means to positively affect the forest vegetation and reduce hazardous fuels. If the forest products industry declines in areas surrounding the Nez Perce-Clearwater to the degree that it is difficult to sell forest products, or if "stumpage prices" decrease substantially, it would affect how many acres could be treated. While some treatments could be accomplished by using prescribed burning only, it is generally very risky in the wildland urban interface and expensive, leading to fewer acres treated.

Other Plans

Since they were developed, national level plans, initiatives, and acts such as the National Fire Plan, Healthy Forest Initiative, Healthy Forest Restoration Act, and National Cohesive Wildland Fire Management Strategy, have influenced the vegetation and fuel management programs on the Nez Perce-Clearwater. In general, these plans have resulted in more vegetation treatments being implemented near wildland urban interface areas with the objective of reducing hazardous fuels and fewer vegetation treatments being conducted in areas located away from communities. Not only do these plans emphasize the need to reduce hazardous fuels in the wildland urban interface, but they also stress the need to restore the natural fire regimes and forest conditions to the larger national forest landscape. These plans encourage the development of more resistant and resilient forest vegetation that would be less susceptible to large undesirable wildfires or insect outbreaks.

The Managing Fire on Lands Protected by the state of Idaho (2016) guides fire management on state lands in Idaho. The plan includes concepts that are complementary to revised plan components for the Nez Perce-Clearwater, such as state direction for suppression of wildfires. While specific desired conditions are not stated in the same terms as the Nez Perce-Clearwater, it is likely that some elements, such as providing for firefighter and public safety, would be similar. State forestlands may be actively managed to a greater degree than National Forest System lands and would likely contribute to achievement of some desired fire and fuels conditions across the landscape.

Effects to Resource from Other Resources

Effects to safety and risk from the management of other resources not specifically addressed in prior sections of this report are assumed to be "near-term" risks relative to the scope of this analysis. As such, application of Operational Risk principles may be used at the project level to reasonably mitigate risk to life safety of employees and communities.

Summary of Consequences

Table 455 provides a summary of potential effects to life safety by alternative. "Very High or High indicates a lean towards a more detrimental impact, whereas Low or Moderate would have a less detrimental impact."

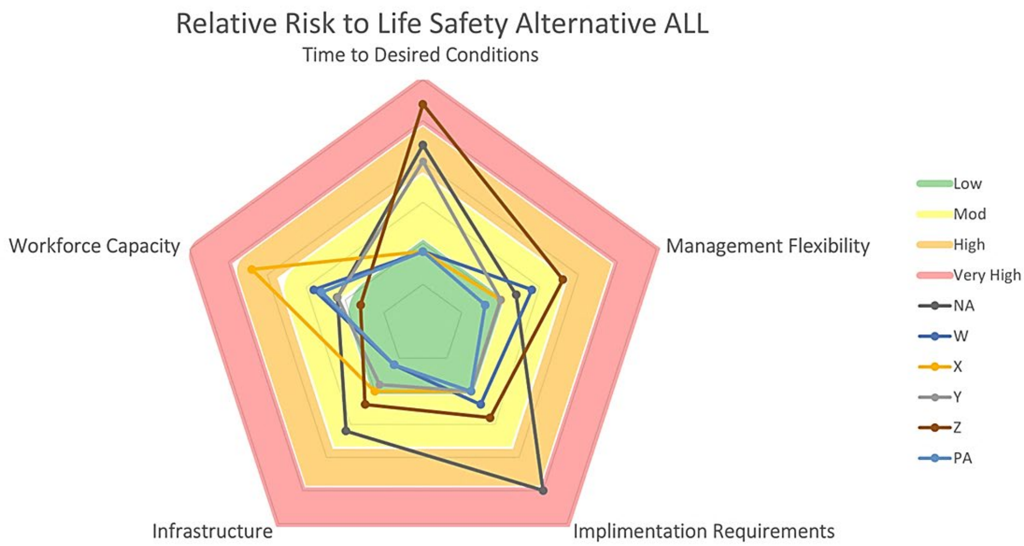


Figure 167. Summary of relative risk to life safety, by alternative
Data Source: Nez Perce-Clearwater, Occupational Health and Safety Manager

Table 455. Summary of potential effects to life safety by alternative (Alt)

Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Time to Desired Conditions	High	Low – Moderate	Low – Moderate	High	Very High	Low – Moderate
Management Flexibility	Moderate	Moderate	Low – Moderate	Low – Moderate	Moderate – High	Low
Implementation Requirements	Very High	Moderate	Low – Moderate	Low – Moderate	Moderate	Low – Moderate
Infrastructure	Moderate	Low	Low – Moderate	Low – Moderate	Moderate	Low
Workforce Capacity	Moderate	Moderate – High	High – Very High	Moderate	Low	Moderate

3.8 Economic and Social Sustainability

3.8.1 Economic Sustainability

The mission of the Forest Service is to sustain the health, diversity, and productivity of the nation's forests and grasslands to meet the needs of present and future generations. Local communities, particularly those adjacent to National Forest lands, benefit from a multitude of goods and services provided by the Nez Perce-Clearwater and the Forest Service. Some of these goods and services can be valued in a market context and have economic implications for both local and non-local communities. Relating to the key benefits described in the social sustainability report, this report will focus specifically on the direct and measurable benefits of labor income and employment contributions from these National Forest System lands and agency operations.

The 2012 Planning Rule states that plans are to guide management so that forests and grasslands contribute to economic sustainability, providing communities with ecosystem services and multiple uses that deliver a range of social, economic, and ecological benefits in the present and into the future. Specifically, plan components must include standards or guidelines to guide the Nez Perce-Clearwater's contribution to economic sustainability, considering ecosystem services, as well as multiple uses that contribute to local, regional, and national communities in a sustainable manner. Furthermore, reasonably foreseeable risks to economic benefits shall be considered when developing the land management plan.

Therefore, this section (1) describes the economic conditions of the affected environment using key indicators of economic sustainability; (2) describes how key benefits of the Nez Perce-Clearwater currently contribute to economic sustainability of beneficiaries, both locally and at a broader scale; and (3) evaluates the potential economic impacts of the proposed land management plan and alternatives on local beneficiaries and the public.

Changes between Draft and Final

The Economic Sustainability section of the Final Environmental Impact Statement has been updated to include an economic contribution analysis with additional preferred alternative and changes to total wood sale quantities estimated in the Sustained Yield Limit Tables of the Timber subchapter. Additional qualitative discussion has been included covering in greater detail topics of tribal, recreation, ecosystem services and other economic value concerns not fully represented in the quantitative economic contribution analysis. Additionally, the IMPLAN model in the Final Environmental Impact Statement includes changes to agriculture and grazing, national employment multipliers. This change, to incorporate updated methods to the model, has reduced estimated employment contributions from grazing activities on the Nez Perce-Clearwater, between the Draft Environmental Impact Statement and Final Environmental Impact Statement. This change was a nation-wide update to range management IMPLAN modeling by the National Forest System. The new model parameters are reflective of industry updates from USDA statistics, and industry practice data, and do not reflect changes made specific to this Final Environmental Impact Statement.

Relevant Laws, Regulations, and Policy

Federal Laws

The following is a select set of statutory authorities that govern the evaluation of social and economic resources on the Nez Perce-Clearwater. They are briefly identified and described below to provide context to the management and evaluation of the resource. There are multiple other laws, regulations, and policies not described below that also guide the management of this resource.

Multiple-Use Sustained Yield Act of 1960: This act identifies principles for managing the resources of National Forest System lands. The direction to manage these resources for the greatest good over time includes the use of economic and social analysis to determine management of the National Forest System.

National Environmental Policy Act of 1969: This act mandates consideration of the consequences to the quality of the human environment from proposed management actions. The agency must examine the potential impacts to physical and biological resources as well as potential socioeconomic impacts (40 CFR 1508.14).

Forest and Rangeland Renewable Resources Planning Act of 1974: As amended by the National Forest Management Act of 1976, this act requires consideration of potential economic consequences of land management planning.

Office of Management and Budget Circular A-116 (issued August 16, 1978): This act requires executive branch agencies to conduct long range planning and impact analysis associated with major initiatives.

National Forest Revenue Act (amended 1908): This act requires 25 percent of revenues generated by National Forest System lands to be paid to the states for use by the counties in which the lands are situated for the benefit of public schools and roads.

Secure Rural Schools and Community Self-Determination Act of 2000: This act was designed to stabilize annual payments to state and counties containing National Forest System lands and public domain lands managed by the Bureau of Land Management. Funds distributed under the provisions of this act are for the benefit of public schools, roads, and related purposes.

Agency Regulations

2012 National Forest System Land Management Planning Rule: The evaluations of social resources are framed within the context of sustainability because, in accordance with the 2012 National Forest System Land Management Planning Rule (36 CFR 219), land management plans are to guide management so that forests and grasslands are ecologically sustainable and contribute to social and economic sustainability. The Agency 2012 planning process leads to plans that contribute to ecological, social, and economic sustainability by protecting resources on the unit to maintain a flow of goods and services from National Forest System lands on the unit over time.

Pertaining to social resources, the 2012 Planning Rule states that the plan should:

Contribute to ecological, social, and economic sustainability by ensuring that all plans will be responsive and can adapt to issues such as the challenges of climate change; the need for forest restoration and conservation, watershed protection, and species conservation; and the sustainable use of public lands to support vibrant communities.

"Social sustainability" refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another and support vibrant communities (36 CFR 219.19).

§ 219.8 Sustainability states the plan must provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the Nez Perce-Clearwater, as follows:

(b) Social and economic sustainability. The plan must include plan components, including standards or guidelines, to guide the Nez Perce-Clearwater's contribution to social and economic sustainability, taking into account:

4. Social, cultural, and economic conditions relevant to the area influenced by the plan.
5. Sustainable recreation; including recreation settings, opportunities, and access; and scenic character.

6. Multiple uses that contribute to local, regional, and national economies in a sustainable manner.
7. Ecosystem services.
8. Cultural and historic resources and uses.
9. Opportunities to connect people with nature.
10. Reasonably foreseeable risks to ecological, social, and economic sustainability.

The rule states that the plan must also be consistent with laws and executive orders including:

36 CFR 212 Travel Management	*36 CFR 251 Land Uses*
36 CFR 223 Special Forest Products	*36 CFR 254 Land Ownership Adjustments*
36 CFR 228 Minerals	*36 CFR 262 Law Enforcement Support Activities*
36 CFR 241 Fish & Wildlife	*36 CFR 293 Wilderness*

Policy

- Forest Service Handbook 1909.12
- How to Address Social, Cultural and Economic Requirements in Forest Plan Assessments: A Technical Guide for Implementing the 2012 Planning Rule: Forest Service Handbook 1909.12, Chapter 10
- How to Develop a Monitoring Program for Social, Cultural, and Economic Plan Components: A Technical Guide for Implementing the 2012 Planning Rule: Forest Service Handbook 1909.12, Chapter 30
- How to Implement Public Participation for National Forest Planning: A Technical Guide for Implementing the 2012 Planning Rule: Forest Service Handbook 1909.12, Chapter 40
- Periman, R. & E. Grinspoon. 2014. Striving for Inclusion: Environmental Justice under the Forest Service 2012 Planning Rule. Washington, DC

Methodology

Spatial Scale

The economic analysis area is defined by administrative geography. It includes counties connected to the National Forest through economic resource trade, commuting, recreation, and other economic interaction. The Socioeconomic Conditions and Trends report defines the analysis area as the five counties in north central Idaho that are adjacent to, or in the immediate vicinity of, the Nez Perce-Clearwater. These five counties are Clearwater County, Idaho County, Latah County, Lewis County, and Nez Perce County. In addition to the primary economic analysis area identified in the assessment, this analysis also considers a secondary economic analysis area defined by the most recently available data through methods detailed in the U.S. Department of Agriculture Forest Service Protocols for Delineation of Economic Impact Analysis Areas (METI Corp/Economic Insights of Colorado 2010) and further updated by the Washington Office Briefing Paper (U.S. Department of Agriculture 2018a) and additional model documentation (U.S. Department of Agriculture 2018i). It is important to note that the economic analysis area is different from the social analysis area.

This combined area is made up of 11 counties, 6 of which receive federal land payments for having Nez Perce-Clearwater lands within them (Figure 168). The counties in the secondary economic analysis area include Benewah County, Idaho; Shoshone County, Idaho; Clearwater County, Idaho; Latah County, Idaho; Missoula County, Montana; Mineral County, Montana; Nez Perce County, Idaho; Lewis County, Idaho; Idaho County, Idaho; Ravalli County, Montana; Adams County, Idaho.

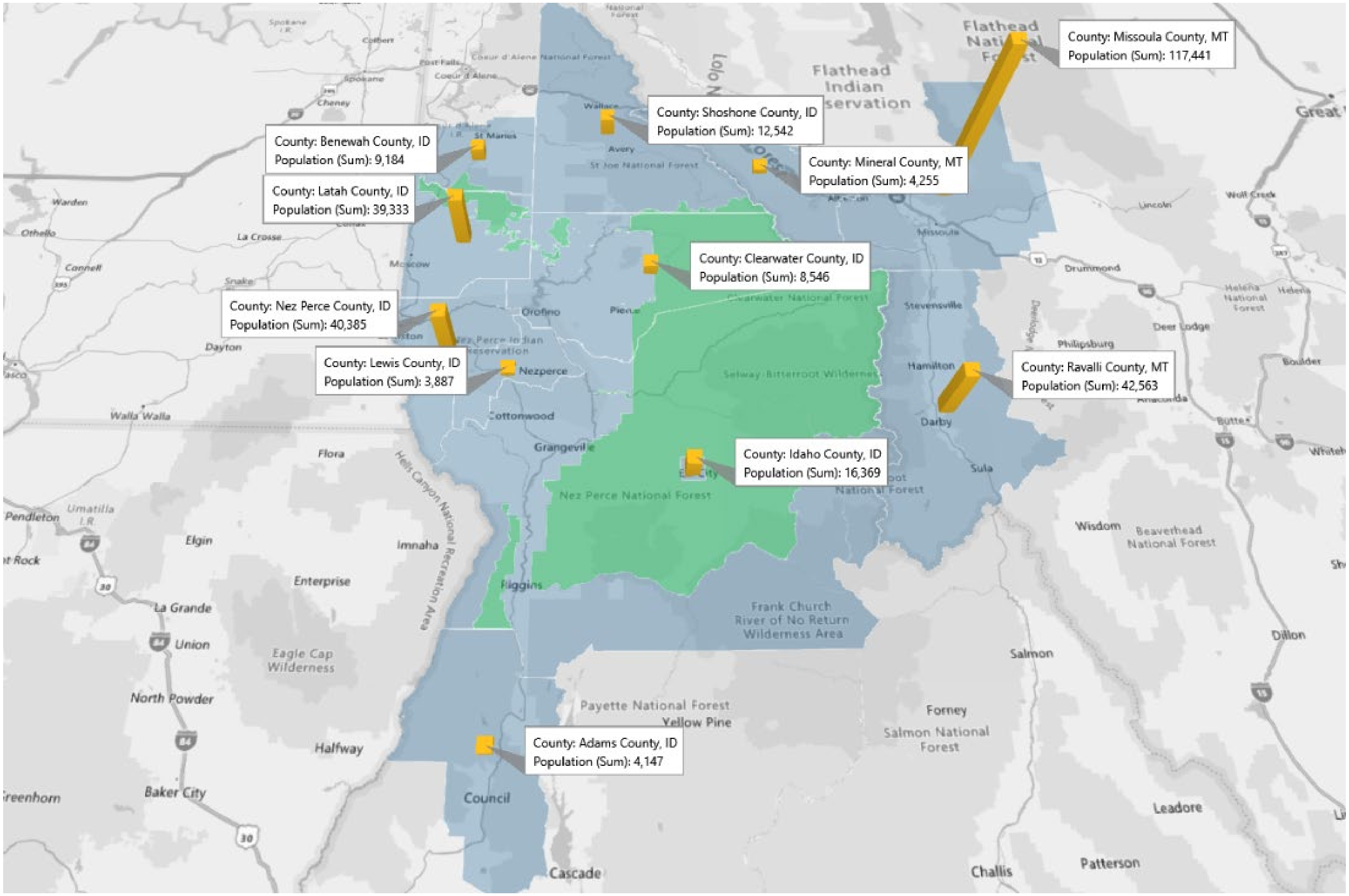


Figure 168. County Economic Analysis Area.

Data source: U.S. Census 2017; Map Source: U.S. Forest Service Northern Region 2019; Bing Maps.

Temporal Scale

The temporal scope of the analysis is the life of the plan. The analysis area for indirect effects is the same as the analysis area for cumulative effects.

Past, Present, and Future Activities used in the Analysis

The Affected Environment section below includes a synthesis of how relevant past, ongoing, and future management affect economic conditions and benefits at the county and forestwide levels.

Methods and Assumptions

The focus of this analysis is determining how the proposed plan and alternatives may affect economic conditions and economic benefits through contributions to economic sustainability.

Economic benefits of the Nez Perce-Clearwater are those that directly result from economic opportunities provided by National Forest assets including National Forest System administration.

Limited approaches exist for measuring conditions and progress towards achieving economic sustainability. In the land management planning context, an economic contribution analysis is a useful method to estimate the contribution of jobs and income from agency administration and the provision of measurable ecosystem goods and services that eventually lead to the generation of income and employment. Economic contribution analysis, however, is not suitable for analysis of all benefits from ecosystem goods and services. This is a critically important caveat when placing jobs and income into the appropriate context of the wider perspective of total economic value, where non-market benefits, or non-consumptive values (e.g., the value of a hunting experience) generated by the ecosystem and other Nez Perce-Clearwater assets may be of great, and in some cases, even greater importance to beneficiaries. For example, the delivering of fresh surface water and recharging of subsurface water supplies from the Nez Perce-Clearwater into municipal and agriculture utility systems may not directly produce income or employment but may remain critically important for social and economic sustainability. Economic contribution analysis is not a catch-all methodology for measuring total economic value.

Economic contribution analysis in this report is completed using input-output modeling methodologies available through IMPLAN software, and these model outputs are then customized into resource-level outputs using a National Forest System contribution impact analysis data processing tool called Aphelia. Aphelia is also used to generate the National Forest At-A-Glance reports. For more information regarding Aphelia and economic input and output models see the *Overview of Methods for Economic Impacts and Contributions* dated May 24, 2019 (Anderes et al. 2019), and the *At A Glance Analysis Methods Guide* from August 2018 (U.S. Department of Agriculture 2018i).

Existing condition economic data is collected and monitored through the Economic Profile System (EPS)[28] a data repository that is updated continuously as new datasets become available. The economic and population data accessed through the Economic Profile System are sourced from various federal sources including the U.S. Department of Commerce. Additional economic data is collected from IMPLAN licensed software, an aggregator of regional economic research data for

[28] Economic Profile System (EPS): https://headwaterseconomics.org/tools/economic-profile-system/about-eps

over 500 industries in the United States. Resource data is collected from the National Forest National Resource Management database (NRM).

Limits to economic data spatially, and temporally, exist. The available data for IMPLAN economic contribution analysis is the best existing source as it is the most complete and standard source for raw industry, income, employment, production, and consumption data used in economic impact modeling. The IMPLAN data sources include data managed and offered by multiple Federal sources including the U.S. Bureau of Economic Analysis, USDA, Bureau of Labor Statistics, and the U.S. Census Bureau. Current, community level economic data are not available consistently, or systematically, across economic regions of the U.S. County-level economic data is the standard level at which activities and industries can be analyzed across an economic sub-region. This is based on the nature of the collection of source data, as well as the methodology of aggregating and computing this data. Economic information pertaining to individual communities, and areas within county geography can help inform a qualitive analysis of economic values and tradeoffs pertaining to proposed plans but is not consistently available for substitution into impact analyses.

The economic analysis draws upon the best available literature citations that were found to be relevant to the economic and social conditions on the Nez Perce-Clearwater. Literature sources that were the most recent and applicable to the local economic environment were selected.

In addition to quantitative measurements of economic contributions from the proposed plan and alternatives, the analysis of effects includes qualitative analysis of economic values and tradeoffs associated with the varying alternatives. The proposed plan is programmatic and has limited direct implications with respect to definitive, measurable economic activity.

Measurement Indicators

The indicators used to assess economic sustainability are the contributions of direct, indirect, and induced jobs and labor income, as well as direct federal land payments made to local governments. National Forest System administration and National Forest assets, including natural resources as well as many other ecosystems goods and services, contribute to the economic sustainability within the area of influence.

The concept of quality of life includes economic opportunities to obtain income and employment. For the purposes of this analysis, economic factors of quality of life will be discussed separately from others labeled as social benefits.

The key economic benefits of the Nez Perce-Clearwater in the Forest Plan economic analysis area include reliable contributions to jobs and income. These benefits, as well as other social benefits were identified through interdisciplinary discussions with Nez Perce-Clearwater staff and comments from the public. Key economic benefits to society provided by the Nez Perce-Clearwater in the Forest Plan economic analysis area include:

- Income – direct, indirect, and induced income from multiple uses of National Forest assets.
- Jobs – direct, indirect, and induced jobs, including those related to providing recreation experiences, harvesting and process timber into forest products, grazing and the raising of livestock, mineral, oil and gas resources for energy, and raw material productions.

Affected Environment

Existing Economic Condition

The key indicators of economic conditions in the primary economic analysis area are summarized below. The analysis area described in this section is comprised of 11 counties, an area identified with the most recently available data through methods detailed in the *USDA Forest Service Protocols for Delineation of Economic Impact Analysis Areas* (METI Corp/Economic Insights of Colorado 2010).

This multi-county area includes the Nez Perce Tribal Reservation, a contiguous land across multiple counties in Idaho (Lewis, Nez Perce, Latah, Clearwater, and Idaho County). Tribal economic activity that is recorded by Federal sources is indirectly detailed as activity existing within each intersecting county described below. Economic values and activities not available from Federal sources are discussed further qualitatively in this and the Social Sustainability section.

The data in the Assessment was reviewed to determine which economic conditions may be relevant for analyzing the effects of the alternatives on economic sustainability. With this lens in mind, the Affected Environment section provides a more focused summation of the economic conditions in the analysis area. Relevant economic conditions, specifically income and subsequent jobs in industries closely tied to federal lands, recreation, and natural resources, are of key interest.

Total population, employment, and personal income trends since 1970 fluctuate widely across the primary analysis area counties. Table 456 shows population ranking and the population and employment trends of the 11 counties in the analysis area. Population changes since 1970 ranges from 193 percent to negative 36 percent for Ravalli County, Montana and Shoshone County, Idaho, respectively. Employment change since 1970 ranges from 333 to negative 29 percent in the same counties. Lastly, personal income changes since 1970 ranges from 516 percent to -1 percent, again, in the same counties.

Table 456. County population, employment, and personal income trends in the multi-county area (1970-2017).

County	Population 2017	Population Rank	Population % change	Employment % change	Personal Income % change
Benewah County, ID*	9,184	7	47%	110%	142%
Shoshone County, ID*	12,542	6	-36%	-29%	-1%
Clearwater County, ID*	8,546	8	-22%	-27%	13%
Latah County, ID*	39,333	4	57%	135%	208%
Missoula County, MT	117,441	1	101%	232%	317%
Mineral County, MT	4,255	9	44%	60%	168%
Nez Perce County, ID*	40,385	3	33%	84%	132%
Lewis County, ID	3,887	11	-1%	51%	54%
Idaho County, ID*	16,369	5	26%	46%	87%
Ravalli County, MT	42,563	2	193%	333%	516%
Adams County, ID	4,147	10	44%	75%	120%
Combined County Region	298,652	N/A	59%	129%	199%
U.S.	325,719,178	N/A	60%	115%	211%

*Counties intersecting the Nez Perce-Clearwater boundary and receiving federal land payments.

Unemployment and industry presence also fluctuate greatly across analysis area counties. Table 457 shows the 11 counties ordered by unemployment rate. Unemployment rate ranges from 7.2 percent to 2.5 percent, a measurement for Mineral County, Montana, and Latah County, Idaho, respectively. Timber industry presence in private employment is highest at 32.9 percent in Benewah County, Idaho. Mining industry presence in private employment is highest at 21.6 percent in Shoshone County, Idaho. Agriculture industry presence in private employment is highest at 12.2 percent in Adams County, Idaho. Lastly, travel and tourism industry presence in private employment is highest at 35.5 percent in Mineral County, Montana.

Table 457. Unemployment and Industry presence in private employment in primary counties.

County	Unemployment Rate, 2017	Timber % of total private industry	Mining % of total private employment	Agriculture % of total employment	Travel and Tourism % of total private employment
Benewah County, ID*	4.6%	32.9%	0.3%	6.8%	11.1%
Shoshone County, ID*	5.7%	1.7%	21.6%	0.6%	20.7%
Clearwater County, ID*	6.7%	16.2%	0.0%	6.7%	14.4%
Latah County, ID*	2.5%	4.9%	0.2%	5.1%	26.6%
Missoula County, MT	3.3%	1.1%	0.1%	0.8%	20.7%
Mineral County, MT	7.2%	22.4%	0.0%	4.4%	35.5%
Nez Perce County, ID*	2.8%	9.4%	1.1%	2.0%	14.6%
Lewis County, ID	5.5%	20.8%	0.1%	10.2%	17.8%
Idaho County, ID*	4.7%	9.4%	1.9%	10.8%	12.5%
Ravalli County, MT	4.2%	1.7%	0.0%	6.6%	16.7%
Adams County, ID	5.5%	29.4%	0.0%	12.2%	28.6%
Combined County Region	3.6%	4.8%	1.2%	3.2%	19.3%
U.S.	3.9%	0.6%	0.5%	1.3%	15.8%

*Counties intersecting the Nez Perce-Clearwater boundary and receiving federal land payments.

Private timber industries represent a very significant employer in many counties, including Benewah, Clearwater, Mineral, Lewis, Idaho, Nez Perce, and Adams. In these counties, where timber represents between 9 and 33 percent of all private county-level employment, the relative importance of timber resources from the Nez Perce-Clearwater are highest. Especially, timber resources and forest product manufacturing remain fundamental to economic sustainability in these counties.

Collectively, across the full extent of the economic analysis area, private timber jobs were estimated at 4,730 in 2016, down from a peak employment level of 7,669 in 1999. Figure 169 provides a 19-year trend on timber industry employment levels. Over this period, private industry timber jobs in especially saw and paper mills have declined steadily from various market forces, including increased capitalization of milling ownership, technology, and operations.

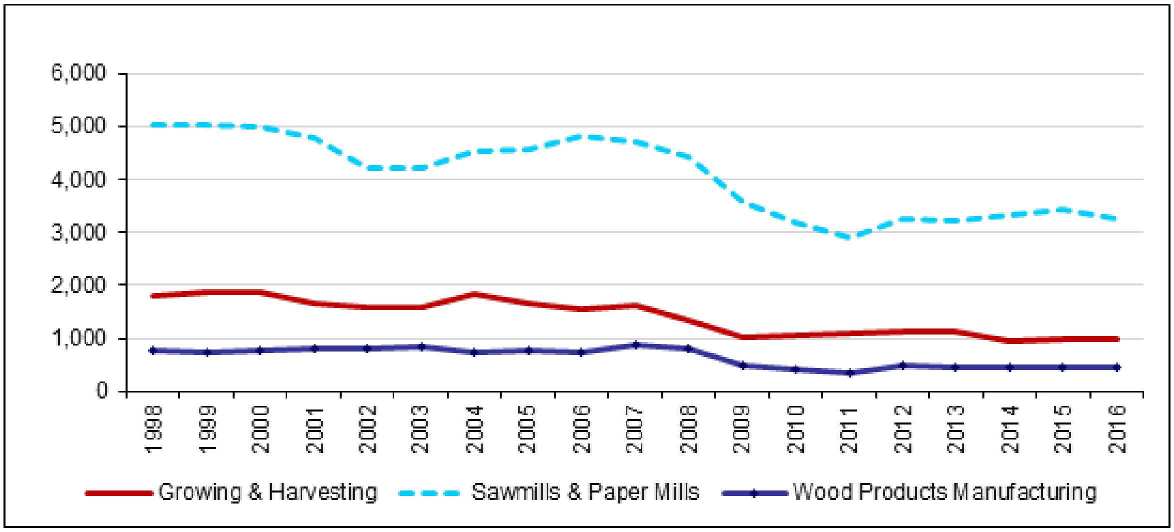


Figure 169. Jobs in timber sectors (1998-2016), eleven county analysis area.

Data Source: U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.

While timber industries remain a large stakeholder in the Nez Perce-Clearwater analysis area, the total economic value of Nez Perce-Clearwater lands and operations includes benefits to other industries including minerals and energy, agriculture and range, and travel and tourism sectors.

Across the full extent of the economic area of influence, private mineral and energy jobs were estimated at 1,212 in 2016. Figure 170 provides the same 19-year trend in mineral and energy industry employment levels. Over this period, private industry mineral and energy jobs in this multi-county region have fluctuated with the rise and fall of external market events and resource discoveries. Levels of employment in this sector have permanently declined as much as in timber sectors across the same multi-county area.

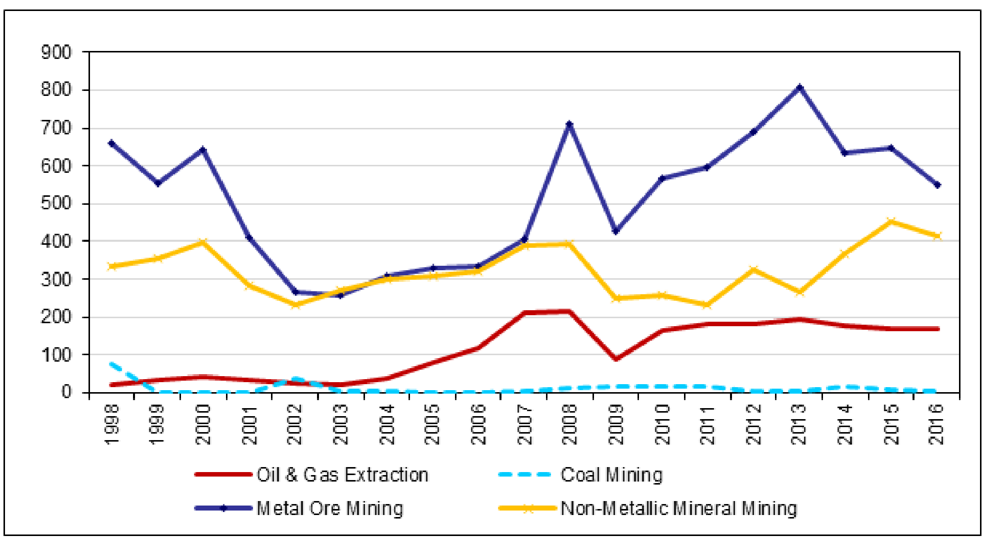


Figure 170. Jobs in mineral and energy sectors (1998-2016), eleven county analysis area.

Data Source: U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.

In additional to mineral and energy industries, agriculture and grazing industries benefit from the availability of water and rangeland delivered or provided by the Nez Perce-Clearwater (Figure 171). Total farm jobs in the analysis area have trended flat over a long period of time. From 1970 to 2016, farm jobs in this region have increased slightly from 5,040 to 5,848, but compared to non-farm jobs, have shrunk from approximately seven percent of total analysis area employment to less than one percent.

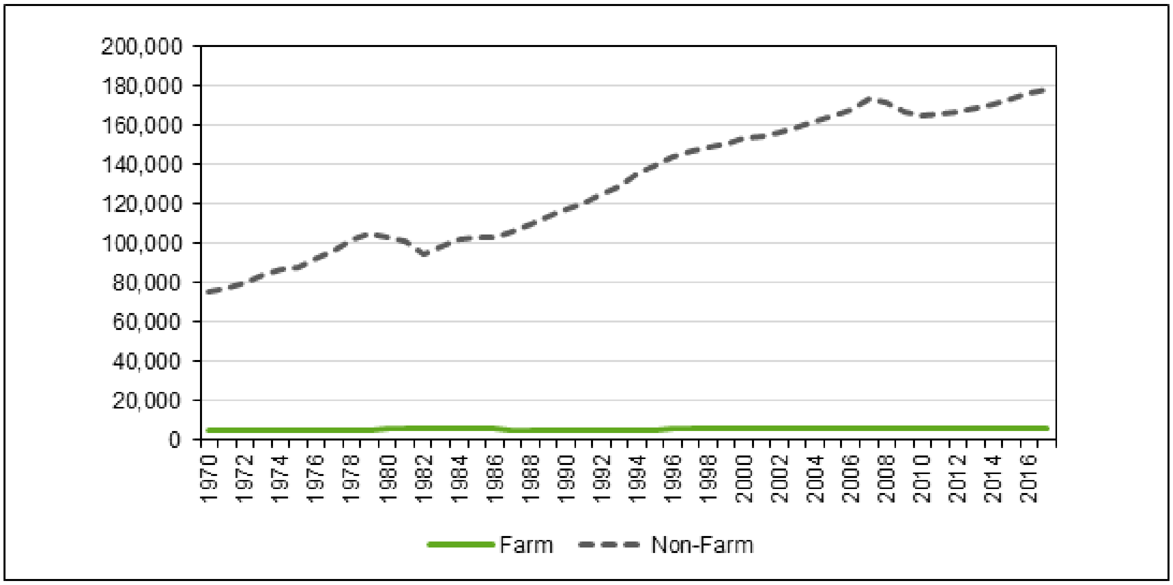


Figure 171. Jobs in farm sectors (1998-2016), eleven county analysis area.

Data Source: U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.

Finally, recreation opportunities for local and non-local Nez Perce-Clearwater visitors puts demand on goods and services from travel and tourism related industries across the analysis area (Figure 172). Collectively, jobs and income in these service subsectors are shifting and on the rise. Since 1998, jobs in retail, arts and entertainment, and accommodations and food service have been collectively on the rise from 14,632 to 19,109 in 2016. Counties with a higher proportion of travel and tourism related services include Adams, Mineral, Missoula, Latah, and Shoshone.

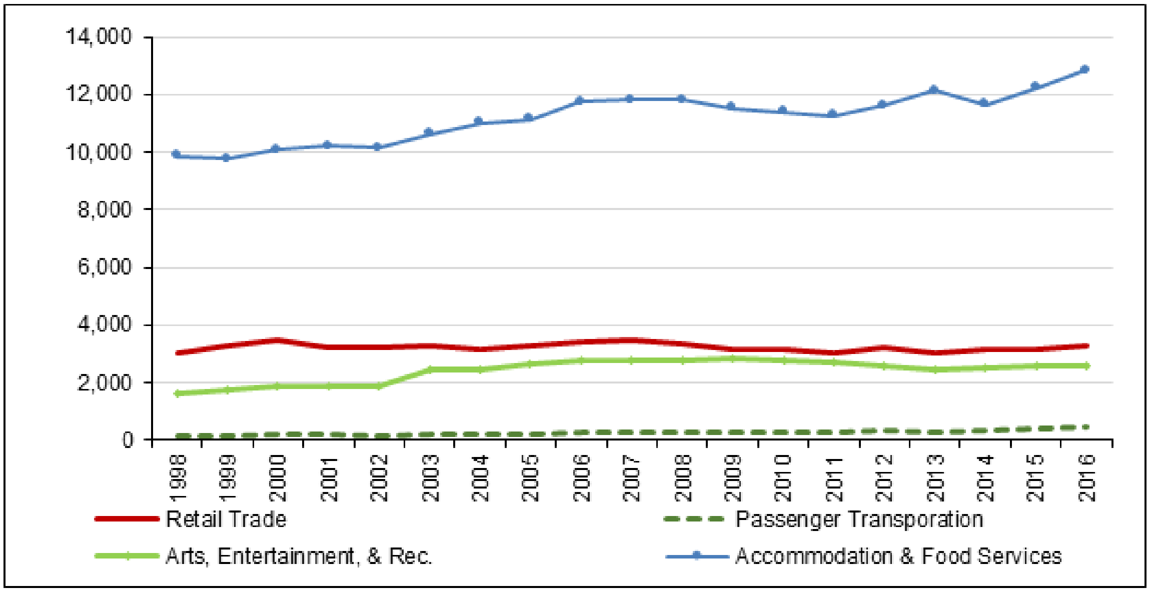


Figure 172. Jobs in recreation and related services (1998-2016), eleven county analysis area.

Data Source: U.S. Department of Commerce. 2018. Census Bureau, County Business Patterns, Washington, D.C.

The economic region described in this analysis includes other sectors and industries, however the primary industries described above represent those fundamentally closest in connection to National Forest plans and programs. There are both market activities (e.g., tribal industries not measured in Federal data) and non-market activities (e.g., economic value generated from hunting, fishing, collection of sustainable foods, or other key ecosystem service benefits) that are not reflected in the industry data provided above.

In the following section, an economic contribution analysis will look closely at the potential for the land management plan to impact jobs and income across these private industries, as well as from additional Forest Service operations.

Environmental and Economic Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications or longer-term environmental and economic consequences of managing the Nez Perce-Clearwater under this programmatic framework.

The previous sections briefly assessed the economic conditions of the affected environment and industries most connected to natural resource management. The Affected Environment section provides a baseline understanding of the relative importance of industries, income, and employment in counties around the Nez Perce-Clearwater. The following section considers how the Nez Perce-Clearwater may contribute under new plan direction. Here, the potential impacts of alternative management scenarios on Nez Perce-Clearwater related market-related contributions, measured by labor income and job estimates, are considered. Not all economic benefits from the Nez Perce-Clearwater are described in this section as many benefits pass to consumers, businesses, and the public without market transactions, such as sourced municipal water or consumer surplus from recreation experiences. This section only summarizes the estimated contributions to industries, including timber and forest products, minerals and energy, agriculture and grazing, recreation travel and tourism, and government operations.

Effects Common to All Alternatives

Under all alternatives, the Nez Perce-Clearwater will continue to provide the full suite of economic benefits which currently contribute to economic sustainability, as described in the Affected Environment section. Over the life of the plan, no consequential adverse impacts are expected to the economic conditions of the primary analysis area or to any of the key industries that the Nez Perce-Clearwater currently supports.

Under all action alternatives, contributions to economic sustainability are expected to be different than under the No Action Alternative. This is due to new management direction across resource areas focused, to varying degrees, on increasing areas suitable for timber production, increasing timber volume, and increasing vegetation management. All alternatives considered provide an enhanced suite of recreation (motorized and non), wildlife, subsistence-use, forest products, and other ecosystem service-related benefits. Not all economic contributions are included and analyzed quantitatively in the contribution analysis. These economic values and contributions are captured in the intent of plan components (e.g., FW-DC-ES-01, FW-DC-ES-02, FW-GDL-ES-01) that are unchanging across alternatives.

Results of the economic contribution analysis appear in the two tables below. In Table 458, employment refers to levels of average annual jobs contributed from resource programs and agency operations. The estimate of jobs includes a mixture of full and part-time employment. In Table 459, labor income refers specifically to earned wage or proprietor income but does not include Social Security, Medicaid, dividends, or capital gains government programs or investments. These separate sources of income are defined as non-labor income sources and are not included in the contribution analysis of the Nez Perce-Clearwater.

Table 458. Employment in the analysis area (direct employment contribution, estimated number of jobs) by resource and alternative.

Resource	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Recreation: all	251	251	251	251	251	251
Wildlife and Fish Recreation: all	91	91	91	91	91	91
Grazing	56	56	56	56	56	56
Timber	839	3,096	3,347	1,954	1,088	2,461
Minerals	0	0	0	0	0	0
Payments to States/Counties	93	93	93	93	93	93
Forest Service Expenditures	1,056	1,056	1,056	1,056	1,056	1,056
Forest Total	2,387	4,643	4,894	3,502	2,635	4,008
Percent Change	14%	122%	134%	67%	26%	91%

Table 459. Labor income in the analysis area (average annual labor income, in thousands of 2016 U.S. dollars) by resource and alternative.

Resource	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Recreation: all	$7,053	$7,053	$7,053	$7,053	$7,053	$7,053

Wildlife and Fish Recreation: all	$2,628	$2,628	$2,628	$2,628	$2,628	$2,628
Grazing	$1,197	$1,197	$1,197	$1,197	$1,197	$1,197
Timber	$35,500	$130,913	$141,537	$82,648	$46,018	$104,078
Minerals	$0	$0	$0	$0	$0	$0
Payments to States/Counties	$4,474	$4,474	$4,474	$4,474	$4,474	$4,474
Forest Service Expenditures	$44,023	$44,023	$44,023	$44,023	$44,023	$44,023
Forest Total	$94,875	$190,288	$200,912	$142,023	$105,393	$163,453
Percent Change	15%	130%	143%	72%	27%	98%

Income and employment levels contributed fluctuate specifically with timber related jobs and income. As shown in the contribution tables, income and employment are different across alternatives due to changing assumptions regarding forest management activities under the timber programs. Across alternatives, total job contributions range between 2,095 and 4,894 jobs, and labor income between $82 million and $200 million (2016 US dollar currency).

Aside of changes to timber industry, that are considered across the range of possible sustain yield limits, all other quantifiable contributions remain constant. The other plan program areas are significant in their respective contribution to economic activity; however, the proposed plan and alternatives do not directly change the measured factors in estimating these contributions. The unchanged model output represents a methodological limitation in the quantitative analysis, rather than an increased focus on timber contributions. There are many other qualitative, and unmeasured tradeoffs to consider across the proposed plan and alternatives.

General recreation and wildlife related recreation specifically, are highly visible economic contributors for many communities and counties surrounding National Forests. Visitation level data are the primary input for measuring recreation related economic activity. Visitation to Nez Perce-Clearwater is not estimated to change because of plan decisions. Visitation patterns rise with public interest, population, and recreation trends. Though we consider this indirect to the land management plan, recreation benefits, economic or otherwise, are related to the aggregate level of access and opportunity provided across the national forest, which is influenced by the proposed plan and alternatives. Therefore, it is important to consider the tradeoffs between the multiple uses of a Forest that may diminish the quantity, or quality of recreation opportunities and activities. Details on recreation opportunities are provided in in both the Social Sustainability, as well as the Sustainable Recreation subsections of Chapter 3. Additionally, similar details are provided on wildlife related recreation in the Wildlife subsection of Chapter 3.

Similarly, economic value generated from ecosystem services, such as subsistence hunting and gathering are equally important to consider in the range of alternatives. Though tribal and non-tribal communities alike value these ecosystem service-related benefits, they are not accurately reflected in the quantitative economic contribution analysis. This is due to a lack of consistent, comparable community or county-level data reflecting quantified economic values for these services. Instead, these values are described and highlighted across multiple sections of the Final Environmental Impact Statement, including the Social Sustainability, Tribal Trust and Responsibilities, Wildlife, and other subsections of Chapter 3.

As discussed in the economic contribution analysis, relative to current conditions, all alternatives show a significant increase in the contributions from timber programs. This shift represents not only an increase in the sustained yield limit wood sale quantity but also the difference between actual agency operations, as compared to the highest potential for optimized, sustained yield-based sale quantities. In this sense, the action alternatives are not fully constrained estimates and cannot be compared to current forest operations without placing the future estimates in this important context.

All alternatives are estimated to produce more jobs and income over current estimated levels, with Alternative X contributing the most income and jobs. The preferred alternative is estimated to sustain a maximum of 2,461 annual jobs in timber related industries, and $104 million in labor income, annually.

Variation in employment across alternatives stems from known differences in wood quantities modeled to be sold under each alternative. Projected wood quantities represent an upper boundary to the potential economic activity within a constrained Nez Perce-Clearwater budget. These estimates do not reflect jobs and income from actual harvest levels. Instead, these estimates represent the full potential of the Nez Perce-Clearwater to contribute to resource industries under the direction of the Nez Perce-Clearwater plan and exclude factors related to private industry capacity to increase employment and productions levels.

Separate of timber programs, the economic impact model does not differentiate visitation levels, or the recreation impacts between alternatives, or the contribution from other ecosystem service-related benefits. As stated in the recreation section of the social sustainability report and pertaining to population trends, with any increase in population, recreational uses of the Nez Perce-Clearwater are expected to increase. Other economic benefits not analyzed directly, including nonmonetary benefits for Nez Perce-Clearwater stakeholders including the Nez Perce Tribe, and economic value for various recreation user groups, would vary between alternatives in parallel with ecosystem and resource availability and recreation opportunities, respectively. The best indication of these opportunities and availabilities are provided in the respective subsections of the Final Environmental Impact Statement Chapter 3.

Again, as highlighted in both tables, the greatest numerically measurable contribution to employment and income from the Nez Perce-Clearwater, as impacted by a plan, or alternative, comes by way of the levels of timber resources provided for economic gain, and the public investments that are made in agency operations.

Cumulative Effects

Many factors may influence and affect the economic environment in the future. Population growth and climate change are among the highest factors to consider in looking at cumulative effects for any resource. Population growth in the West is a trend that is expected to continue, and climate change is predicted to increase the number of hot days in the region, as well as many other environmental changing factors.

With respect to alternative selection as it is analyzed in this section, there are potential cumulative affects related to the direction and coalescing of forest product industries with long term changes to timber supply from National Forests. Industries' ability to maintain sufficient capacity to absorb supply increases from National Forests is dependent on existing infrastructure and future industry trends. Additional timber industry descriptive information is highlighted in the Timber subsection of Chapter 3.

There are also changes emerging in the recreational uses of National Forests across the West, where recreation congestion and overuse of access areas and available lands are becoming more common place. Future demands for recreation opportunities can be expected to increase on the Nez Perce-Clearwater and may be incongruent with the opportunities provided through the recreation opportunity spectrum class allocations. These trends are related to population growth locally, regionally, and nationally as well as new technologies and recreational products.

Summary of Consequences

Under the No Action Alternative through Alternative Z, including the Preferred Alternative, the Nez Perce-Clearwater would continue to provide the full suite of economic benefits which currently contribute to economic sustainability. The relative magnitude of contributions to economic sustainability vary by alternative. In this analysis, contributions to economic sustainability are made clear as hinging on choices around timber, vegetation, and designation of lands as being suitable for timber management.

Given the diversity of management preferences across both local and national stakeholder groups, it is not possible to unequivocally identify which action alternative provides the greatest overall contribution to economic sustainability for all stakeholders across all possible economic benefits, market and non-market. Within the scope of this analysis and the measured benefits identified, Alternative X provides the greatest range of opportunity to generate contributions and prioritize timber and forest product industries, as well as overall contribution to jobs and income from forest management. Conversely, the No Action Alternative has the most limiting range of opportunity under the sustain yield limit to contribute to forest product industries locally, and regionally.

The table below itemizes the relative contributions of key economic benefits by alternative. When relative contributions are expected to be similar, alternatives are listed in the same box in alphabetical order.

Table 460. Relative contributions to social and economic sustainability by alternative

Key Social Benefit	Greatest	>	>	>	>	Smallest
Income – payments in lieu of taxes, secure rural schools, labor income in various industries: recreation, timber, and grazing	Alt X	Alt W	Preferred	Alt Y	Alt Z	No Action
Jobs – including induced jobs such as recreation, timber, and grazing	Alt X	Alt W	Preferred	Alt Y	Alt Z	No Action

Data Sources

All data and methods sourced from the following:

- Headwaters Economics. Economic Profile System (EPS). Headwaters Economics. (Headwaters Economics n.d.)

Analysis Methods Guide—Job and Income at a Glance Reports: The Estimated Economic Contributions of National Forests and Grasslands. August 2018. USDA Forest Service Washington Office, National Forest System Ecosystem Management Coordination.

3.8.2 Social Sustainability

The mission of the Forest Service is to sustain the health, diversity, and productivity of the nation’s forests and grasslands to meet the needs of present and future generations. Nez Perce-Clearwater lands both influence and are influenced by local and national publics. Local communities, particularly those adjacent to national forest lands, benefit from a multitude of goods and services provided by the Nez Perce-Clearwater and the Forest Service. These social benefits are often referred to as ecosystem services, which are defined "as goods and services provided wholly or in part by ecosystems and that are of value to people" (Olander et al. 2015). The Nez Perce-Clearwater's ecosystem services, alongside infrastructure and operations, are the main ways that public lands contribute to social sustainability. Many local communities were formed based on availability of roads and ecosystem goods and services such as timber, minerals, grazing lands, and other natural resources. Historically, individuals in these communities have benefited from a host of services, such as recreation, scenery, employment, and opportunities to connect with nature. The public across the United States also benefit from the Nez Perce- Clearwater.

These same "goods and services" such as firewood or wildlife and fish for hunting and fishing are not just integral to the Nez Perce Tribe's culture, religion, health, and economy, they are legally protected rights. Social sustainability in the context of American Indians is briefly discussed in this section, and more thoroughly discussed in the Tribal Trust and Responsibilities section of this EIS.

The key benefits the Nez Perce-Clearwater and the Forest Service provide include, but are not limited to:

- clean water and water supply
- clean air
- wood products
- forage
- hunting and wildlife
- fish
- cultural values – heritage values, subsistence food gathering, spiritual and inspirational values
- aesthetics – scenery
- recreation
- flood control
- soil stabilization and landslide protection

The 2012 Planning Rule states that plans are to guide management so that forests and grasslands contribute to social sustainability, providing communities with ecosystem services and multiple uses that deliver a range of social, economic, and ecological benefits in the present and into the future. Specifically, plan components must include standards or guidelines to guide the Nez Perce-Clearwater's contribution to social sustainability, considering ecosystem services as well as multiple uses that contribute to local, regional, and national communities in a sustainable manner. Furthermore, reasonably foreseeable risks to social benefits shall be considered when developing the Land Management Plan.

This section, therefore, (1) describes the social conditions of the affected environment using key indicators of social sustainability; (2) describes how key benefits of the Nez Perce-Clearwater currently contribute to social sustainability of beneficiaries, both locally and at a broader scale; (3) evaluates the impacts of the alternatives on the benefits the Nez Perce-Clearwater provides to local beneficiaries and the public.

Changes between Draft and Final Environmental Impact Statements

The Social Sustainability section of the Final Environmental Impact Statement has been updated to include additional relevant policies and executive orders, an update to the term traditional industries to land-based livelihoods, and an analysis of the preferred alternative.

Relevant Laws, Regulations, and Policy

Federal Laws

The following is a select set of statutory authorities that govern the evaluation of the social resources in the Nez Perce-Clearwater. They are briefly identified and described below to provide context to the management and evaluation of the resource. There are multiple other laws and regulations and policies not described below that also guide the management of this resource.

Multiple-Use Sustained Yield Act of 1960: Identifies principles for managing the resources of the National Forest System. The direction to manage these resources for the greatest good over time includes the use of economic and social analysis to determine management of the National Forest System lands.

National Environmental Policy Act of 1969: Mandates consideration of the consequences to the quality of the human environment from proposed management actions. The agency must examine the potential impacts to physical and biological resources as well as potential socioeconomic impacts (40 CFR 1508.14).

Forest and Rangeland Renewable Resources Planning Act of 1974: As amended by the National Forest Management Act of 1976, requires consideration of potential social and economic consequences of land management planning.

Office of Management and Budget Circular A-116 (issued August 16, 1978): Requires executive branch agencies to conduct long range planning and impact analysis associated with major initiatives.

Secure Rural Schools and Community Self-Determination Act of 2000: Was designed to stabilize annual payments to state and counties containing National Forest System lands and public domain lands managed by the Bureau of Land Management. Funds distributed under the provisions of this act are for the benefit of public schools, roads, and related purposes.

Executive Orders

Executive Order No. 12898 on Environmental Justice (issued February 11, 1994): Mandates federal agencies to make achieving environmental justice part of their mission. This includes identification and response to disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations.

Executive Order 14008 of 2021, Tackling the Climate Crisis at Home and Abroad: This order provides direction for a government-wide approach to combat the climate crisis. The order requires a coordinated approach from planning to implementation coupled with substantive engagement by stakeholders, including state, local, and tribal governments. This order also created the Justice40 Initiative that sets the goal that 40% of covered investments will benefit disadvantaged communities and required the development of an online assessment tool to identify disadvantaged communities. Finally, the order also established the Environmental Justice Scorecard.

Executive Order 13985 - Advancing Racial Equity and Support for Underserved Communities Through the Federal Government: This order recognizes the unbearable human costs of systemic racism that arise from entrenched disparities in our laws and public policies, and in our public and private institutions that have often denied equal opportunity to individuals and communities. Consequently, this order 1) provides a definition of equity and underserved communities; 2) direct the Domestic Policy Council to coordinate efforts to embed equity principles, policies, and approaches across the Federal Government; 3) direct OMB to study methods and identify best practices for equity assessments then conduct equity assessment of agency policies, programs, and actions; 4) establish an Equitable Data Working Group; and 5) require equity action plans for each agency.

Executive Order 14096 of 2023 - Revitalize Our Nation's Commitment to Environmental Justice for All: This order revitalizes and builds on the federal government's commitment to environmental justice. It adds achieving environmental justice to the mission of each agency and recognizes communities with environmental justice concerns experience disproportionate and adverse human health or environmental burdens. This order also updates the definition of environmental justice; 2) create environmental justice strategic plans and subsequent environmental justice assessments; 3) establish an Environmental Justice Subcommittee of the National Science and Technology Council, the White House Environmental Justice Interagency Council, and the White House Office of Environmental Justice is hereby established within the Council of Environmental Quality.

Agency Regulations

2012 National Forest System Land Management Planning Rule: The evaluations of social resources are framed within the context of sustainability because, in accordance with the 2012 National Forest System Land Management Planning Rule (36 CFR 219), land management plans are to guide management so that forests and grasslands are ecologically sustainable and contribute to social and economic sustainability. The Agency 2012 planning process leads to plans that contribute to ecological, social, and economic sustainability by protecting resources on the unit to maintain a flow of goods and services from National Forest System lands on the unit over time.

Pertaining to social resources, the 2012 Planning Rule states that the plan should:

Contribute to ecological, social, and economic sustainability by ensuring that all plans will be responsive and can adapt to issues such as the challenges of climate change; the need for forest restoration and conservation, watershed protection, and species conservation; and the sustainable use of public lands to support vibrant communities.

"Social sustainability" refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another and support vibrant communities (36 CFR 219.19).

§ 219.8 Sustainability states the plan must provide for social, economic, and ecological sustainability within Forest Service authority and consistent with the inherent capability of the Nez Perce-Clearwater, as follows:

(b) Social and economic sustainability. The plan must include plan components, including standards or guidelines, to guide the Nez Perce-Clearwater's contribution to social and economic sustainability, taking into account:

1. Social, cultural, and economic conditions relevant to the area influenced by the plan.
2. Sustainable recreation; including recreation settings, opportunities, access, and scenic character.
3. Multiple uses that contribute to local, regional, and national economies in a sustainable manner.
4. Ecosystem services.
5. Cultural and historic resources and uses.
6. Opportunities to connect people with nature.
7. Reasonably foreseeable risks to ecological, social, and economic sustainability.

The rule states that the plan must also be consistent with laws and executive orders including:

- *36 CFR 212 Travel Management*
- *36 CFR 223 Special Forest Products*
- *36 CFR 228 Minerals*
- *36 CFR 241 Fish & Wildlife*
- *36 CFR 251 Land Uses*
- *36 CFR 254 Land Ownership Adjustments*
- *36 CFR 262 Law Enforcement Support Activities*
- *36 CFR 293 Wilderness*

Policy

- Forest Service Handbook (FSH) 1909.12
    - ♦ How to Address Social, Cultural and Economic Requirements in Forest Plan Assessments: A Technical Guide for Implementing the 2012 Planning Rule: Forest Service Handbook 1909.12, Chapter 10
    - ♦ How to Develop a Monitoring Program for Social, Cultural, and Economic Plan Components: A Technical Guide for Implementing the 2012 Planning Rule: Forest Service Handbook 1909.12, Chapter 30
    - ♦ How to Implement Public Participation for National Forest Planning: A Technical Guide for Implementing the 2012 Planning Rule: Forest Service Handbook 1909.12, Chapter 40
- Periman, R. & E. Grinspoon. (2014). Striving for inclusion: Environmental justice under the Forest Service 2012 Planning Rule. Washington, DC.

USDA Forest Service Equity Action Plan of 2023: Required under Executive Order 13985 - Advancing Racial Equity and Support for Underserved Communities Through the Federal Government, this plan outlines the USDA Forest Service's commitment and supports the U.S. Department of Agriculture's and Administration's leadership in advancing racial equity and support for underserved communities. It describes 10 high-impact Agency-wide actions that will benefit Tribes, partners, the public, and employees.

State and Local Plans

- *Clearwater Soil and Water Conservation District Five-Year Resource Conservation Business Plan*
- *Idaho County Natural Resources Plan*
- *Benewah Soil and Water Conservation District Five Year Conservation Plan*
- *Kootenai-Shoshone Soil & Water Conservation District Five Year Resource Conservation Business Plan*
- *Nez Perce County Comprehensive Plan*
- *Latah Soil and Water Conservation District Resource Conservation Plan*

Methodology

Spatial Scale

The social analysis area is defined by both geography and social ties. The Land Management Plan Assessment, Chapter 6.0, Socioeconomic Conditions and Trends report defines the analysis area as the five counties in North Central Idaho that are adjacent to, or in the immediate vicinity of, the Nez Perce-Clearwater. These five counties are Clearwater County, Idaho County, Latah County, Lewis County, and Nez Perce County. In addition to the primary social analysis area identified in the assessment, this analysis also considers the preferences and perspectives of local stakeholders living within a secondary social analysis area. The secondary social analysis area includes all census county divisions within 50 miles of the Nez Perce-Clearwater. The 50-mile distance threshold is commonly used to approximate areas of social influence as it represents approximately a one hour's drive to the Nez Perce-Clearwater. This is a reasonable distance for one to travel on a weekly or even daily basis, either for recreation or for commuting purposes. Additionally, according to 2012-2016 National Visitor Use Monitoring Survey data, a third of visits to the Nez Perce-Clearwater were from people living within 50 miles of the Nez Perce-Clearwater.

The secondary social analysis area contains 77 county sub-divisions, spanning portions of counties in Idaho, Montana, and Washington. Figure 173 displays the primary and secondary social analysis areas.

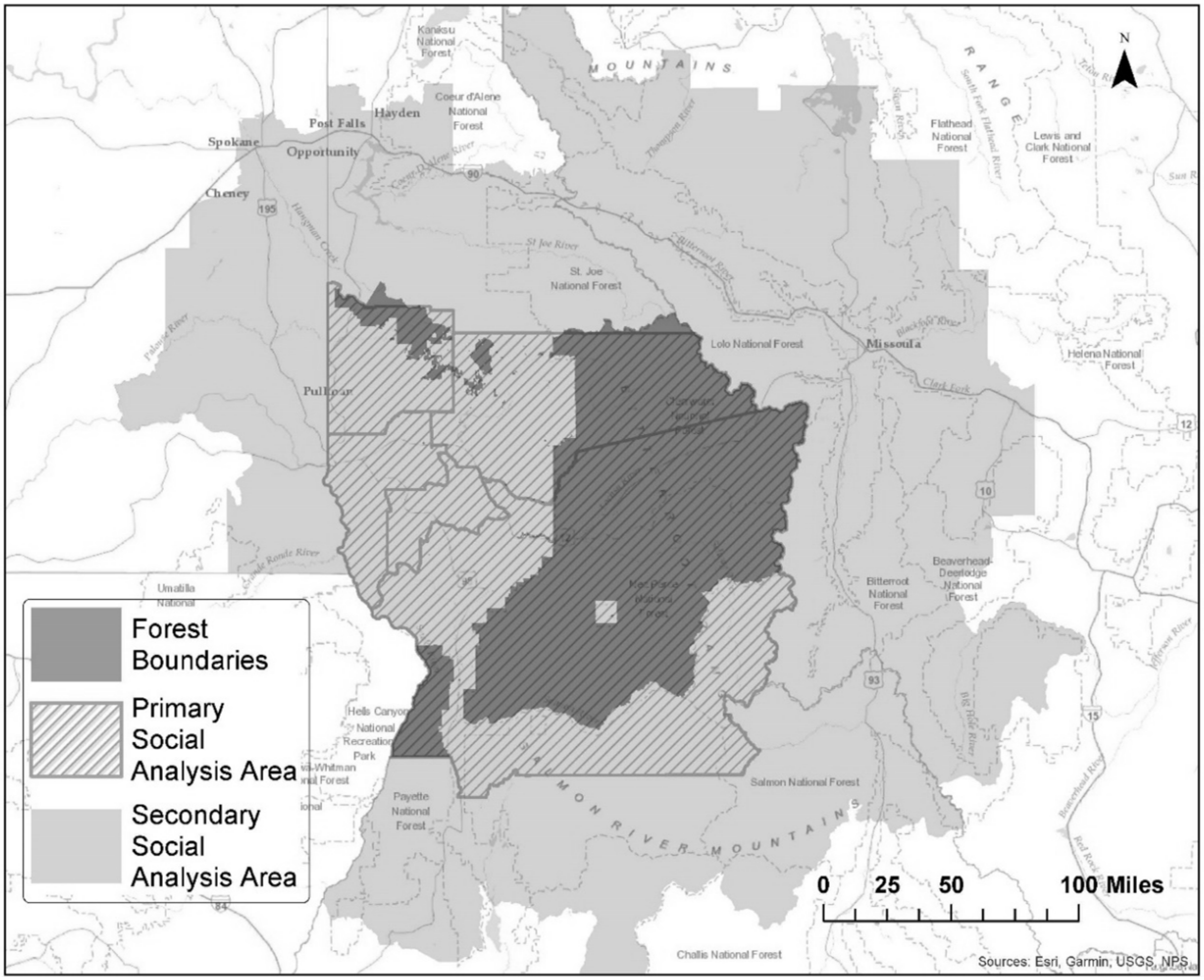


Figure 173. Primary and secondary social analysis areas

Data source: U.S. Census 2016; Map Source: U.S. Forest Service Northern Region 2019

Contributions from the Nez Perce-Clearwater to the broader landscape, including national and global stakeholders, are also considered. The scale of the broader landscape is dependent on the given benefit in question. For example, those who benefit from the existence of Wilderness, even if they never plan to visit (Kline and Mazzotta 2012), are considered when examining the cultural benefits of the Nez Perce-Clearwater. For a detailed explanation of how the primary social analysis area was selected, please see the Land Management Plan Assessment, Chapter 6.0, Socioeconomic Conditions and Trends.

Temporal Scale

The temporal scope of the analysis is the anticipated life of the plan. The analysis area for indirect effects is the same as the analysis area for cumulative effects.

Past, Present, and Future Activities used in the Analysis

The Affected Environment section below includes a synthesis of how relevant past, ongoing and future actions and processes are affecting, have affected, and may affect social conditions and benefits.

Methods and Assumptions

The focus of this analysis is determining how the alternatives may affect social conditions and social benefits, or contributions to social sustainability.

Social benefits of the Nez Perce-Clearwater are those ecosystem services, including multiple uses; infrastructure; and operations, which either directly or indirectly contribute to social sustainability, or are of value to people. This analysis focuses only on those benefits which may be affected by the alternatives.

Numerous approaches exist for measuring society's condition or progress towards achieving social sustainability. In the land management planning context, a broad ecosystem services framework, which catalogues social benefits of forests, is an ideal framework for identifying how the Nez Perce-Clearwater contributes to social sustainability.

Social benefits of the Nez Perce-Clearwater are used and valued differently by different groups and communities. The Assessment provided a brief overview of social conditions and highlighted the benefits the Nez Perce-Clearwater provides to nearby communities. In the Affected Environment section, basic social conditions of the primary social analysis are summarized. Next, the key social benefits the Nez Perce-Clearwater provides to beneficiaries that may be affected by the alternatives are described.

A primary social analysis area was identified during the Assessment phase to analyze the potential effects of the alternatives on the Nez Perce-Clearwater's contributions to social sustainability.

The social analysis is conducted in three steps. First, the key indicators of social conditions of the primary social analysis area are summarized. Next, each social benefit is briefly described, and when relevant, discussed in the context of the social conditions of the area of influence. Some social benefits are easier to quantify than others. Indicators that do not easily lend themselves to quantification, such as cultural values, are discussed qualitatively. Lastly, the alternatives are analyzed to determine how they might affect social conditions and social benefits, or contributions to social sustainability, taking relevant social conditions, risks, and stressors into account. Social benefits addressed in detail in other resource reports are only briefly addressed in this section. This section draws from other resource analysis sections.

Measurement Indicators

Social conditions

The assessment provided a comprehensive review of social conditions in the primary social analysis area. The key demographic indicators of social conditions used in this analysis are:

- population size by county, American Community Survey, five-year estimates (2012-2017).
- short-term population change by county, American Community Survey, five-year estimates (2006-2010 and 2012-2017).
- long-term population change by county, US Census population counts and American Community Survey, five-year estimates (1970 and 2012-2017).

Environmental Justice

Social conditions indicators are also used to identify whether environmental justice populations, or communities with environmental justice concerns, exist within the primary social analysis area. Environmental justice populations are defined as census tracts, a proxy for communities, with a poverty rate over 30 percent and/or a minority population of 30 percent or greater (Periman and Grinspoon 2014). The indicators of environmental justice communities used in this analysis are:

- poverty rate by census tract, or the percent of population below poverty line, American Community Survey, five-year estimates (2012-2017).
- minority population by census tract, as measured by the percent that is not categorized as non-Hispanic white population, American Community Survey, five-year estimates (2012-2017).

Environmental justice community thresholds are defined according to Periman and Grinspoon's (2014) methodology in their guide "Striving for inclusion: Environmental justice under the Forest Service 2012 planning rule." These thresholds for minority populations and poverty populations are meaningfully greater than the minority and poverty populations in Idaho and Montana. The percentage of the population that is minority, or not non-Hispanic white, in Idaho is 17.5 percent and 13.4 percent in Montana. The percentage of the population living below the poverty line in Idaho is 14.5 percent and 14.4 percent in Montana (United States Census Bureau, 2017). Environmental justice communities are, therefore, defined as areas with approximately twice the rate of poverty or minority populations as compared to the overall populations of Montana and Idaho.

Social benefits

The indicators used to assess contributions to social sustainability are the key social benefits the Nez Perce-Clearwater provides to beneficiaries that have the potential to be affected by the alternatives. The benefits are described below in the context of social conditions, where relevant. These social benefits contribute to the social sustainability of the area of influence, or the affected communities and beneficiaries, by enhancing the quality of life of the public. Quality of life is defined as the general level of wellbeing of individuals and society. The concept of quality of life encompasses all aspects of life including, but not limited to, employment, safety, and health. The key social benefits of the Nez Perce-Clearwater include ecosystem services, multiple uses, infrastructure, and operations. The key benefits were identified through interdisciplinary discussions with Nez Perce-Clearwater staff and comments from the public. Key benefits to society provided by the Nez Perce-Clearwater that have the potential to be affected by the alternatives include, but are not limited to:

- clean water and water supply
- clean air
- wood products
- forage
- hunting and wildlife
- fish
- cultural values – heritage values, subsistence food gathering, spiritual and inspirational values
- aesthetics – scenery
- recreation
- flood control
- soil stabilization and landslide protection

Additionally, the Nez Perce-Clearwater also provides additional benefits including wildfire protection, educational programs, and other ecological benefits, such as carbon sequestration and nutrient cycling. The key benefits that will be analyzed are a subset of all the benefits the Nez Perce-Clearwater provides. The planning team and the public noted these key benefits as most relevant to the planning effort, from a social perspective.

Affected Environment

Social Conditions

The key indicators of social conditions in the primary social analysis are summarized in Table 461. Population size is an indicator of community type, such as urban, suburban, or rural, and helpful in understanding how populations may relate to public lands. Urban populations are more likely to value public lands for their cultural resources, including recreation, scenery, and inspiration, while rural populations are more likely to value public lands for both cultural and economic resources such as opportunities for timber, mining, and grazing (U.S. Department of Agriculture 2014e, Van Driesche and Reardon 2014). The populations in the five-county area reside in rural, suburban, and urban areas, suggesting populations with both cultural and economic ties to the Nez Perce-Clearwater.

Table 461. Summary of key social conditions in the primary social analysis area of influence

Metric	Latah County, ID	Clearwater County, ID	Idaho County, ID	Lewis County, ID	Nez Perce County, ID	Five County Area
Population (2012-2017)	38,697	8,533	16,275	3,824	40,014	107,343
Population (2006-2010)	36,645	8,766	15,947	3,761	38,886	104,005
Short-term population % change (2010*-2017*)	5.6%	-2.7%	2.1%	1.7%	2.9%	3.2%
Long-term population % change (1970-2017)	57%	-22%	26%	-1%	33%	30%

*ACS 5-year estimates used. 2017 represents average characteristics from 2013-2017; 2010 represents 2006-2010.

Data Sources: U.S. Department of Commerce. 2018. Census Bureau, American Community Survey Office, Washington, D.C. (Headwaters Economics n.d.)

Population change is an indicator of social sustainability. Areas experiencing either rapid declines or rapid increases in population may have trouble providing adequate public services such as primary and secondary education, infrastructure maintenance, policing and public safety, and affordable housing. Long-term declines in population also indicate lower levels of social sustainability. These areas may have fewer basic social services. Long-term gains in population indicate higher levels of social sustainability.

Between 2006 to 2010 and 2012 to 2017, there have not been substantial short-term changes in county populations. Clearwater County has experienced substantial declines in population since 1970, suggesting lower levels of social sustainability. Latah, Idaho, and Nez Perce counties have experienced long-term population gains, suggesting higher levels of social sustainability.

Environmental Justice Populations

Environmental justice populations exist in the primary social analysis area and are defined as census tracts with a poverty rate over 30 percent and a minority population of 30 percent or greater. Figure 174 shows the location of environmental justice populations. The areas with greater than 30 percent of the population living in poverty are in Latah County, near Moscow. This rate is likely affected by the student population in Moscow, where the University of Idaho is located. There is one area in Nez Perce County that has an over 30 percent minority population. This is the eastern portion of Nez Perce County where the Nez Perce Reservation is located.

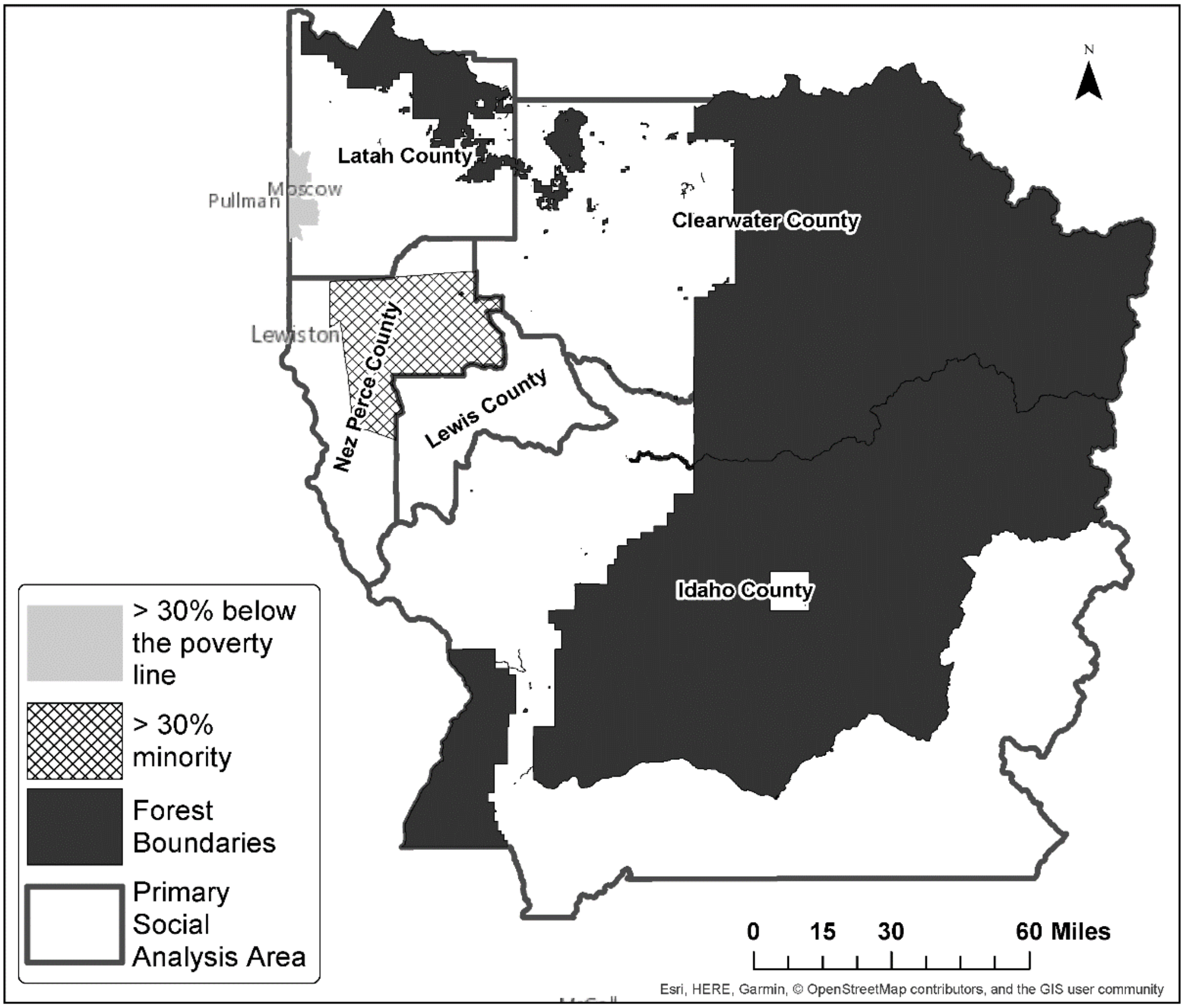


Figure 174. Environmental justice areas within the primary social analysis area

Data source: U.S. Census 2017; Map Source: U.S. Forest Service Northern Region 2019.

Social Benefits

The key benefits of the Nez Perce-Clearwater that contribute to social sustainability by enhancing quality of life are described in detail in the Assessment. These benefits include relevant multiple uses, ecosystem services, infrastructure, and operations. Below is a summary of key social benefits the Nez Perce-Clearwater provides to beneficiaries. The discussion of each benefit includes, where applicable and where data allow, a very brief description of the benefit, relevant social conditions, local stakeholder values, attitudes, and beliefs that relate to the given benefit, risks, and stressors, such as broader landscape, climate change, and conflicting benefits, that may affect how the benefit is contributing to social sustainability. Only key benefits that have the potential to impact social sustainability and have the potential to be influenced by the Nez Perce-Clearwater's management actions are addressed in detail. Local stakeholder values, attitudes, and beliefs are largely identified from the results of the Assessment's Forest Service Region 1 Social Survey (Bureau of Business and Economic Research 2018, University of Montana 2019), a review of public comments, and notes from public workshops and public meetings. Reviews of county resource plans also provided some insight. Percentages of survey data displayed are weighted responses and representative of the views of stakeholders residing in the secondary social analysis area. The confidence intervals for a proportion of 50 percent estimated from the survey is approximately plus or minus 8 percent (Bureau of Business and Economic Research 2018).

Stakeholders across the secondary social analysis area hold diverse values and preferences for management. Most survey respondents share a common vision of the most important purposes of their local, federal public lands. This vision includes protecting air and water quality, protecting wildlife habitat, protecting rare and endangered species, preserving areas for scientific study, providing scenic beauty, preserving wildlands, and providing recreational opportunities. Economic priorities, including timber, tourism, and mining, were very or extremely important to a subset of respondents, and at least moderately important to most respondents. Figure 175 shows the level of importance survey respondents assigned to various purposes of local, federal public lands. The percentages noted in the chart are weighted percentages of survey respondents located in the secondary social analysis area, defined as those living in areas within 50 miles of the Nez Perce-Clearwater boundaries.

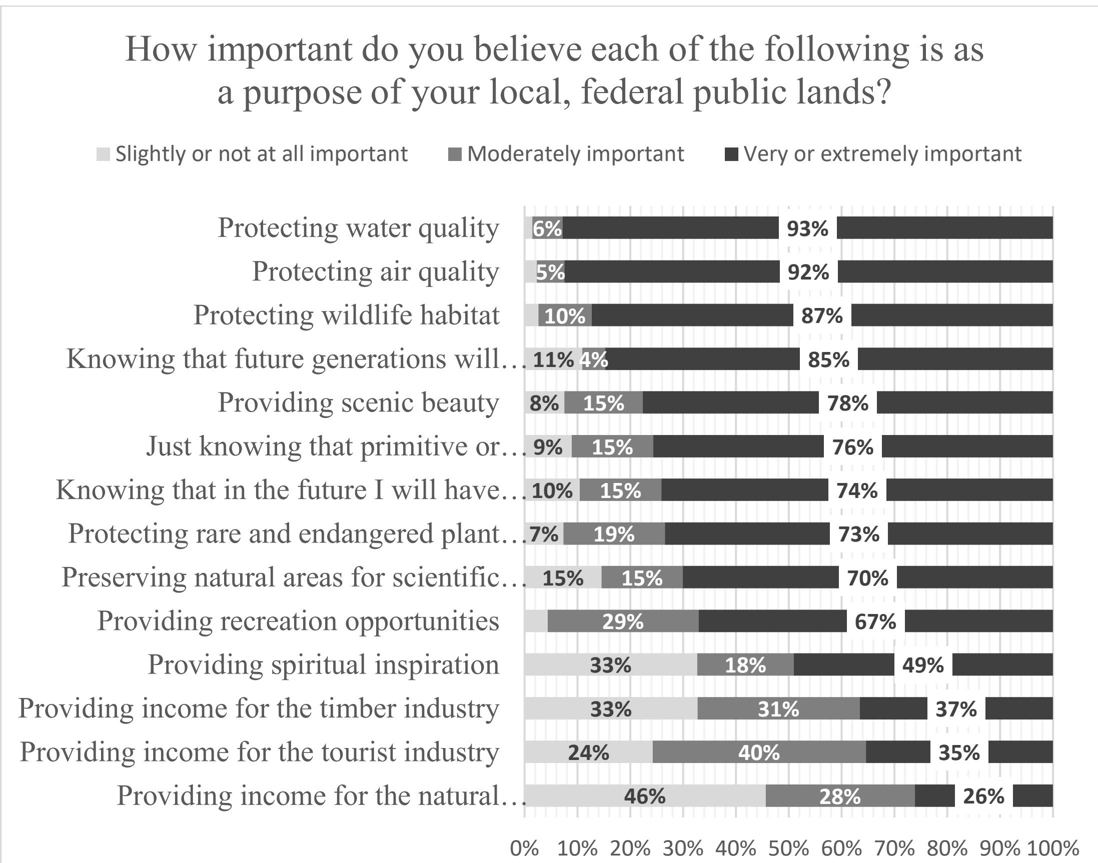


Figure 175. Local stakeholder survey respondent perspectives on the importance of federal land purposes in the local area

Data Source: (Bureau of Business and Economic Research 2018)

A review of comments received on the proposed action highlights that some stakeholders have differing, and often conflicting priorities in relation to the types of recreation opportunities, such as motorized, mechanized, and quiet; level of economic opportunity and timber harvest the Nez Perce-Clearwater should provide; and different perspectives on which areas and rivers should be recommended as Wilderness or eligible or suitable for Wild and Scenic River designations. Where relevant, these diverse perspectives are incorporated into the discussion of the benefits the Nez Perce-Clearwater currently provides. Climate change vulnerability data is taken from the Socioeconomic Climate Change Vulnerability Assessment (U.S. Department of Agriculture 2014e).

Clean Water and Water Supply

Clean water is one of the most highly valued benefits the Nez Perce-Clearwater provides. A survey of the public in the secondary social analysis area indicates that 93 percent of residents believe that protecting water quality is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Public commenters also noted the importance of clean water as an important benefit the Nez Perce-Clearwater provides. The Nez Perce-Clearwater provides benefits to towns in the region that rely on surface water for municipal use. Clean water also benefits the recreational and consumptive fishermen who fish for trout and salmon, which require relatively high-water quality to thrive. Availability of water is important not only for consumptive purposes and fishery habitats, but also for recreational activities and aesthetics, two other important benefits provided by the Nez Perce-Clearwater. Additionally, groundwater is very important (U.S. Department of Agriculture 2014e).

County resource plans highlight water quality as a key benefit and note that although many waterways are high functioning, there are streams and lakes that are impaired. The counties advocate for watersheds to be managed for a high level of water quality and suggest that federal land managers focus on restoration of impaired streams and lakes. County plans also note forest road construction, recreational activities, grazing, and timber harvest activities as potentially having negative effects on water quality.

National surveys also indicate that the majority of Americans feel that protecting water quality is a very or extremely important purpose of federal public lands, and a particularly important purpose of primitive and Wilderness areas (Cordell et al. 2005). Younger generations are most likely to identify ecosystem protection values such as protecting water quality as a very or extremely important purpose of federal, public wildlands (Rasch 2018).

Clean water and water supply were identified as highly vulnerable to climate change due to projected rising temperatures, reduced snowpack leading to lower flows in the dry seasons, and increased sedimentation due to earlier snowmelt and increases in wildfire activity. The ability of communities within the primary social analysis area to adapt to climate stressors on water supply and quality is moderate due to the high costs of water treatment and obtaining alternative sources of water in rural areas (U.S. Department of Agriculture 2014e).

The population in the primary analysis area increased by 30 percent over the past 50 years (U.S. Department of Agriculture 2014e). With any increase in population, both consumptive and non-consumptive water use is expected to increase, adding further pressure on the water supply.

Clean Air

Clean air is one of the most highly valued benefits the Nez Perce-Clearwater provides. A survey of the public in the secondary social analysis area indicates that 92 percent of residents believe that protecting air quality is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Most air quality concerns expressed by the public related to the occurrence, intensity, and frequency of wildfires in the region. Good air quality is important for public health, viewsheds, and recreational experiences (U.S. Department of Agriculture 2014e).

County plans list air quality as a key benefit and note the impacts of wildfire and prescribed burning on the ability of agricultural businesses to conduct field burning. Idaho County advocates for coordination of federal prescribed burns with the county to minimize impacts to agriculture businesses (U.S. Department of Agriculture 2014e).

Clean air was identified as moderately to highly vulnerable to climate change due to projected increases in wildfire activity and related smoke. The communities within the primary social analysis area are only moderately vulnerable, as air quality is only likely to be negatively affected by smoke in July, August, and September. Smoke from wildland fire, and agricultural burning does linger for days during the summer months and could impact recreational activities in the area (U.S. Department of Agriculture 2014e, b).

The ability of communities within the primary social analysis area to adapt to climate stressors on air quality is deemed very high. The Idaho Department of Environmental Quality and the Nez Perce Tribe regulate agricultural burning throughout the year while working with the Western Montana and North Idaho Airshed Group to coordinate projects and control potential air quality effects from each prescribed burn. The Nez Perce-Clearwater has the ability to time prescribed burns when they should have the least impact on air quality and to conduct fuel treatments designed to reduce the extent and duration of wildfires and the associated smoke (U.S. Department of Agriculture 2014e, b).

Wood products

Wood products are an important benefit for the communities surrounding the Nez Perce-Clearwater and for the timber industry in Idaho. A survey of the public in the secondary social analysis area indicates that 37 percent of residents believe that providing income to the timber industry is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Public commenters also noted the importance of wood products to local businesses and communities. The harvesting and processing of timber provide jobs and are part of the culture of the area. 60 percent of rural residents in the secondary analysis area report collecting firewood from local, federal public lands on an annual basis and 13 percent note that they harvest timber from local, federal public lands each year (University of Montana 2019).

County plans advocate for protecting traditional economic structures, including timber, and promote multiple uses of natural resources. Idaho County advocates for vegetation treatments that improve forest health, reduce wildfire risk, and provide a sustainable flow of commodities. Idaho County also advocates for harvesting dead and dying trees to recover their economic value. Latah County advocates for sustainable harvest practices and notes that unsustainable harvesting and resource conflicts could affect the long-term viability of timber harvest in the county.

Overall, wood products are viewed as being moderately vulnerable to climate change due to projected increases in wildfires, insects, and disease. Where increased temperature coincides with possible decreased precipitation, which is predicted in the Interior West where the Nez Perce-Clearwater lies, forest growth is expected to be lower (Ryan et al. 2008). Warmer winters with more sporadic freezing and thawing would likely increase erosion and landslides on forest roads and reduce access for winter harvesting (Karl et al. 2009), increasing costs and likely reducing the supply of forest products (U.S. Department of Agriculture 2014e, b).

Non-climate stressors identified were timber prices and the demand for timber, industry infrastructure, debates over logging on national forests, and conflicts with protecting other resource values. Some communities in the primary analysis area derive a relatively large percentage of their employment from timber-related industries and are highly vulnerable to both climate-related and non-climate related stressors to wood products. The ability of communities within the primary social analysis area to adapt to stressors on wood products is moderate, with some ability of the Nez Perce-Clearwater to manage for resilience to fires and insects and the potential for the industry to adapt to changing species mixes over time (U.S. Department of Agriculture 2014e, b).

Forage

Range has been, and continues to be, an important use of the Nez Perce-Clearwater. Although rangeland provides a variety of ecosystem services, such as wildlife habitat, wildlife-associated recreation, watershed functions, carbon sequestration, and biodiversity conservation, these lands have primarily been managed for forage. County plans advocate for protecting traditional economic structures, including agriculture. Idaho County recognizes the importance of productive grasslands that provide forage for deer and elk as well as for grazing domestic livestock. Commenters also noted the importance of management to address invasive weeds.

The planning team identified the vulnerability of forage to climate change as uncertain due to the uncertainty around projected precipitation changes. More precipitation can benefit forage and increase management flexibility for livestock, but a warmer, drier climate leads to reduced annual forage production and stress to riparian areas. Other stressors identified were invasive weeds and wildfires. Wildland fire can be both a stressor and a benefit. It kills in-growth of trees, so it maintains grasslands. Also, wildfires will likely kill trees in sites that have converted from rangeland to forest, causing them to revert to rangeland (U.S. Department of Agriculture 2014e, b).

Some communities in the primary analysis area derive a relatively large percentage of their employment from range-related industries, operate with limited financial resources, and are highly vulnerable to climate-related stressors to rangelands. The ability of communities within the primary social analysis area to adapt to stressors on forage was identified as uncertain due to the uncertainty around changes in precipitation.

Hunting and Wildlife

Wildlife in the Nez Perce-Clearwater provides many benefits to the public, including consumptive uses, recreational and cultural uses, and non-use values. A survey of the public in the secondary social analysis area indicates that 87 percent of residents believe that protecting wildlife habitat is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Public commenters also noted the importance of protecting wildlife habitat and providing hunting opportunities as important benefits that the Nez Perce-Clearwater provides.

County plans advocate for protection of wildlife habitat, local historical customs and culture, and traditional economic structures, and promotion of multiple uses of natural resources, including enjoyment and recreation. Idaho County also notes the importance of wildlife and hunting to local economies and subsistence and advocate for management actions to protect wildlife habitat. Latah County notes that crop predation from deer and elk is a threat to maintaining productive agricultural lands. Latah County as notes that where feasible to protect wildlife habitat, planning efforts should work to decommission forest roads, avoid placing new roads that would fragment quality habitat, and protect corridors for wildlife to promote connectivity among high value habitats (U.S. Department of Agriculture 2014e, b).

Consumptive uses include big game hunting, trapping for fur, predator harvest, and hunting and trapping by the Nez Perce Tribe. Recreational and cultural uses include sport hunting, wildlife viewing, and cultural resources for the Nez Perce Tribe. Non-use values include existence values, the value people place on knowing the species exist although they may never see or use them, and bequest values, the value people place on knowing the species will be present for future generations to enjoy (U.S. Department of Agriculture 2014e, b).

The public enjoys a wide variety of wildlife species found in the Nez Perce-Clearwater. The main game species include elk, white-tailed deer, mule deer, moose, mountain goat, bighorn sheep, cougar, black bear, forest grouse, turkey, and chukar. The main species that are trapped by the public include American marten, bobcat, and wolf. Workshop participants mentioned that people enjoy viewing many bird and wildlife species in addition to those mentioned, and that viewing wildlife was one of the top five reasons people visit the Nez Perce-Clearwater according the National Visitor Use Monitoring Survey (https://apps.fs.usda.gov/nvum/results) (U.S. Department of Agriculture 2014e, b, n).https://apps.fs.usda.gov/nvum/results) (U.S. Department of Agriculture 2014e, n, b).https://apps.fs.usda.gov/nvum/results) (U.S. Department of Agriculture 2014e, n, b).

Wildlife and hunting are viewed as being moderately to highly vulnerable to climate change. Hunting and trapping were seen as more vulnerable to the impacts of climate change, with warmer temperatures and less precipitation affecting hunter success and pelt quality. Some anticipated climate changes may benefit some species, for example, as more frequent wildfires open up grasslands for ungulate forage, or decreased snow depth allows for more winter forage and higher survival rates (U.S. Department of Agriculture 2014e, b, n) .

Wildlife viewing is less vulnerable to climate change impacts because it would most likely result in a different mix of species, as habitat types and species' ranges shift over time. So, if forest visitors enjoy viewing wildlife in general, viewing would not be impacted as much as if they wished to view only certain species (U.S. Department of Agriculture 2014e, c, n).

Non-climate stressors also varied by the type of use. For consumptive wildlife uses, fire suppression and invasive plant species were viewed as limiting big game forage and hunting opportunities. Fire suppression benefits furbearers, however. For wildlife viewing, the non-climate stressors perceived to have the greatest impact were: 1) hunting and trapping, which make animals more wary of humans and reduce viewing opportunities, 2) invasive species, which change the species composition and availability of forage for native wildlife, 3) off-highway vehicle use, which displaces wildlife that people are interested in viewing, and 4) major transportation corridors, which act as sources of mortality and barriers to dispersal. Other stressors mentioned included agriculture, grazing, pollution and poison, land use conversion, energy production, and logging (U.S. Department of Agriculture 2014e, n, c).

For communities in the primary and secondary analysis area, hunting and wildlife viewing are integrated into the culture and economy, serving as recreation, subsistence and employment for local outfitters and businesses reliant on the tourism industry. Changes to species composition, abundance, and distribution in the Nez Perce-Clearwater could have significant effects on many residents' way of life. Communities are thus highly vulnerable to climate-related stressors to wildlife and hunting opportunities. The population in the primary analysis area increased by 30 percent over past 50 years (U.S. Department of Agriculture 2014e, n, c). With any increase in population, both consumptive and non-consumptive uses of wildlife are expected to increase. The ability of communities within the primary social analysis area to adapt to stressors on wildlife is moderate, with some ability of the Nez Perce-Clearwater to improve habitat and limit negative impacts to habitat from logging, grazing and recreation (U.S. Department of Agriculture 2014e, n).

Fish

Fish are a highly valued Nez Perce-Clearwater resource, benefiting anglers, the Nez Perce tribe, and local businesses. The lakes and streams of the Nez Perce-Clearwater support many species of anadromous fish, defined as fish born in freshwater that spend time at sea and return to freshwater to spawn, and resident fish, including several species of trout, bass, and salmon, which are valued by the public for a wide variety of consumptive and non-consumptive uses. The opportunity to fish for and harvest salmon and steelhead, as well as the catch-and-release fisheries associated with the Selway River, Lochsa River, and Kelly Creek attracts anglers locally and from across the country. Fish are also an important cultural resource for the Nez Perce Tribe (U.S. Department of Agriculture 2014e, c, h).

County plans advocate for protecting fisheries and riparian habitat, protecting local historical customs and culture related to fishing, protecting traditional economic structures, opening new economic opportunities, and promoting multiple uses of natural resources, including enjoyment and recreation. Idaho County advocates for fisheries resources to be increased to 50 percent of historic levels and be managed to meet recreational needs.

Fish were viewed as very vulnerable to climate change, with the potential to be impacted by a wide variety of climate-related changes including stream temperatures, high flows and runoff, drought, snowpack depth, timing of snowmelt runoff, low instream flows, high lentic (still water) and lotic (running water) temperatures, wildfire, and ocean conditions. Fish were viewed as sensitive to the following non-climate stressors, in order of decreasing sensitivity: dams, transportation corridors, mining, logging, livestock grazing, fire suppression, and recreation. Exposure was highest for recreation, fire suppression, transportation corridors, and logging (U.S. Department of Agriculture 2014e, n).

For communities in the primary and secondary analysis area, fish are integrated into the culture and economy, serving as recreation, subsistence and employment for local outfitters, fishermen and businesses reliant on the tourism industry. Changes to species composition, abundance, and distribution of fish on the Nez Perce-Clearwater could have significant effects on many residents' way of life. Communities are thus extremely vulnerable to both climate-related and non-climate-related stressors to fish and fishing opportunities. The population in the primary analysis area increased by 30 percent over the past 50 years (U.S. Department of Agriculture 2014e, h, c). With any increase in population, both consumptive and non-consumptive uses of fish are expected to increase. The ability of communities within the primary social analysis area to adapt to climate stressors on fish is low, with some ability of the Nez Perce-Clearwater to complete stream restoration projects and limit negative impacts to habitat from mining, logging, grazing, recreation, fuels management and fire suppression (U.S. Department of Agriculture 2014e, n). For more information on fish resources, please see the 'Aquatic Ecosystems and Fisheries' analysis.

Cultural Values

Though difficult to quantify, cultural and heritage values of the Nez Perce-Clearwater are important benefits. These include an array of benefits to those living within the primary and secondary social analysis areas and those in the larger landscape. These benefits include values held by subsistence food gatherers and hunters, spiritual values held by Tribes and others religiously associated with the Nez Perce-Clearwater, recreationists seeking adventure and solitude, local people's sense of place and well-being, relationships to cultural and historic resources, and the inspiration and health benefits the Nez Perce-Clearwater provide to both visitors and those who do not visit the Nez Perce-Clearwater, but place a high value on knowing that the Nez Perce-Clearwater and its wild rivers and landscapes exist (Bowker et al. 2006, Cole 2005). For the purposes of this analysis, cultural values are discussed in three sections: inspiration and health, traditional industries, and tribal concerns.

Inspiration and Health

In both rural and more developed areas of the secondary social analysis area, residents have strong connections to the Nez Perce-Clearwater. Public commenters noted the importance of preserving certain landscapes and rivers on the Nez Perce-Clearwater to maintain their sense of place and connection to those places. Others note the importance of preserving historic properties and cultural artifacts. National and even international communities also are inspired by areas on the Nez Perce-Clearwater, especially designated areas such as Wilderness and Wild and Scenic Rivers. Other commenters noted the importance of accessing areas they value through different modes of transportation including motorized and mechanized access. Commenters held diverse perspectives on which areas should be preserved for non-motorized and mechanized access, and which areas should be open to all modes of transportation.

A survey of the public in the secondary social analysis area indicates that 85 percent of residents indicated that "knowing that future generations would have primitive or wilderness" is a very or extremely important purpose of their local, federal public lands. Seventy-six percent indicated that "knowing primitive or wilderness areas exist" is very or extremely important purpose of their local, federal public lands. Forty-nine percent noted that spiritual inspiration is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Public commenters also noted the importance of preserving primitive areas as an important benefit the Nez Perce-Clearwater provides. National surveys also indicate that the majority of Americans feel that knowing that future generations would have primitive or wilderness areas is a very or extremely important purpose of federal public lands (Cordell et al. 2005).

Connections to the Nez Perce-Clearwater also provide people with health benefits such as relaxation, stress reduction and general well-being. Forest bathing and nature therapy are acknowledged in public health literature as powerful methods for stress reduction and increasing well-being. Immersion in nature has been associated with positive effects to:

(1) the immune system function (increase in natural killer cells/cancer prevention); (2) cardiovascular system (hypertension/coronary artery disease); (3) the respiratory system (allergies and respiratory disease); (4) depression and anxiety (mood disorders and stress); (5) mental relaxation (Attention Deficit/Hyperactivity Disorder) and (6) human feelings of "awe" (increase in gratitude and selflessness). (Hansen et al. 2017).

Traditional Industries

Cultural values also include contributions to people's sense of place through participation in traditional industries and activities including mining, timber, agriculture, tourism, and recreation. In some communities, these industries contribute to people's sense of place as these activities have been part of the culture for generations (U.S. Department of Agriculture 2014e, h). County plans include principles that relate to preservation of cultural values including protecting of local historical customs and culture, protecting of traditional economic structures, maintaining rural lifestyles and character, maintaining an agrarian way of life, and promoting multiple uses of natural resources, including enjoyment and recreation. The Idaho County plan also notes the importance of mining to local community members' sense of place and connection to their heritage, as well as to local economies.

Maintaining traditional industries, providing opportunities for cultural activities, and increasing public access could be complicated by the increased stress added to forest resources from climate change and increasing demand for different, competing uses. The population in the primary analysis area increased by 30 percent over the past 50 years. Demand for cultural activities is expected to continue to increase in the future (U.S. Department of Agriculture 2014e, n, h). Visitation to Wilderness areas is expected to rise in the coming decades, particularly to areas relatively close to metropolitan areas, such as the Nez Perce-Clearwater (Rasch and Hahn 2018). This may create added stress to primitive landscapes and affect the ability of the Nez Perce-Clearwater to provide cultural values including opportunities for solitude and inspiration.

Tribal concerns

There are large Native American populations within the primary analysis area with ties to the lands and waters of the Nez Perce-Clearwater. In addition to the tribal trust responsibility of the Nez Perce-Clearwater, tribal concerns can be unique to specific tribes, including traditions and histories and, in this case, uses of Nez Perce-Clearwater resources. Examples include use of an array of wildlife species to create cultural artifacts for cultural ceremonies, interests in maintaining access to sacred spaces, protections of sacred species and honoring all treaty rights. Ecosystem services are also a concern because they contribute to traditional market and non-market economic activities that preserve and sustain the culture and tribal members and communities. For detailed information on tribal concerns, please see the Tribal Trust Responsibilities analysis.

The ability of communities within the primary social analysis area to adapt to climate stressors on cultural values was uncertain, with some ability of the Nez Perce-Clearwater to engage in restoration and conservation actions that can enhance resilience and increase the ability of the public to use and enjoy important forest resources (U.S. Department of Agriculture 2014e, n, g).

Native American communities in the area may be particularly vulnerable to climate-related shifts in opportunities to express cultural values and engage in traditional activities. This is because certain locations are sacred and cannot be substituted. Additionally, some may not have sufficient resources to travel to different areas should their local area no longer provide ample opportunities for subsistence hunting and gathering, or climate change may alter historical wildlife movements and availability of important forage species.

For more information on cultural values resources, please see the Tribal Trust Responsibilities, Human Uses of the Nez Perce-Clearwater, Production of Natural Resources, and Designated and Proposed Areas sections and analyses.

Aesthetics (Scenery)

Many areas of the Nez Perce-Clearwater are enjoyed for their scenic beauty. A survey of the public in the secondary social analysis area indicates that 78 percent of residents believe that providing scenic beauty is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Public commenters also noted that scenery was an important benefit the Nez Perce-Clearwater provides and contributes to their sense of place. Increases in forest disturbances, such as wildfires, insects, or disease can affect viewsheds – both the character of the landscape and the vantage points from which visitors experience the scenery. Scenery is vulnerable to climate change to the extent that climate change increases forest disturbances. Disturbances, such as insects, tree disease and wildfire, can impact recreation experiences, and perhaps visitation numbers. Driving for pleasure to enjoy the view is one of the top activities among visitors to the Nez Perce-Clearwater.[29] Aesthetics and the natural resource-based amenities of an area have been shown to contribute to population growth and economic development. Also, studies have found a positive effect on sales prices of homes located near National Forest lands *(Cho et al. 2009, Hand et al. 2008, Kim and Johnson 2002).* Changes in the viewsheds due to insects and disease could change the value of property in proximity to the Nez Perce-Clearwater *(U.S. Department of Agriculture 2014e, n, h).*

County plans note the importance of protecting the aesthetic values the Nez Perce-Clearwater provides. The ability of communities within the primary social analysis area to adapt to climate stressors on scenery was uncertain, with some ability of the Nez Perce-Clearwater to increase restoration efforts which have the potential to reduce negative impacts of forest disturbances on scenery (U.S. Department of Agriculture 2014e, n, h).

Recreation

Recreation on the Nez Perce-Clearwater is characterized by the vast, wild, and remote landscapes that support nature-based recreation activities that depend on water, snow, fisheries, and wildlife. A survey of the public in the secondary social analysis area indicates that 67 percent of residents believe that providing recreational opportunities is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018). Public commenters also noted the importance of recreation to their quality of life, well-being, local businesses, and the ability of communities to attract new businesses and residents.

Local residents in the secondary analysis area enjoy a range of recreation activities and the majority of residents participate in the following activities on an annual basis: hiking, relaxing, wildlife viewing, driving for pleasure, camping, fishing, picnicking, and foraging. Survey respondents were asked to indicate if they feel that there are "too few," an "adequate amount," "too many," or "don't know" of various types of recreational opportunities. A minority of local survey respondents in the secondary analysis area noted that the level of accessible sites, all-terrain vehicle trails, areas open to snowmobiles, and mountain bike trails are not adequate (Figure 176). Those in rural areas were more likely to note that current motorized access opportunities were not sufficient (Bureau of Business and Economic Research 2018, University of Montana 2019).

[29] https://apps.fs.usda.gov/nvum/results

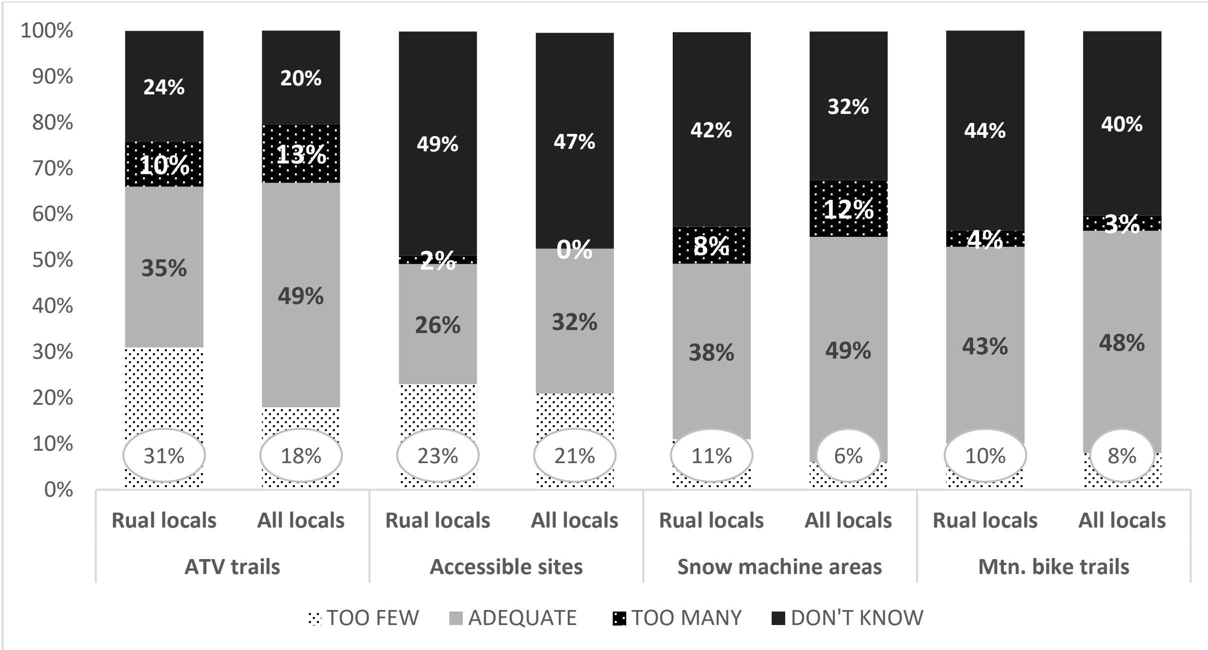


Figure 176. Residents' perceptions of the adequacy of motorized, mechanized, and wheelchair accessible facilities on federal lands in the local area

Data Source: Region 1 Social Survey, BBER, 2018; Region 1 Social Survey Year 2 only, BBER, 2019.

County plans note the importance of land and water recreation and tourism to both local economies and the well-being of residents. Idaho County also advocates for an increase in semi-primitive motorized opportunities as well as non-motorized opportunities including trails for hiking, horseback riding, mountain biking, cross-county skiing, and snowshoeing. Recreation is considered moderately vulnerable to climate change. Snow- and ice-dependent activities could be adversely affected by even small increases in temperature, especially in areas with marginal snow conditions. Snowmobiling, which depends wholly on natural snowfall and often occurs in lower-elevation areas, is vulnerable to decreases in snowfall (U.S. Department of Agriculture 2014e, n).

The desirability of nature-based activities such as hiking, river visits, and sightseeing for both scenery and wildlife viewing, may increase because of small near-term increases in temperature and the gradual development of longer warm weather seasons that may lead to longer access to natural settings and landscapes. Altered biodiversity and increases in wildfire and insect infestations, however, could adversely affect nature tourism. Viewing of wildlife, especially in critical habitat or recommended wilderness areas, and hunting opportunities could also change as animal habitats and perhaps even the viability of some species shift due to climate change (U.S. Department of Agriculture 2014e, n, h).

Lower water levels in reservoirs and rivers during the summer months could affect fishing and boating activities. However, warmer temperatures could lead to increased demand for water-related activities (Karl et al. 2009, Gamble et al. 2008) earlier in the spring and later in the fall. For communities in the primary and secondary analysis area, recreation is integrated into the culture and economy. A survey of the public in the secondary social analysis area indicates that 35 percent of residents believe that providing income to the tourism industry is a very or extremely important purpose of their local, federal public lands (Bureau of Business and Economic Research 2018).

Public commenters also noted the importance of providing recreation opportunities to support and expand recreation and tourism employment in local communities.

Changes to recreation opportunities could have significant effects on many residents' way of life and livelihoods. Communities are moderately vulnerable to climate-related stressors to recreation opportunities. The population in the primary analysis area increased by 30 percent over the past 50 years (U.S. Department of Agriculture 2014e, n). With any increase in population, recreational uses of the Nez Perce-Clearwater are expected to increase. The ability of communities within the primary social analysis area to adapt to climate stressors on recreation is moderate, with some ability of the Nez Perce-Clearwater to extend guiding and permitted water and snow-based activity seasons to coincide with changes in water flows and elevation of snow (U.S. Department of Agriculture 2014e, n, h).

Flood Control

Flood protection is an important regulating ecosystem service provided by the Nez Perce-Clearwater. Large trees break up heavy rainfall, surface duff layers encourage moisture to infiltrate the soil, soil organic matter and established root systems assist in absorbing water, and permeable soils allow surface water to soak in and recharge groundwater resources. Flood protection was viewed as important for preserving infrastructure, property, and fish habitat (U.S. Department of Agriculture 2014e, n, h).

County plans advocate for providing for the safety of county residents from flooding. Flood control was considered to have moderate vulnerability to climate change. Changes in the magnitude and frequency of extreme disturbance events are the largest factors behind future flooding frequency. Though fire suppression and dams and diversions were listed as non-climate stressors, they were identified as having positive rather than negative effects. Dams ameliorate floods by storing water. Wildfires can cause soils to be temporarily hydrophobic, or incapable of absorbing water, which leads to water collection on soil surface, increased surface runoff, and erosion in post-burn sites. Fire suppression is seen as positive since it can prevent hydrophobicity, allowing moisture to infiltrate soils and reducing runoff and erosion (U.S. Department of Agriculture 2014e, n, h).

For communities in the primary analysis area, flood control is an important benefit that the Nez Perce-Clearwater provides. Continuing urbanization and increasing construction of second homes in forested settings have expanded the area of the wildland-urban interface, causing increased concerns about protection from wildfire and potential post-fire landslides and flooding (Jones et al. 2009). Compared to other western states, the percentage of wildland-urban interface areas with homes is relatively low for the areas surrounding the Nez Perce-Clearwater – 4.7 percent contained houses in 2010. For comparison, the wildland urban interface areas occupied by houses was 12.6 percent for the state of Idaho. Although this means lower community exposure now, as populations grow and residential development in the five-county area continues to expand, exposure to floods could increase significantly (U.S. Department of Agriculture 2014e, n, h).

The ability of communities within the primary social analysis area to adapt to climate stressors on flood control was concerned low, but also highly uncertain. The Nez Perce-Clearwater may have some ability to reduce wildfire severity disturbance through restoration activities (U.S. Department of Agriculture 2014e, n, h).

Soil Stabilization and Landslide Protection

Soil stabilization and landslide protection were viewed as highly valuable benefits of the Forests Nez Perce-Clearwater that prevent damage to nature resources, property, and infrastructure. Soil stabilization and landslide protection was viewed as moderately vulnerable to climate change. Climate change would likely lead to new patterns of snow melt, runoff, soil moisture, vegetation type and wildfire that could all have adverse effects on soil stabilization and landslides. Changes in precipitation and snowpack depth were also mentioned as having a lesser impact. Non-climate stressors contributing to vulnerability include logging, transportation corridors, and livestock grazing, and to a lesser extent invasive species, recreation, and fire suppression (U.S. Department of Agriculture 2014e, n, h).

The county plans note potential for soil erosion due to residential development, logging, and road construction. County plans advocate for soil conservation practices including reducing erosion, managing to reduce noxious weeds, and providing for the safety of county residents from flooding, fires, and landslides. Continuing urbanization and increasing construction of second homes in forested settings have expanded the area of the wildland-urban interface, causing increased concerns about protection from forest disturbances such as wildfire and landslides (Jones et al. 2009). This along with the location of several communities in lower slope positions lead to a high vulnerability rating (U.S. Department of Agriculture 2014e, n, h).

The ability of communities within the primary social analysis area to adapt to stressors on soil stabilization and landslide protection was rated as low. The expense of applying best management practices or moving transportation corridors and hurdles to changing timing of land management activities were all viewed as hindering adaptive capacity. The loss of the ash cap on area soils was noted as a critical turning point after which maintaining stable soils and preventing landslides would become considerably more difficult. Along with climate impacts, there is a wide range of non-climate stressors to consider, including logging, transportation corridors, livestock grazing, invasive species, and recreation. The Nez Perce-Clearwater could act to sustain or improve soil stabilization to avoid more costly measures later. These actions would involve a mix of creating more resilience to climate-driven factors such as increased rain-on-snow events and more intense runoff patterns, and minimizing impacts of non-climate disturbance such as logging and grazing (U.S. Department of Agriculture 2014e, n, h).

Environmental Consequences

The land management plan provides a programmatic framework that guides site-specific actions but does not authorize, fund, or carryout any project or activity. Because the land management plan does not authorize or mandate any site-specific projects or activities, including ground-disturbing actions, there can be no direct effects. However, there may be implications, or longer-term environmental consequences, of managing the Nez Perce-Clearwater under this programmatic framework.

The previous sections assessed the social conditions of the Affected Environment and the social benefits the Nez Perce-Clearwater provides. The Affected Environment section provides a baseline understanding of how the Nez Perce-Clearwater currently contributes to social sustainability for local beneficiaries and the public, where applicable. The key dimensions of social sustainability assessed are how the management of the Nez Perce-Clearwater contributes to the quality of life of the public. The following section considers the potential impacts of alternative management scenarios on these contributions. This section provides a summary of the expected impacts to the key social benefits the Nez Perce-Clearwater provides, and explores how those impacts may affect contributions to social sustainability. For more details and the complete analysis of effects to specific Nez Perce-Clearwater resources, please see the relevant resource analysis.

Effects Common to All Alternatives

Under all alternatives, the Nez Perce-Clearwater will continue to provide the full suite of social benefits which currently contribute to social sustainability, as described in the Affected Environment section. Over the life of the plan, no consequential adverse impacts are expected to the social conditions of the primary analysis area or to any of the key social benefits that the Nez Perce-Clearwater currently provides. For more details on each benefit, please see the relevant resource analysis.

Under all action alternatives, contributions to social sustainability are expected to be different than under the No Action Alternative. This is due to new management direction across resource areas focused, to varying degrees, on increasing areas suitable for timber production, increasing timber volume, increasing vegetation management through fuels treatments and harvest, and increasing opportunities for motorized and mechanized recreation. The relative contributions to social sustainability for local communities, national and international publics vary by alternative and by the preferences of these diverse publics.

Effects to Social Conditions

Under all alternatives, effects to the key indicators of population size, short-term population change, and long-term population change are expected to be minimal. The main way that the alternatives could potentially impact social conditions are impacts to quality of life, including employment opportunities. If quality of life improves, populations are expected to grow. Conversely, if quality of life declines, populations may begin to decline. No significant changes to social conditions are expected under the conditions of any alternative.

However, alternative X has the largest expected change to employment opportunities and may result in a short-term increase in populations in the primary analysis area. Given that employment opportunities affected by the alternatives comprise a small fraction of overall employment in the primary analysis area, any short-term gains in populations are not expected to significantly affect quality of life in the area.

Short-term population gains do have the potential to place added stresses on local public services such as primary and secondary education, infrastructure maintenance, policing, public safety, and affordable housing. The additional timber output expected in Alternative X may help ease the financial burden on local governments as county governments receive a portion of federal timber sale revenue to use for public services. For more information on effects to local jobs and income, please see the Economic Sustainability section.

Effects to Environmental Justice Communities

Under all alternatives, effects to environmental justice communities, or communities with environmental justice concerns, are expected to be minimal. The main way that the alternatives could potentially impact these communities is to impacts to quality of life, including increasing the cost of living or employment opportunities. Under all alternatives, no significant impacts to the quality of life or employment opportunities available in environmental justice communities are expected because of alternatives. The relative contributions to the quality of life or employment opportunities available in environmental justice communities may vary across alternatives. Alternative X has the largest expected increase in employment opportunities so may result in more employment opportunities for low-income, environmental justice communities. The extent to which these communities would directly or indirectly benefit from the additional income and jobs will vary depending on where on the landscape projects occur, as well as the skill sets and desired employment types of people living in environmental justice communities. The relative contributions to the quality of life of tribal communities (minority and communities with environmental justice concerns) vary based on the unique interests and concerns of those tribal communities. For more information on how relative contributions to tribal communities vary by alternative, please see the Tribal Trust Responsibilities section.

Clean Water and Water Supply

Human populations in the primary analysis area are projected to continue to grow over the life of the plan. Therefore, demand for clean water is expected to increase. The No Action Alternative does not take climate change into account and does not incorporate as much detail and clarity regarding the conditions and management of watersheds as the action alternatives. Thus, contributions to the integrity and resilience of watersheds are expected to be less robust under the No Action Alternative, compared to action Alternatives W, X, and Y. Contributions would be highest under Alternative X, followed by Alternative W, then Y and then Z. These differences across action alternatives are mainly a function of the variations in level of proposed restoration across action alternatives. The proposed levels of watershed restoration are similar for the No Action Alternative and Alternative Z, so contributions from the No Action Alternative and Alternative Z are expected to be similar. The higher levels of expected timber harvest and motorized use under Alternative X are not expected to reduce the magnitude of the Nez Perce-Clearwater's contributions to clean water as best management practices will be implemented in road and trail construction and maintenance.

Clean Air

Clean air is an important benefit to local communities, both for the health of the local public, and for its role in facilitating a robust outdoor recreation tourism industry, which is an economic driver in some communities. While acres of expected prescribed fire vary by alternative, at the forest scale, prescribed fire is not expected to contribute to significant differences in effects to air quality across alternatives. Wildfire is expected to be the largest contributing factor to air quality across alternatives. Within recommended wilderness areas and suitable wild and scenic river corridors, wildfire is expected to be managed for resource benefit, which may result in more smoke impacts in local communities. The more acres managed as recommended wilderness and suitable wild and scenic river corridors, the greater the potential for increased smoke effects from managed wildfire. Therefore, contributions to clean air are expected to be highest under Alternative X, followed by the No Action alternative, then Alternative Y and then Alternative Z. Contributions may be lowest under Alternative W. These differences across alternatives are a function of the variation in level of recommended wilderness and suitable wild and scenic river corridors across alternatives.

Wood Products

Wood products remain an important benefit to local communities, both as an economic driver in some communities and as a contribution to sense of place and local heritage to those who may not directly benefit from economic opportunities in the wood products industries. Contributions would be highest under Alternative X, followed by Alternative W, Y, and then Z. Contributions would be lowest under the No Action Alternative. These differences across alternatives are mainly a function of the variation in level of acres suitable for harvest and the level of proposed timber harvest activities across alternatives. Opportunities for collecting firewood are not expected to vary across alternatives.

Forage

Forage remains an important benefit to local communities, both as an economic driver in some communities and as a contribution to sense of place and local heritage to those who may not directly benefit from economic opportunities in ranching industries. Contributions would be highest under Alternative X, followed by Alternative W, Y, and then Z. Contributions would be lowest under the No Action Alternative. These differences across alternatives are mainly a function of the level of active management proposed that is expected to maintain and enhance forage productivity and availability. Variations in contributions across alternatives are also a function of the levels of recommended wilderness and suitable wild and scenic rivers within active grazing allotments. These management allocations add complexity to the management of livestock and may negatively impact some grazing permittees' abilities to parsimoniously access and maintain their grazing allotments.

Hunting and Wildlife

Human populations in the primary analysis area are projected to continue to grow over the life of the plan. Therefore, demand for hunting and wildlife viewing opportunities are expected to increase. Contributions to hunting and wildlife viewing opportunities vary by alternative and by species of interest. For elk, mule deer, moose, wolf, cougar, grouse, turkey, weasel, badger, and some birds that enjoy non-forested or early seral habitats, contributions would be greatest under Alternative X, followed by Alternative W, then Alternative Y. The No Action Alternative and Alternative Z are expected to contribute the least to opportunities for hunting or viewing of these species, compared to the other alternatives. These differences across alternatives are mainly a function of the level of active management proposed that is expected to maintain and enhance species' habitats, forage availability, and prey populations.

Alternatives with higher levels of active forest management are also expected to increase forest openings, which, in turn, are expected to provide more opportunities for viewing terrestrial wildlife and birds. Contributions are expected to be similar across all alternatives for hunting, trapping, and viewing bighorn sheep, snowshoe hare, chukar, river otter, red fox, mink, skunk, raccoon, beaver, and aquatic birds as plan components across alternatives provide similar protections for their riparian and aquatic habitats. Some forest birds prefer dense, closed forests. Contributions to viewing opportunities for birds which prefer a closed forest structure would be highest under the No Action Alternative or Alternative Z, followed by Alternative Y, then Alternative W, and lowest under Alternative X. Bobcat, American marten, black bear, and mountain goat each have their own unique habitat preferences and considerations. For the relative contributions to opportunities for hunting and viewing these species, please see the summary chart in the Summary of Consequences section of this analysis.

Fish

Human populations in the primary analysis area are projected to continue to grow over the life of the plan. Therefore, demand for fish and healthy fisheries are expected to increase. The No Action Alternative does not take climate change into account and does not incorporate as much detail and clarity regarding the conditions and management of fisheries as the action alternatives. Thus, contributions to the integrity and resilience of fisheries are expected to be less robust under the No Action Alternative, compared to action Alternatives W, X, and Y. Contributions would be highest under Alternative X, followed by Alternative W, then Y and then Z. These differences across action alternatives are mainly a function of the variations in the objectives for proposed level of aquatic restoration across action alternatives. The proposed levels of restoration are similar for the No Action Alternative and Alternative Z so contributions from each are expected to be similar.

Cultural Values

Inspiration and Health

Local, national, and even international publics highly value the opportunities the Nez Perce-Clearwater provides to be inspired by nature and wild places. The health benefits of experiencing these special places, either directly through visitation, or indirectly through photography and just knowing wild places exist are well documented. Opportunities for inspiration and to enjoy the health benefits of experiencing pristine, natural environments in quiet, primitive settings vary by alternative. Contributions are expected to be greatest under the No Action Alternative, followed by Alternatives Y and Z, which are similar, then Alternative W and lowest under Alternative X.

These differences across alternatives are, in part, a function of the variation in level of proposed recommended wilderness, wild and scenic rivers, and the variation in allowable uses such as motorized uses in these areas and in Idaho Roadless Areas. For example, Alternative W allocates the most acres as recommended wilderness but also allows for a significant increase in motorized use in Idaho Roadless Areas, resulting in a net loss of primitive areas available for quiet recreation. Mechanized and motorized use in primitive areas may disturb those seeking solitude, quiet recreation settings, and opportunities for forest bathing therapies. Differences across alternatives are also due to variation in proposed level of active management. Increased timber outputs are expected to increase commercial traffic on roads, which may affect people's ability to access areas of the Nez Perce-Clearwater during harvest activities. Under Alternative W, commercial traffic is expected to quadruple, compared to the No Action Alternative. Commercial traffic is expected to more than quadruple under Alternative X and double under Alternatives Y and Z.

Historic properties are also an important benefit to local, national, and even international communities as they contribute to opportunities for inspiration, connecting to the land, preservation of heritages, and opportunities for tourism. Contributions would be highest under Alternative Z, followed by the No Action Alternative. Contributions under Alternatives W and Y would be moderate and lowest under Alternative X. These differences across alternatives are, in part, a function of the variation in level of proposed motorized use across alternatives and the resulting risk of disturbance to historic resources. These differences across alternatives are also due to variation in level of proposed timber harvest. More harvest is expected to have a positive effect on preservation of historic properties as harvest activities generally increase opportunities to formally evaluate historic resources within a project area. Harvest activities may also remove hazardous fuels, making properties more defensible in the event of a future wildland fire.

Land-based Livelihoods

Timber, grazing, mining, and recreation are part of the cultural heritage of some local communities in the primary analysis area. Opportunities for timber, grazing, mining, and recreation vary across alternatives. Timber, grazing, and recreation opportunities are described under the wood products, forage, and recreation benefit sections, respectively. The amount of land on the Nez Perce-Clearwater available for mineral entry, mineral disposal, and mineral leasing vary by alternative. Contributions to opportunities for mining are expected to be greatest under Alternative X, followed by the No Action Alternative, then Alternative Y, then Alternative Z. Alternative W is expected to provide the lowest relative contribution to mining opportunities. These differences across alternatives are, in part, a function of the variation in level of proposed recommended wilderness, suitable wild and scenic rivers, and the variation in allowable uses such as motorized and mechanized uses in these areas and in Idaho Roadless Areas. Differences are also a function of variations in plan components related to road creation, road decommissioning and restricting surface occupancy on future mineral projects.

Tribal Concerns

Contributions to tribes and tribal interests vary across alternatives and tribal communities as tribal concerns are unique to their own traditions, histories, and uses of Nez Perce-Clearwater resources. For detailed information on how the different alternatives may affect tribal concerns, please see the Tribal Trust Responsibilities section.

Aesthetics (Scenery)

Scenery is an important benefit to local communities, both as an economic driver in some communities and as a contribution to sense of place and local heritage. Scenery is important for tourism and attracting business and new residents to the area. Contributions vary by alternative. Alternative W provides the highest contributions, followed by Alternatives Y and Z, and then the No Action Alternative. Alternative X provides the lowest contribution. These differences across alternatives are mainly a function of the variation in level of proposed recommended Wilderness, suitable wild and scenic rivers, research natural areas, and significant special areas such as the Lolo Trail National Historic Landmark. Scenic integrity objectives are higher is these areas.

Recreation

Recreation is an important benefit to local communities, national publics, and even international publics. Recreation is as an economic driver in some communities that contributes to a sense of place and local heritage and provides opportunities for exercise and stress relief, which in turn contributes to human health. Recreation opportunities are also important for tourism and attracting new residents to communities within the primary analysis area. As human populations continue to grow, there will be added pressure on existing opportunities, potential for crowding, and limitations on opportunities for solitude in more popular locations.

Contributions vary depending on the type of recreation opportunities people prefer. For those most interested in motorized opportunities, Alternative X provides the highest contributions, followed by Alternatives W, Y and Z, which provide fewer opportunities compared to Alterative X. The No Action Alternative provides the least motorized opportunities. For those most interested in mechanized opportunities such as mountain biking, Alternative X provides the highest contributions, followed by the No Action Alternative and Alternative Z, which provide fewer opportunities compared to Alternative X. Alternative Y provides less that the No Action Alternative and Alternative Z and Alternative W provides the least mechanized opportunities. For those most interested in quiet recreation opportunities such as opportunities for solitude in wild places, the No Action Alternative provides the highest contributions, followed by Alternatives Y and Z, which provide fewer opportunities compared to the No Action Alternative. Alternative W provides less that Alternatives Y and Z, and Alternative X provides the least amount of quiet recreation opportunities. These differences across alternatives are mainly due to variation in level of proposed recommended Wilderness and variation in plan components which allow or do not allow different types of uses, such as mountain biking and motorized uses, in Idaho Roadless Areas and recommended Wilderness areas.

Flood Control, Soil Stabilization and Landslide Protection

Human populations in the primary analysis area are projected to continue to grow over the life of the plan. Therefore, more residential development near the Nez Perce-Clearwater and more exposure to flooding and landslides are expected. Great traffic volume is also expected as the human population increases, which can impact roads. The No Action Alternative does not take climate change into account and does not incorporate as much detail and clarity regarding the conditions and management of soils and roads as the action alternatives. Thus, contributions to the integrity, stability and resilience of soils are expected to be less robust under the No Action Alternative when compared to action Alternatives W, X and Y. Contributions would be highest under Alternative X, followed by Alternative W, then Y and then Z. These differences across action alternatives are mainly a function of the variations in level of proposed road maintenance and restoration across action alternatives. The proposed levels of restoration are similar for the No Action Alternative and Alternative Z so contributions from each are expected to be similar.

Cumulative Effects

Societal trends of population growth, urbanization, and growth in travel and tourism in the primary and secondary analysis areas may impact the Nez Perce-Clearwater's ability to contribute to social sustainability over the next 10 to 15 years. Based on the review of county plans, as referenced in the Affected Environment section, cumulative effects to the Nez Perce-Clearwater's ability to contribute to social sustainability over the next 10 to 15 years are not expected from the implementation of county natural resource and conservation plans. Minor long-term population growth within the primary analysis is likely to have minimal effects on the Nez Perce-Clearwater's ability to contribute to social sustainability. However, substantial population growth in nearby urban areas that promote an outdoor recreation-based lifestyle and culture to attract new residents, such as Missoula, Spokane, and Boise, is likely to create increasing demand for Nez Perce-Clearwater recreation opportunities and may lead to crowding and traffic in some areas, thereby affecting the quality of life of local residents. All action alternatives considered population growth, urbanization and increasing pressures from tourism, and are designed to mitigate resource impacts from these known stressors.

Summary of Consequences

Because no significant changes to social conditions are expected under any of the alternatives, including the preferred alternative, the Nez Perce-Clearwater would continue to provide the full suite of social benefits which currently contribute to social sustainability, as described in the Affected Environment section. The relative magnitude of contributions to social sustainability varies by alternative.

Given the diversity of management preferences across both local and national stakeholder groups, it is not possible to unequivocally identify which alternative provides the greatest overall contribution to social sustainability for all stakeholders. The No Action Alternative is likely to provide the greatest contributions to those who prioritize quiet recreation opportunities and inspirational and health benefits of the Nez Perce-Clearwater. Alternative X is likely to provide the greatest contributions to those who prioritize active vegetation management, motorized and mechanized recreation, timber volume, timber industry jobs, grazing opportunities, opportunities for energy and mineral extraction, and active restoration of aquatic and terrestrial habitats. Alternatives W, Y and Z provide a mix of contributions to social sustainability across all stakeholder groups. The preferred alternative will likely provide no net change in the contributions the Nez Perce-Clearwater makes to social sustainability because those that prioritize quiet recreation opportunities and inspirational and health benefits both gain and lose area they more readily affiliate with these goals and those that prioritize active vegetation management, motorized and mechanized recreation, timber volume, timber industry jobs, grazing opportunities, opportunities for energy and mineral extraction, and active restoration of aquatic and terrestrial habitats similarly gain and lose areas they more readily affiliate with these goals. In sum, there will be limited changes to social sustainability with the preferred alternative.

Table 462 summarizes potential effects to social conditions by alternative. Potential consequences to high minority environmental justice communities varies by tribal interests and community; see Tribal Trust analysis. Potential consequences to high poverty communities vary from Alternative X (highest), Alternative W, Alternative Y, Alternative Z, the Preferred action, to No Action Alternative (least).

Table 462. Summary of potential consequences to social conditions by alternative (Alt)

Measurement Indicator	No Action	Alt W	Alt X	Alt Y	Alt Z	Preferred
Population size	No effect	No effect	No effect	No effect	No effect	No effect
Short-term population change	No effect	No effect	Potential short-term population increase	No effect	No effect	No effect
Long-term population change	No effect	No effect	No effect	No effect	No effect	No effect

Chapter 4. Concluding Information and Disclosures

4.1 Unavoidable Adverse Effects

Neither the proposed Land Management Plan nor the existing Forest Plans produce unavoidable adverse effects because they do not directly implement any management activities that would result in such effects. However, the forest plans do establish management emphasis and direction for implementation of activities that may occur on National Forest System lands in the planning period. If those activities occur, the application of forestwide and management area standards and guidelines, as described in the Land Management Plan, would limit the extent and duration of any resulting environmental effects. Some unavoidable effects could still occur; however, these potential effects are described by resource area throughout Chapter 3 of this Nez Perce-Clearwater National Forests Final Environmental Impact Statement, primarily under "Environmental Consequences."

4.2 Irreversible and Irretrievable Commitments of Resources

Irreversible and irretrievable commitments of resources are defined in Forest Service Handbook 1909.15 – Environmental Policy and Procedures. Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period, such as the temporary loss of timber productivity in forested areas that are kept clear for use as a powerline right-of-way or a road. The decisions made in the Land Management Plan do not represent actual irreversible and irretrievable commitments of resources. This is because forest planning identifies what kinds and levels of activities are appropriate in different parts of the forest; it does not make project decisions. Ground-disturbing activities cannot occur without further site-specific analyses, Section 7 consultation required under the Endangered Species Act, and project decision documents.

4.3 Consistency with State and Local Plans

A review of state and local plans was conducted by the interdisciplinary team comparing the stated goals and objectives of the state and local plans compared to the Land Management Plan direction. The Nez Perce-Clearwater endeavors to incorporate relevant state and local direction into the alternatives of the Land Management Plan when it is within the scope of the Land Management Plan, within the authority of the Forest Service, and in compliance with federal code, rules, regulations, and policy.

Land Management Plans attempt to provide for ecological, economic, and social sustainability. State and local plans also attempt to provide for sustainability of resources and economies. The degree to which each alternative contributes to ecological, economic, and social sustainability varies. Therefore, each alternative and each individual component of each alternative may be more consistent or less consistent with the stated purpose and specific components of each state and local plan. An individual alternative may better respond to a state or local plan than another and consistency may be realized not in any one alternative but across various alternatives. Initial results indicate consistency with some combination of the building blocks in alternatives for each state and local plan. Additional detail below summarizes the main findings of each plan.

4.3.1 Natural Resources Plans of Clearwater, Idaho, and Benewah Counties

The Idaho County Natural Resources Plan (Idaho County Commisioners 2016), the Clearwater County Natural Resource Plan (Clearwater County 2017a), and the Benewah County Natural Resources Plan (2009) were developed to assist private landowners and direct the county governments in the State of Idaho and particularly the federal government as they conduct both strategic planning and project level planning. The plans generally call for increased timber harvest, increased livestock grazing, increased mining activities, and increased motorized access and motorized recreation opportunities on federal lands. Additionally, plans generally look negatively at recommendations for designations made by the Forest Service, such as recommended wilderness and suitable wild and scenic rivers. Very specific plan components within each plan direct specific actions or decisions to be made by the Forest Service in some resource areas. An analysis of specific plan components of the county plans tied to the correlated plan components in the Land Management Plan has been conducted and is documented in the project record. Major findings are presented below.

The Idaho County and Clearwater County Natural Resources Plans generally match Alternative X. Alternative X was specifically developed to respond to county and state plans. Increases in timber harvest, mineral extraction, and motorized access are maximized in Alternative X. Additionally, Alternative X does not recommend any areas for recommended wilderness nor does it find any rivers suitable as wild and scenic rivers. Livestock grazing is held constant across all alternatives based on current allotments and grazing demand. Specific desired conditions to increase motorized recreation, in addition to finding additional areas as suitable for motorized use, are not present in the final environmental impact statement. Additionally, old growth in the Land Management Plan may still be protected in Management Area 3 to a greater extent than the county natural resource plans call for. Fire management direction in the Land Management Plan may also be less specific than the county plans call for, specifically the Land Management Plan acknowledges the benefits of wildfire, under certain conditions, in all management areas of the Nez Perce-Clearwater. County plans specify aggressive suppression of all wildfires within the lands suitable for timber production, whereas the Land Management Plan allows for greater flexibility of fire management in all management areas, including in Management Area 3 under certain conditions.

The Benewah County Natural Resource Plan calls for unrestricted suction dredge mineral extraction, increases in livestock grazing, and aggressive fire suppression for most wildfires. These items are not specifically addressed in the Land Management Plan. A detailed set of forest management policies and objectives are not specifically met but, in general, Alternative X provides for greater levels of timber harvest and maximizes the economic contribution from Nez Perce-Clearwater management similar to the policy of Benewah County but not in exact conformance. Increased motorized access and no designation or recommendation of wilderness in Benewah County is substantively similar to the Idaho and Clearwater County Natural Resource Plans.

All counties specifically desire no net decrease of lands that contribute to the taxable base of the counties. With limited private lands, particularly in Idaho and Clearwater Counties, any decrease in the taxable base, as happens when private lands transfer to public lands, significantly affects the economics of the counties. The Land Management Plan does not specifically allow or disallow such transfers of land ownership to federal agencies.

4.3.2 State Wildlife Action Plan

The Idaho State Wildlife Action Plan (Idaho Department of Fish and Game 2017b) is a 10-year comprehensive document that establishes conservation targets, identifies threats to those targets, and recommends actions to address the threats. The Idaho State Wildlife Action Plan is arranged by ecoregion, with the Bitterroot Mountains, Idaho Batholith, and Palouse Prairie ecoregions being relevant to our planning effort. There is a high degree of consistency across all alternatives with the State Wildlife Action Plan. Primary actions within the State Wildlife Action Plan that cross jurisdictions are related to habitat for wildlife species. Specific items focus on forested and non-forested vegetation being within the natural range of variability, reduction of invasive species, improving water quality and aquatic habitats, and limiting disturbance to species during vulnerable periods. The Land Management Plan shares these same overarching principles, and plan components respond to each of the overarching themes of the wildlife action plan. While some alternatives may respond to specific actions better than others, no inconsistencies between the plans have been identified at this time.

4.3.3 State Forest Action Plan

The Idaho State Forest Action Plan (Idaho Department of Lands 2020) serves to conserve, protect, and enhance forestlands within the State of Idaho. The Idaho State Forest Action Plan is broken into two documents – 1) an assessment of the condition of Idaho's forests and 2) the resource strategy. The existing condition in the environmental impact statement uses similar data sources to the State Forest Action Plan and is generally coordinated. Desired conditions in the Land Management Plan are well aligned with the resource strategy of the State Forest Action Plan. Managing forest vegetation to reduce insect and disease, prevent catastrophic wildfire, and return species compositions and densities of forest vegetation are all primary drivers of both the Land Management Plan and the State Forest Action Plan. Additionally, the State Forest Action Plan identifies at least one priority landscape area that overlaps with the Nez Perce-Clearwater – the Craig-Camas Priority Landscape Area. In this priority landscape area, threats identified are risks from insects and disease to forest health and the potential for catastrophic wildfire. Potential benefits to the area are the proximity to milling infrastructure and the high to very-high potential for diverse and abundant wildlife. These findings were also incorporated in the Land Management Plan. Overall, there is a high degree of consistency between the two plans, paving the way for shared stewardship of the cross-jurisdictional resources and an opportunity to work across administrative boundaries using an all-lands approach.

4.3.4 County Fire Plans and Community Wildfire Protection Plans

The Nez Perce-Clearwater encompasses seven counties in Idaho, five with National Forest System lands totaling 100 acres or more. All seven counties have a wildfire protection plan, a fire plan, or a community protection plan. These plans designate wildland urban interface within the counties and describe prioritized treatment areas to protect communities from wildfire. Plans also may specifically support specific or general projects planned by the Forest Service that mitigate hazardous fuels. While each plan differs, generally they call for reduced hazardous fuels, prompt response to wildfire within the wildland urban interface, and pre-planning of response agencies, communities, and local governments. The Land Management Plan supports these priorities and defers to the counties for designation of the wildland urban interface.

4.4 Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare final environmental impact statements concurrently with and integrated with …other environmental review laws and executive orders."

4.4.1 Environmental Justice Act

As required by Executive Order 12898, all federal actions must consider potentially disproportionate effects on minority or low-income communities. The Land Management Plan is strategic and programmatic in nature, providing guidance and direction to future site-specific projects and activities. The Plan does not create, authorize, or execute any ground-disturbing activity, although it does provide for the consideration of certain types of activities. Site-specific activities will consider potential disproportionate effects on minority or low-income communities during project planning.

The Economic and Social Environment section of Chapter 3 did not identify any disproportionate impacts from forest management. In addition, collaboration on the plan did not identify any concerns regarding disproportionate impacts to low-income or minority populations. The Nez Perce-Clearwater also coordinated and consulted the Nez Perce Tribe. No disproportionate impacts were identified by the Tribe.

4.4.2 American Indian Religious Freedom Act

Agencies must make a good faith effort to understand how Indian religious practices may come into conflict with other forest uses and consider any adverse impacts on these practices in their decision-making practices. The Nez Perce-Clearwater consults primarily with the Nez Perce Tribe. The Nez Perce-Clearwater is wholly within the Nez Perce Tribe's homeland. Other tribes have been known to cross the Nez Perce-Clearwater. Other tribes have been notified of the Land Management Plan and final environmental impact statement.

No effects on American Indian social, economic, or subsistence rights are anticipated as a result of this Land Management Plan effort. No matter which alternative is chosen for implementation, the National Forest will be required to consult with tribes when management activities may impact treaty rights or cultural sites and cultural use. Desired conditions for American Indian Rights and Interests, for revised plan alternatives, would be that culturally significant species and the habitat necessary to support healthy, sustainable, and harvestable plant and animal populations support rights reserved by tribes in treaties; National Forest resources are available for collection by tribal members with treaty rights; and tribal members have access to sacred sites and landscapes within the Nez Perce-Clearwater for the exercise of reserved treaty rights and cultural uses.

4.4.3 Energy Requirements and Conservation Potential

Energy is consumed in the administration of natural resources from the National Forests. The main activities that consume energy are timber harvest; recreation use; road construction and reconstruction; minerals and energy exploration and development; transporting and managing livestock; and administrative activities of the Forest Service and other regulatory agencies. Energy consumption is expected to vary only slightly by alternative.

4.4.4 Prime Farmland, Rangeland, and Forestland

No prime farmland, rangeland, or forestland has been identified in the planning area. Neither the proposed Land Management Plan nor the existing Forest Plans would directly affect such lands, although implementation of the plan could have indirect effects. Regardless of the alternative selected for implementation, National Forest System lands would be managed with sensitivity to the values of any adjacent private or public lands.

4.4.5 Threatened and Endangered Species

Potential effects to species listed under the Endangered Species Act can be found in Chapter 3. The Biological Assessment and Biological Evaluation will be finalized for the final Land Management Plan and final environmental impact statement. Management direction to protect at-risk species or to provide for their habitats can be found in the Land Management Plan within forestwide and management area desired conditions, standards, and guidelines.

4.4.6 Wetlands and Floodplains

Neither the proposed Land Management Plan nor the existing Forest Plans directly implement any management activities that would result in loss of wetland or floodplains. Revised forestwide management direction provides a broad spectrum of standards and guidelines designed to protect soil, water, riparian, and aquatic resources. The goals and intent of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) would be met through compliance with this direction. Documentation for this conclusion can be found Chapter 3 and in the Land Management Plan desired condition, standards, and guidelines.

4.4.7 Conflicts with Other Agency or Government Goals or Objectives

Contact, review, and public involvement with other federal and state agencies indicate no major conflicts between the Land Management Plan and the goals and objectives of other governmental entities. This review is documented in the project record and the cumulative effects analysis of many sections of this document.

4.4.8 Preparers and Contributors

The Nez Perce-Clearwater consulted the following individuals and cooperating agencies during the preparation of the final environmental impact statement.

Table 463. Current team members

Name	Position
Vince Archer	Regional Soil Scientist
George Bain	Recreation Planner
Christine Bradbury	Nez Perce Tribe Liaison
Buddie Carroll	Forester and Silviculturist
Michelle Cox	Regional Invasive Species Specialist
Sara Daugherty	Forest Planner

Name	Position
James Efta	Regional Hydrologist
Mo Essen	Social Scientist
David Fothergill	Landscape Architect
Susan Graves	Engineer
Mike Hays	Botanist
RJ Hemingway	Fisheries Biologist
Linh Hoang	Regional Climate Change and Forest Carbon Specialist
Kevin Labrum	Wildlife Biologist
Megan Lucas	Ecologist
Jim Lutes	Wildlife Biologist
Sean Mueller	Air Quality Specialist
Justin Pappani	Fire Ecologist
Zach Peterson	Public and Government Relations Staff Officer
Jerry Petruzalek	Spatial Analyst
Kevin Pfister	Fire Staff Officer
Brett Rogers	Safety Officer
Colin Sorenson	Regional Economist
Kristen Stoeger	Editor
Craig Towery	Geologist
Jill Webster	Air Quality Specialist

Table 464. Previous team members (2015-2022)

Name	Position
Robert Ahl	Spatial Analyst
Rebecca Anderson	Geologist
Catherine Blackwell	Engineer
Patrick Bridegam	Lands Specialist
Curtis Caton	Geologist
Marcus Chin	Forester and Silviculturist
Autumn Ela	Recreation Planner
Bradley Gillespie	Fire Ecologist
Douglas Graves	Fire Ecologist
Carol Hennessey	Recreation Planner
Clint Hughes	Geologist
Diana Jones	Landscape Architect
Jordan Larson	Regional Economist
Steve Lucas	Archeologist
Howard Lyman	Rangeland Management Specialist
Sam Martin	Spatial Analyst
Adan McClory	Lands Specialist
Heidi McRoberts	Fish Biologist
Tim Metzger	Fire Ecologist

Name	Position
Chris Noyes	Wild and Scenic Rivers
Rebecca Rasch	Social Scientist
Barry Ruklic	Fire Planner
Robert Schantz	Silviculturist
Norma Staaf	Recreation Planner
Katherine Thompson	Fish Biologist

Cooperating Agencies

- State of Idaho
    - ♦ Idaho Governor's Office of Species Conservation (lead agency)
    - ♦ Idaho Department of Fish and Game
    - ♦ Idaho Department of Parks and Recreation
    - ♦ Idaho State Department of Agriculture
    - ♦ Idaho Department of Lands
    - ♦ Idaho Department of Environmental Quality
    - ♦ Idaho State Historic Preservation Office
    - ♦ Idaho Department of Water Resources
    - ♦ Idaho Geological Society
    - ♦ Idaho Governor's Office Roadless Commission
    - ♦ Idaho State Historic Preservation Office
    - ♦ Idaho Governor's Office Lewis and Clark Trail Commission
- Idaho County
- Clearwater County

Tribes

- Nez Perce Tribe

Others

- National Marine Fisheries Service
- Fish and Wildlife Service

4.4.9 Distribution of the Environmental Impact Statement

This environmental impact statement has been made available online so that individuals who submitted substantive comments on the draft environmental impact statement may review. In addition, notifications have been made to county governments for the availability of this environmental impact statement; local governments; the State of Idaho; other federal agencies, including the Bureau of Land Management, National Marine Fisheries Service, Fish and Wildlife Service, Army Corps of Engineers, and Environmental Protection Agency; US Forest Service employees; collaborative groups; state representatives; US Congressional delegation members; the Nez Perce Tribe; and local media outlets, including print, radio, television, and web based media.

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