United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
Eastern Washington Field Office
11103 East Montgomery Drive
Spokane Valley, Washington 99206

In Reply Refer To:
01EWFW00-2017-F-0456

OCT 24 2017

Rodney D. Smoldon
Forest Supervisor
Colville National Forest
U.S. Forest Service
765 South Main Street
Colville, Washington 99114

Dear Mr. Smoldon:

Subject: Colville National Forest Land and Resource Management Plan Revision

This document represents the U. S. Fish and Wildlife Service's (USFWS) Biological Opinion and Conference Opinion (collectively, Opinion) on the Draft Colville National Forest Land and Resource Management Plan (CNF Plan). The Colville National Forest (CNF) is located in Pend Oreille, Stevens, and Ferry Counties, Washington. The Opinion addresses effects of the CNF Plan on five listed species with two designated critical habitats: bull troutbull trout (*Salvelinus confluentus)* and its critical habitat, woodland caribou (*Rangifer tarandus caribou*) and its critical habitat, grizzly bear (*Ursus arctos*), Canada lynx (*Lynx canadensis*), and yellow-billed cuckoo (*Coccyzus americanis*). In addition the Opinion addresses two unlisted species: Wolverine (*Gulo gulo luscus*) and whitebark pine (*Pinus albicaulis*). Formal consultation on the proposed action was conducted in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA). The USFWS received adequate information to initiate consultation on April 17, 2017.

The enclosed Opinion is based on information provide in the Biological Assessment, the CNF Plan, telephone conversations, emails, and other sources of information cited in the Opinion. A complete record of this consultation is on file at the Eastern Washington Field Office in Spokane Valley, Washington.

If you have any questions regarding the enclosed Opinion or our shared responsibilities under the ESA, please contact Michelle Eames at (509) 893-8010 or Russ MacRae at (509) 893-8001.

Sincerely,

for Eric V. Rickerson, State Supervisor
Washington Fish and Wildlife Office

Enclosure

Endangered Species Act - Section 7 Consultation

BIOLOGICAL OPINION

U.S. Fish and Wildlife Service Reference:
01EWFW00-2017-F-0456

Colville National Forest
Land and Resource Management Plan Revision

Pend Oreille, Stevens, and Ferry Counties, Washington

Federal Action Agency:

U.S. Forest Service

Consultation Conducted By:

U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office
Spokane Valley, Washington

for Eric V. Rickerson, State Supervisor
Washington Fish and Wildlife Office

Date 10/24/17

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ACRONYMS AND ABBREVIATIONS

AEC	Aquatic Ecological Condition
AIS	Aquatic Invasive Species
AQH	Aquatic Habitat [as part of monitoring questions]
ARCS	Aquatic and Riparian Conservation Strategy
ARS	Aquatic and Riparian
B.C.	British Columbia
BA	Biological Assessment
BC	Back Country (Non-Motorized)
BCM	Backcountry Motorized
BE	Bitteroot Ecoystem
BLM	Bureau of Land Management
BMP	Best Management Practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
CHRU	Columbia Headwaters Recovery Unit
CHU	Critical Habitat Unit
CMU	Caribou Management Unit
CNF	Colville National Forest
CNF Plan	Draft Colville National Forest Plan
CYE	Cabinet Yak Ecosystem
DC	Desired Condition
DMA	Designated Monitoring Area
DPS	Distinct Population Segment
eDNA	Environmental DNA
EDRR	Early Detection and Rapid Response
ESA	Endangered Species Act of 1973, as amended (16 U.S.C. l531 *et seq.*)
EWFO	Eastern Washington Field Office
FLNRO	Forest, Lands, and Natural Resources Operations [B.C. Ministry of Forestry]
FLS	Federally Listed Species
FMO	Forage, Migration, and Overwintering
FR	Focused Restoration [CNF Plan Management Area]
FR	Federal Register
FRCC	Fire Regime Condition Class
GBMU	Grizzly Bear Management Unit
GDL	Guideline
GIS	Geographic Information System
GR	General Restoration (CNF Plan Management Area)
GYA	Greater Yellowstone Area
GYA DPS	Greater Yellowstone Area Distinct Population Segment
HRV	Historic Range of Variability
HUC	Hydrologic Unit Code
IDFG	Idaho Department of Fish and Game

IDL	Idaho Department of Lands
IGBC	Interagency Grizzly Bear Committee
IGDO	inter-gravel dissolved oxygen
ILBT	Interagency Lynx Biology Team
INFISH	Inland Native Fish Strategy
IPM	Integrated Pest Management
IPNF	Idaho Panhandle National Forest
KCRA	Kettle Crest Recreation Area
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation and Assessment Strategy
LPO	Lake Pend Oreille
LRMP	Land and Resource Management Plan
LSU	Lands and Special Uses
LWD	Large Woody Debris
MA	Management Area
MCST	Mountain Caribou Science Team
MCTAC	Mountain Caribou Technical Advisory Committee
MHHW	Mean Higher High-Water
MIN	Minerals
MIS	Management Indicator Species
MIST	Minimum impact Suppression Tactics
MLLW	Mean Low Low-Water
MON	Monitoring, as part of a CNF Plan Component
NCDE	Northern Continental Divide Ecosystem
NCE	North Cascades Ecosystem
NEP	Nonessential Experimental Population
NEPA	National Environmental Policy Act
NFS	National Forest System
OBJ	Objective
OHV	Off-highway Vehicle
OMRD	Open Motorized Road Density
Opinion	Biological Opinion and Conference Opinion
ORV	Off-Road Vehicle
PACFISH	Pacific Anadromous Fish Strategy
PBF	Physical and Biological Features
PCE	Primary Constituent Element
PHS	Priority Habitats and Species
PIBO	PacFish INFish Biological Opinion
POPUD	Pend Oreille PUD
PUD	Public Utility District
REC	Recreation
RM	River Mile
RMA	Riparian Management Area
RNA	Research Natural Area
RU	Recovery Unit

RUIP	Recovery Unit Implementation Plan
RW	Recommended Wilderness
SCITWG	Selkirk Caribou International Working Group
SE	Selkirk Ecosystem
SR	State Route
STD	Standard
TMDL	Total Maximum Daily Load
TMRD	Total Motorized Road Density
U.S.	United States of America
USDA	United States Department of Agriculture
USDI	United States Department of Interior
USFS	United States Forest Service
USFWS	U.S. Fish and Wildlife Service
VEG	Vegetation, as part of a CNF Plan Component
WQA	Water Quality Assessment
WCD	Congressionally Designated Wilderness
WCF	Watershed Condition Framework
WDFW	Washington Department of Fish and Wildlife
WDOE	Washington State Department of Ecology
WL	Wildlife [as part of a CNF Plan Component]
WR	Water Resources [as part of a CNF Plan Component]
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WTS	Watershed [as used in Watershed Monitoring Questions]
WYBC	Western Yellow Billed Cuckoo
YGBE	Yellowstone Grizzly Bear Ecosystem

INTRODUCTION

This document represents the U. S. Fish and Wildlife Service's (USFWS) Biological Opinion and Conference Opinion (collectively, Opinion) on the Draft Colville National Forest Land and Resource Management Plan (CNF Plan), in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA). The Opinion addresses effects of the CNF Plan on five listed species with two designated critical habitats: bull trout (*Salvelinus confluentus*) and its critical habitat, woodland caribou (*Rangifer tarandus caribou*) and its critical habitat, grizzly bear (*Ursus arctos*), Canada lynx (*Lynx canadensis*), and yellow-billed cuckoo (*Coccyzus americanis*). In addition the Opinion addresses two unlisted species: Wolverine (*Gulo gulo luscus*) and whitebark pine (*Pinus albicaulis*).

The Colville National Forest (CNF) is located in Pend Oreille, Stevens, and Ferry Counties, Washington. Your February 2, 2017, request for formal consultation was received via email on the same date. On March 8, 2017, the USFWS sent a letter requesting additional information necessary to complete the initiation package. The USFWS received adequate information to initiate consultation on April 17, 2017.

This Opinion is based on information provided in the March 28, 2017, Biological Assessment (BA), an April 17, 2017 review copy of the Final Environmental Impact Statement, an August 29, 2017 review copy of the CNF Plan, telephone conversations, emails, and other sources of information as detailed below. A complete record of this consultation is on file at the Eastern Washington Field Office in Spokane, WashingtonEastern Washington Field Office in Spokane, Washington.

CONSULTATION HISTORY

The following is a summary of important events associated with this consultation:

- The CNF Plan revision began in 2003, followed by public participation that began in 2004 with community workshops about the need to change the existing forest plan. At that time, one interdisciplinary team was working to revise Forest Plans for both the Okanogan-Wenatchee National Forest and the Colville National Forest. In 2011, the U.S. Forest Service (Forest Service) published a combined notice announcing that the proposed actions for the Colville and Okanogan-Wenatchee National Forests were available for public review and comment.
- After the public comment period on the combined proposed action, the Regional Forester decided it would be more effective and efficient to separate the Colville and Okanogan-Wenatchee National Forests' plan revision efforts. In a letter dated October 6, 2016, and received on October 11, 2016, the CNF updated a 2013 consultation agreement between the Forest Service and the USFWS by revising the work group memberships to specify staff from the CNF and the USFWS Eastern Washington Field Office.
- The Forest met with the Eastern Washington Field Office 5 times between June 2005 and August 2016 (6/2005, 11/2012, 2/2015, 11/2015, 8/2016) to review the consultation process, provide updates, and discuss issues related to the release of the Proposed

Revised Land Management Plan for the CNF and the Draft Programmatic Environmental Impact Statement (per the consultation agreement).

- The Forest requested a review of the Draft Environmental Impact Statement, the Draft CNF Plan, and fish and wildlife specialists' reports on February 16, 2016. The USFWS and Forest Service met on February 17, 2016 to discuss the draft Forest Plan. The USFWS's Eastern Washington Field Office provided written comments on these draft documents on August 15, 2016.
- The CNF provided a draft biological assessment on January 10, 2017; the Forest Service and the USFWS met on January 11, 2017 to discuss the draft biological assessment. The Forest Service provided a revised biological assessment with a letter requesting formal consultation on February 2, 2017.
- On March 8, 2017, the USFWS sent a letter requesting additional information necessary to complete the initiation package. The additional information necessary to initiate consultation was received in two batches: one received on March 30, 2017 (including the final BA dated March 28, 2017), and the second batch received on April 17, 2017. The second batch included a review draft of the CNF Plan.
- On April 28, 2017 we sent a letter initiating consultation as of April 17, 2017, and requesting an extension of the time for the formal consultation time-period of an additional 45 days. The CNF sent a letter, dated May 25, 2017, and received on June 1, 2017, agreeing to the extension.
- The CNF provided a revised draft of the CNF Plan on August 29, 2017. This Opinion addresses that draft of the CNF Plan.

GOALS AND OVERVIEW OF THE PROGRAMMATIC SECTION 7 CONSULTATION PROCESS

The CNF Plan would guide all natural resource management activities on the CNF and establish management standards and guidelines for the development of site-specific actions that carry out resource management activities. The CNF Plan describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management. The CNF Plan includes plan components, such as desired conditions, standards, guidelines and objectives for each management area on the Forest. The 1982 planning rule (36 CFR 219.19) requires national forests to manage habitat in order "*to maintain viable populations of existing native and desired non-native vertebrate species in the planning area*", and further defines a viable population as "*one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area*". As such, this Federal action provides a framework for the development of future CNF actions authorized, funded, or carried out within the next 15 years. The purpose of this section 7 consultation is to evaluate the CNF Plan for its consistency with the conservation of listed, proposed, and candidate species. This Opinion presents the USFWS's broad-scale examination of potential impacts on listed, proposed, and candidate resources (species and critical habitats), and examines how the CNF Plan aligns with the survival and recovery needs of listed species and the conservation function of designated critical habitats occurring in the action area.

In an ESA consultation context, Forest Plans generally represent "framework programmatic actions" as that term is defined in the implementing regulations for section 7 of the ESA (50 CFR 402.02; 80 FR 26832). Although framework programmatic actions in general, and Land and Resource Management Plans (LRMP) in particular, in and of themselves, do not cause on-the-ground effects, as noted above, they establish standards and guidelines for the development of future, site-specific actions that are authorized, funded, or carried out at a later time and subject to further section 7 consultation, as appropriate. A July 7, 1994, decision by the Ninth Circuit Court of Appeals in the *Pacific Rivers Council v. Thomas* case (30 F.3d 1050) established that LRMPs are Federal actions subject to the requirements of section 7 of the ESA.

Future actions that will be authorized, funded, or carried out consistent with this overall program and that may affect listed resources will be evaluated through future section 7 consultations under the ESA. During those subsequent consultations, if incidental take is reasonably certain to occur and the proposed action is compliant with the requirements of section 7(a)(2), then an action-specific Incidental Take Statement will be provided.

The CNF has requested conferencing on a "may affect" determination for the proposed wolverine, and the candidate species, whitebark pine. Under 50 CFR section 402.10, the USFWS has the option to conference for effects to proposed species or proposed critical habitat in accordance with the procedures for consultation as identified in 50 CFR section 402.14. The conference consultation can be written as if the proposed species is listed in a final rule such that the effect determination threshold is at the "may affect" level, as opposed to the "jeopardy or adverse modification" level described in 50 CFR section 402.10. The conference may be adopted as a final consultation when the species or critical habitat is designated, but only if no significant new information is developed and no significant changes to the Federal action are made that would alter the effect determinations.

For individual actions covered by previously completed section 7 consultations under the ESA, the issuance of this biological opinion does not automatically constitute a trigger for re-initiation. If the previously completed section 7 consultation included site-specific project design features that are still applicable (i.e., the extent and scale of effects will not change under the CNF Plan), then reinitiation is not triggered solely based on issuance of this Opinion. Actions that have not completed section 7 consultation (i.e., receiving either a final letter of concurrence or a biological opinion) as of the effective date of the Forest Service's Record of Decision will be amended such that they are consistent with the proposed CNF Plan and consultation will be completed according to this framework programmatic Opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

A federal action means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by federal agencies in the United States or upon the high seas (50 CFR 402.02). The CNF Plan provides responsible land management direction for the Colville

National Forest by guiding programs, practices, uses and projects. The CNF Plan provides broad guidance and information for project and activity decision-making for approximately the next 15 years. Chapter 2, p.10 in the CNF Plan describes the guidance that includes:

- Forestwide multiple-use goals (listed as desired conditions) and objectives, including a description of the desired condition of the Forest and an identification of the quantities of goods and services that are expected to be produced during the planning period;
- Forestwide standards and guidelines applying to future activities and resource integration;
- Management Area (MA) direction (multiple-use prescriptions) with associated standards and guidelines, including possible actions (see Appendix B in the CNF Plan);
- Monitoring and evaluation requirements that provide a basis for a periodic determination and evaluation of the effects of management practices;
- Recommendation of wilderness to Congress, as required by 36 CFR 219.17(a); and recommendation of rivers eligible for inclusion in the Wild and Scenic River System; and,
- Determination of suitability and potential capability of lands for resource production (timber and grazing).

The BA (p.16-89) describes the CNF Plan as follows.

CNF Plan Components
The CNF Plan includes plan components that will guide resource management projects during the life of the CNF Plan. These plan components are desired conditions, objectives, and standards and guidelines.

Desired Conditions

The desired conditions are goals describing the social, economic, and ecological attributes toward which management of the land and resources of the CNF is to be directed.

To be consistent with the desired conditions of the CNF Plan, a project or activity, when assessed at the appropriate spatial scale described in the CNF Plan (e.g., landscape scale), must be designed to meet one or more of the following conditions:

- Maintain or make progress toward one or more of the desired conditions of a plan without adversely affecting progress toward, or maintenance of, other desired conditions; or
- Be neutral with regard to progress toward plan desired conditions; or
- Maintain or make progress toward one or more of the desired conditions over the long term, even if the project or activity would adversely affect progress toward or maintenance of one or more desired conditions in the short-term; or
- Maintain or make progress toward one or more of the desired conditions over the long term, even if the project or activity would adversely affect progress toward other desired conditions in a negligible way over the long-term.

The project documentation should explain how the project is consistent with desired conditions and describe any short-term or negligible long-term adverse effects the project may have concerning the maintenance or attainment of any desired condition. If a project will adversely affect progress toward one or more desired conditions in more than a negligible way or short-term way, a Plan Amendment is required.

Objectives

Objectives are concise projections of measurable, time-specific intended outcomes. Objectives are the means of measuring progress toward achieving or maintaining desired conditions. The objectives represent just some of the expected outcomes or actions required to accomplish movement toward desired conditions**.**

Variation in achieving objectives may occur during the next 10 to 15 years because of changes in environmental conditions, available budgets, and other factors. Objectives are strongly influenced by recent trends, past experiences, anticipated staffing levels, and short-term budgets. A project or activity is consistent with the objectives of the CNF Plan if it contributes to or does not prevent the attainment of any applicable objectives. The project documentation should identify any applicable objective(s) to which the project contributes and document that the project does not prevent the attainment of any objectives. In some cases, project or activities may not directly relate to any plan objectives. In that case, the project or activity must at least not hinder the attainment of plan objectives, or be inconsistent with the intent of plan objectives.

The objectives section provides a description of the potential outcomes or results that may be expected to be provided during the planning period.

Standards

Standards are constraints upon project and activity decision making. Standards are established to help achieve desired conditions and objectives, and to ensure project activities on National Forest System (NFS) lands comply with applicable laws, regulations, Executive orders, and agency directives.
A project or activity must be consistent with all standards applicable to the type of project or activity and its location in the CNF Plan area. A project or activity is consistent with a standard when its design is in exact accord with the standard; variance from a standard is not allowed except by plan amendment. The project documentation should confirm that the project is consistent with applicable standards.

Guidelines

Guidelines provide operational practices and procedures that are applied to project and activity decision making to help achieve desired conditions and objectives, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.

A project or activity is consistent with a guideline in either of two ways:

1. The project or activity is designed exactly in accord with the guideline; or

2. A project or activity design varies from the exact words of the guideline, but it is as effective in meeting the purpose of the guideline to contribute to the maintenance or attainment of the relevant desired conditions and objectives.

Guidelines are explicitly identified in the CNF Plan. Guidelines are constraints on project and activity decision-making that allow 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.

<u>Suitability of Areas</u>

National Forest System lands are identified as "generally suitable" for various uses. Suitability describes the appropriateness of applying certain resource management practices (uses) to a particular area of land. An area may be identified as generally suitable for uses that are compatible with desired conditions and objectives for that area.

A project with the purpose of timber production may only occur in an area identified as suitable for timber production. The documentation for the project should confirm the project area meets the suitability requirements.

Except for projects with a purpose of timber production, a project or activity can be consistent with plan suitability determinations in either of two ways:

1. The project or activity is a use identified in the plan as suitable for the location where the project or activity is to occur; or
2. The project or activity is not a use identified in the plan as suitable for the location (i.e., the plan is silent on the use or the plan identifies the use as not suitable), but the responsible official determines that the use is appropriate for that location's desired conditions and objectives.

However, if a project or activity is specified in the plan as not suitable for the area, an amendment to the forest plan is required, and consultation with USFWS will be initiated.

Management Areas

The CNF Plan is a framework programmatic action, as it is programmatic in nature and does not specifically authorize any land management activity. The federal action is the designation of the Management Areas (MAs) which are broadly described areas where general management intent is similar. The MAs have specific desired conditions. The purpose of MAs is to provide consistent guidance for similar portions of National Forest System lands when implementing or continuing management activities. Forest-wide plan components apply within the management areas.

Some MAs, such as riparian management areas, naturally overlap with other MAs. Combinations of activities or uses are dependent on site-specific conditions, making it unreasonable to include all combinations and the applicable plan direction within the forest plan. Therefore, applicability of plan direction is guided by the principle that, where management areas overlap, the most restrictive plan direction applies depending on site-specific conditions and the activity or use.

The Forest also includes areas with special designations (CNF Plan p.96) because of unique or special characteristics, for example Nationally Designated Trails, Scenic Byways, the Kettle Crest Recreation Area, or Wild and Scenic Rivers. Each area may have specific management guidance (in addition to that listed in the CNF Plan) from underlying statute or other designation document, or in Forest Service directives. In the event that a plan component for an area with special designation and the forest-wide component in another section conflict, the more restrictive plan component prevails.

The MAs designated in the CNF Plan within the Action Area are listed in Table 1. (Table 3 in BA) - Management Areas on the CNF and in the Pend Oreille River **Subbasin.**. The Pend Oreille Subbasin acres are included separately because it is the only subbasin with recovery areas woodland caribou, bull trout, and grizzy bear, and critical habitat for woodland caribou and bull trout.

Table 1. (Table 3 in BA) - Management Areas on the CNF and in the Pend Oreille River Subbasin.

Management Area	CNF Acres	Pend Oreille Subbasin Acres
Backcountry	129,100	34,800
Backcountry Motorized	54,600	5,250
Focused Restoration	312,500	192,000
General Restoration	489,200	93,400
Research Natural Area	5,800	3,600
Scenic Byways	19,300	6,200
Wilderness-Congressionally Designated	31,400	31,400
Wilderness-Recommended	61,700	36,800
TOTAL	1,103,500	403,450

*Acres are approximate and vary due to Geographic Information System (GIS) methodology

The following description of components of the proposed action include the Desired Conditions (DC), Objectives (OBJ), Standards (STD), and Guidelines (GDL) that are most relevant to understand the beneficial and adverse effects on the species in later sections of the Opinion. Nonetheless, the proposed action includes the CNF Plan as a whole as the proposed action.

<u>Backcountry and Backcountry Motorized</u>

The CNF Plan includes approximately 129,100 acres in the Backcountry and 54,600 acres in the Backcountry Motorized MAs. 27% of the Backcountry and almost 10% of the Backcountry motorized is within the Pend Oreille River subbasin. The only difference between the two areas is the suitability for non-motorized and motorized recreation. Backcountry emphasizes non-motorized recreation opportunities and can include foot, horse, and mechanized (e.g., mountain bikes) modes of travel. Backcountry motorized emphasizes summer and winter motorized recreation opportunities and can include off- highway vehicles, motorcycles, jeeps, and over-snow vehicles.

Backcountry and Backcountry Motorized are spatially defined by the upper reaches of watersheds in the 2001 Inventoried Roadless Areas, the additional roadless areas identified in the CNF Plan revision wilderness evaluation process, wildlife habitats that include grizzly bear and deer/elk winter range, and threatened, endangered, and sensitive plant communities.

The Backcountry MA emphasis is to provide non-motorized backcountry recreation opportunities in a natural-appearing landscape. Mechanized uses may be allowed. The MA is to contribute to habitat conditions for species that benefit from an unroaded and summer non-motorized landscape.

Throughout the Opinion, BC refers to Backcountry (non-motorized). The desired conditions, standards, and guidelines for Backcountry MA follow.
Desired Conditions BC

MA-DC-BC- 01. Vegetation
The landscape is natural appearing. It contributes to the variety of native plant communities and the structure as defined in desired conditions for vegetation, aquatic, and wildlife habitats. The desired conditions for vegetation are achieved through a combination of ecological processes and management activities. While the landscape is predominantly natural appearing, a few locations have a vegetation structure that is altered to contribute to the recreational setting such as openings created and retained for scenic views. The scenic integrity objective is high.

MA-DC-BC- 02. Habitat
The areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).

MA-DC-BC- 03. Recreation Setting and Activities
These areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semi-primitive non-motorized recreation opportunities. They provide an unroaded setting for a variety of summer and winter recreational opportunities. Seasonal use restrictions occur for the purpose of resource protection and recreation management. Human-caused changes from management actions related to recreation are limited in scale, generally not visibly evident, and reflect a semi-primitive non-motorized recreational opportunity setting.

MA-DC-BC- 04. Developments and Improvements
Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments.

MA-DC-BC- 05. Travelways, Roads
There are no National Forest System roads. Other travelways, such as trails, are present.

MA-DC-BC-06. Existing and Proposed Uses
Existing and proposed recreation activities enhance or maintain recreation opportunities that trend towards the semi-primitive non-motorized/primitive end of the recreation opportunity spectrum.

Standard BC

MA-STD-BC-01. Motor Vehicle Use.
Motor vehicle use is prohibited. The following vehicles and uses are exempt from the motor vehicle use prohibition:

- Aircraft
- Use of any fire, military, emergency, or law enforcement vehicle for emergency purposes
- Authorized use of any combat or combat support vehicle for national defense purposes
- Law enforcement response to violations of law, including pursuit
- Motor vehicle use that is specifically authorized under a written authorization issued under Federal law or regulations
- Limited administrative use by the Forest Service.
- With written authorization

Guidelines BC

There are several Guidelines on p.102 and 103 of the CNF Plan, but two guidelines relevant to this Opinion are:

MA-GDL-BC-05. Fire (Backcountry)
Wildland fire should generally be allowed to play its natural role of influencing natural processes and scenic values. Trail infrastructure should be protected. Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role.

MA-GDL-BC-07. Invasive Plants (Backcountry)
Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants.

The Backcountry MA is considered not suitable for the following activities:

- Motorized recreational use, summer, trails or play areas
- Motorized recreational use, winter, trails or cross-country
- Road construction, permanent or temporary
- Scheduled timber harvest
- Utility corridors.

The emphasis in the Backcountry Motorized MA is to provide motorized backcountry recreation opportunities in a natural-appearing landscape. Summer motorized use is suitable and allowed where identified on the Forest's Motor Vehicle Use Map. Both cross-country and trail-based winter over-snow vehicle uses are suitable. Mechanized uses are suitable. The MA is to contribute to preserving natural behaviors and processes that sustain wildlife populations.

Throughout the Opinion BCM refers to Backcountry Motorized. The desired conditions for Backcountry Motorized are:

MA-DC-BCM-01. Vegetation
The landscape is natural appearing. It contributes to the variety of native plant communities and the structure as defined in desired conditions for vegetation, aquatic, and wildlife habitats. The desired conditions for vegetation are achieved through a combination of ecological processes and management activities. While the landscape is predominantly natural appearing, a few locations have a vegetation structure that is altered to contribute to the recreational setting such as openings created and retained for scenic views and for existing roads. The scenic integrity objective is high.

MA-DC-BCM-02. Habitat
These areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).

MA-DC- BCM-03. Recreation Setting and Activities.
These areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semi-primitive recreation opportunities. They provide an unroaded setting for a variety of summer and winter recreational opportunities. Seasonal use restrictions occur for the purpose of resource protection and recreation management. Human-caused changes from management actions related to recreation are limited in scale, generally not visibly evident, and reflect a semi-primitive motorized recreational opportunity setting.

MA-DC- BCM-04. Developments and Improvements
Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments.

MA-DC- BCM-05. Travelways, Roads.
There are no National Forest System roads. Other travelways, such as trails, are present.

MA-DC-BCM-06. Existing and Proposed Uses
Existing and proposed recreation activities enhance or maintain recreation opportunities that trend towards the semi-primitive motorized classification of the recreation opportunity spectrum.

MA-STD-BCM-01. Trail Use
Motorized, mechanized and non-motorized modes of travel are allowed on system trails. If conflicts occur between types of trail users, motorized use will be given priority over non-motorized modes of travel.

MA-STD-BCM-02. Off-Trail Use
Off-trail motorized use is limited to those areas shown on the Forest's current-year Motor Vehicle Use Map and Over-Snow Vehicle Use Map.

There are additional guidelines for the Backcountry Motorized MA in the CNF Plan on p.106. Suitable and unsuitable uses are on p. 107. Management activities deemed not suitable within the Backcountry Motorized MA are:

- Permanent or temporary road construction
- Scheduled timber harvest.
- Gathering of forest products for personal or commercial use, unless consistent with the 2001 Roadless Area Conservation Rule
- Commercial or personal use firewood cutting, unless consistent with the 2001 Roadless Area Conservation Rule

<u>Focused Restoration</u>

The CNF Plan includes approximately 312,500 acres in Focused Restoration (FR). Sixty one percent (191,965 acres) of the Focused Restoration is within the Pend Oreille River subbasin and is the largest single MA. The management emphasis is to restore ecological integrity and ecosystem function at the landscape scale using both active management (mechanical treatment and prescribed fire) and passive management (natural processes including disturbances and succession), to restore management natural processes and improve resiliency, while emphasizing important fish and wildlife habitats. Focused Restoration areas are defined by the key watersheds, and portions of grizzly bear and caribou recovery areas not included in Backcountry and Backcountry Motorized management areas. Important desired habitat conditions for aquatic, plant, and wildlife species are found in these areas. The active management focus in key watersheds is to promote riparian goals.

Desired conditions and standards for Focused Restoration Areas, in addition to those for Key Watersheds follow.

Desired Conditions FR

MA-DC-FR-01. Vegetation.
The landscape contributes to the variety of native plant communities and the composition, structure, and patterns as defined in desired conditions for vegetative systems, aquatic, plant, and wildlife habitats. The desired conditions for vegetation are achieved through a combination of ecological processes and management activities. While the landscape is predominantly natural appearing, there are some locations where the vegetation composition, structure, or pattern is slightly or moderately altered. The scenic integrity objectives would range from low to high.

MA-DC-FR-02. Habitat.
These areas contribute important habitat for plant, wildlife, and aquatic species that benefit from areas with relatively low road density (see MA-DC-FR-05) and high habitat effectiveness (e.g., relatively low level of human disturbances).

Road interaction with surface and sub-surface water is such that it does not result in an increase in drainage density and/or accelerated or abnormal hill slope failure. Roads function in a hydraulic and geomorphic manner that provides watershed-scale aquatic habitat connectivity and contributes to attainment of state water quality standards.

MA-DC-FR-03. Recreation Setting and Activities
These areas provide a setting for a variety of developed and dispersed summer and winter recreation activities and contributes to wildlife-related recreational opportunities (e.g., wildlife viewing, hunting, etc.). Seasonal use restrictions occur for the purpose of resource protection and recreation management. Human-caused changes from management actions related to recreation are limited in scale, naturally appearing, and reflect a Roaded Natural recreational opportunity spectrum setting. There are some locations where the vegetation composition, structure, or pattern is altered to provide a recreational setting such as openings for scenic views.

MA-DC-FR-04. Developments and Improvements
Facilities (whether operated by the Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance Roaded Natural recreation opportunity spectrum experiences. Facilities should reflect the rustic style associated with the Rocky Mountain Province character type by using native materials, earth toned colors and blend into the natural landscape as much as feasible. Facilities include such things as campgrounds, boat launches, fire lookouts, radio repeaters, administrative buildings, trailheads, and trails (see direction under Administrative and Recreation Sites Management Area). Improvements are evident and may include signs, bridges, fences, shelters, campsites, scenic pullouts/overlooks, interpretive displays, stock containment systems and water developments. Concentrated use by the public may occur at facilities associated with developed recreation sites.

MA-DC-FR-05. Travelways, Roads
Road densities vary across the management area; however, there are no more than 1 mile of NFS road per square mile within the focused restoration management area within each subwatershed. Total road density is calculated as miles of NFS road per square mile of National Forest System lands. This road density calculation does not include roads under another jurisdiction, or roads that have been hydrologically stabilized[1] and effectively closed to traffic, or decommissioned.

1 Road storage and stabilization treatments to avoid, minimize, or mitigate adverse effects to water quality, aquatic habitat, and riparian resources. Hydrologically stabilized roads minimize road erosion and road hydrologic connectivity to the stream system. Practices could include, but are not limited to, removal of culverts and fill material that present an unacceptable risk of failure or flow diversion, and suitable measures to ensure the road surface will intercept, collect, and remove water from the road surface in a manner that reduces concentrated flow in ditches, culverts, and over fill slopes and road surfaces without frequent maintenance. Because hydrologically stabilized roads remain on the FS road system, the integrity of the roadway is retained to the extent practicable and measures are implemented to reduce sediment delivery from the road surface and fills and reduce the risk of crossing failure and stream diversion.

Standards FR

MA-STD-FR-01. Road Construction and Hydrologic Risk Reduction
In subwatersheds that are functioning properly with respect to roads (per the Watershed Condition Framework), there will be no net increase (at least one mile of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. In subwatersheds that are functioning-at-risk or have impaired function with respect to roads, there will be a net decrease (for every mile of road construction there would be greater than one mile of road-related risk reduction) in system roads that affect hydrologic function to move toward proper function. Treatment priority shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction.

All management actions are considered potentially suitable in the Focused Restoration MA.

<u>General Restoration (CNF Plan p.110-x)</u>

The General Restoration (GR) MA, approximately 489,200 acres for the Forest and 93,433 acres (19%) within the Pend Oreille River subbasin, includes all areas not in another management area. The MA emphasis is to focus on enhancing ecological integrity and ecosystem function at the landscape scale using active management (mechanical treatment and prescribed fire) to restore natural processes and improve resiliency. The desired conditions follow.

Desired Conditions GR

MA-DC-GR-01. Vegetation
The landscape is predominately natural appearing to slightly altered to moderately altered and contributes to the variety of native plant communities and the composition, structure, and patterns as defined in desired conditions for vegetative systems, aquatic, plant, and wildlife habitats. The desired conditions for vegetation are achieved through a combination of ecological processes and management activities. While the landscape is natural appearing, there are locations that have a vegetation composition, structure, or pattern that is altered to provide a recreational setting such as openings maintained for scenic views; or other desired conditions, such as vegetation fuel conditions adjacent to an urban interface. The scenic integrity objectives would range from Low to High.

MA-DC-GR-02. Habitat
These areas contribute habitat for plant and wildlife species that are relatively tolerant of human activities/disturbances. Habitat effectiveness is expected to be lower for species that are sensitive to human activities and disturbances. These areas provide wildlife-related recreational opportunities (e.g., wildlife viewing, hunting, etc.) for species less sensitive to human activities and disturbance.

Road interactions with surface and sub-surface water is such that there is limited potential to increase drainage density and/or accelerated or abnormal hill slope failure. Roads function in a hydraulic and geomorphic manner that provides watershed and sub-basin scale aquatic habitat connectivity and contributes to attainment of state water quality standards.

MA-DC-GR-03. Recreation Settings and Activities
These areas provide settings for a variety of developed and dispersed summer and winter recreation activities. Seasonal use restrictions occur for the purpose of resource protection and recreation management. Recreation use is generally dispersed and/or located at recreation developments, such as campgrounds. Human-caused changes from management actions related to recreation are limited in scale, generally not visually evident, and reflect a roaded natural recreational opportunity setting.

MA-DC-GR-04. Developments and Improvements
Facilities (whether operated by the Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance roaded natural recreation experiences. Facilities should reflect the rustic style associated with the Rocky Mountain Province character type by using native materials, earth toned colors and blend into the landscape as much as feasible. Facilities include such things as campgrounds, boat launches, fire lookouts, radio repeaters, administrative buildings, trailheads, and trails. Improvements are evident and may include signs, bridges, fences, shelters, campsites or scenic pullouts/overlooks, interpretive displays, stock containment systems and water developments. Concentrated use by the public may occur at facilities associated with developed recreation sites.

MA-DC-GR-05. Travelways, Roads
Road densities vary across the management area; however, there are no more than 2 miles of NFS road per square mile within the general restoration management area within each subwatershed. Total road density is calculated as miles of NFS road per square mile of NFS lands. This road density calculation does not include roads under another jurisdiction, or roads that have been hydrologically stabilized and effectively closed to vehicular traffic, or decommissioned.

As with the Focused Restoration MA, the General Restoration MA is suitable for all management activities.

<u>Research Natural Areas</u>

Research Natural Areas (RNA), whether established or proposed, are a part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on NFS lands. They are established to provide for study and protection of a full range of habitat types and remain in a relatively unaltered condition for non-manipulative research, observation, and study.

Management activities in an RNA must be consistent with the purposes for which the RNA was established (or proposed), or specifically to maintain the values of the RNA. Purposes and values specific to a RNA are identified in establishment reports. In the absence of an establishment report, purposes and values are those identified in the Forest Service directives for RNAs. Forest Plan direction applies, whether the RNA is established or proposed. The Forest Supervisor approves or disapproves management activities within the areas in coordination with the Pacific Northwest Research Station director.

The Action area includes 3,716 acres of RNAs and 2082 acres of proposed RNAs. The Salmo (1,405 acres), Halliday Fen (725 acres), Maitlen Creek (653 acres), Round Top Mountain (213 acres), and Bunchgrass (720 acres) RNAs cover approximately 3,716 acres in the Pend Oreille Sub-basin. There are nonew RNAs proposed in the Pend Oreille Sub-basin. Outside of the Pend Oreille sub-basin are the proposed RNAs Fire Mountain (1,457 acres) and Hall Ponds (629 acres).

There is one desired condition and it should be protective of wildlife, watershed, aquatic and riparian habitats:

MA-DC-RNA-01. Research Purposes.
Native species and natural processes predominate. Research natural areas remain in a relatively unaltered condition for non-manipulative research, observation, and study. Human uses or activities consist mostly of occasional protection or restoration activities and low impact recreational use suited to the semi-primitive non-motorized recreation opportunity spectrum. The research natural areas are prescribed a high scenic integrity objective.

Uses and activities do not interfere with the objectives for which the research natural area was established. Vegetation, wildland fire, fuels, and recreation management protect, perpetuate, or restore the unique and/or representative ecosystems. Non-motorized, non-mechanized trails protect research natural area attributes. The hydrology of research natural areas is unaltered by water diversions, water developments, or to the extent possible mining-related subsidence in adjacent areas. The area is withdrawn from locatable mineral entry.

Suitable uses in RNAs are existing grazing, existing infrastructure, summer mechanized recreation, and non-motorized summer and winter recreation. For more detail on authorized and unauthorized uses in RNAs or Proposed RNAs refer to CNF Plan p.119 (Table 25).

Riparian Management Areas (RMA)

The following RMA description is from the BA p.48-50. Riparian zones are the inter-faces between terrestrial and aquatic ecosystems. Found adjacent to streams, rivers, lakes and wetlands, riparian zones provide a transitional zone between terrestrial and aquatic components of the landscape (Gregory et al. 1991). Although riparian zones occupy a small part of the overall CNF land base; they support a diverse vegetation community not found in the upland areas. Riparian zones provide important foraging, cover, travel corridors, and nesting habitat for birds, small and large mammals, reptiles, and amphibians. Healthy riparian zones with an abundance of trees and other native woody species and forbs provide for channel and floodplain stability and integrity. Healthy riparian vegetation adjacent to streams and on floodplains slow flood waters and reduce the likelihood of downstream flooding.

Riparian zones improve water quality by filtering runoff, sediment, and nutrients from adjacent upland slopes. Riparian zones provide stream cover and shade which helps keep the summer water temperatures cool for salmonids and other aquatic species, and are a source of large woody debris to stream channels. Riparian zones also contribute to the aquatic food base as a source of terrestrial insects that fall into channels and by providing detritus input which is used by myriad of macroinvertebrate species, which in turn are forage for fish as well as certain bird species. Healthy, functioning riparian zones are vital for providing good water quality and diverse aquatic habitat (Naiman et al. 1992, FEMAT 1993).

RMAs include portions of watersheds where aquatic and riparian dependent resources receive primary emphasis and where special management direction applies. The designation of RMAs include the aquatic environment, the riparian zone and adjacent uplands. RMAs are designated for all permanently flowing streams, lakes, wetlands, seeps, springs and intermittent streams, and unstable sites that may influence these areas. RMAs are used to maintain and restore the riparian structure and function of intermittent and perennial streams, confer benefits to riparian-dependent plant and animal species, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, and contribute to a greater connectivity of the watershed for both riparian and upland species.

RMAs are used as the primary framework (coarse filter) that provides for riparian and aquatic ecosystem diversity by conserving biophysical processes at the landscape and watershed scales. Management of RMAs focuses on ecological processes and conditions. Management activities within RMAs are to be designed to maintain or enhance existing desired conditions or restore degraded conditions for aquatic and riparian dependent species (USDA Forest service 2008; 2016).

RMAs are established to protect the ecological processes and conditions and the important functions of riparian zones provide to aquatic habitat including:

a) The input of fine organic matter and nutrients to aquatic habitat.
b) Providing for bank stability.
c) Filtering sediment due to surface erosion thus controlling the amount reaching the aquatic system.
d) A source of large woody debris.
e) Shading the aquatic habitat thus helping to control water temperature.
f) Controlling microclimate in the riparian zone and adjacent to the aquatic habitat.
g) Recognition of small and intermittent streams and managing unstable lands to account for aquatic function and values.

RMAs include portions of watersheds where aquatic and riparian dependent resources receive primary emphasis and where special management direction applies. The RMAs are designated for all permanently flowing streams, lakes, wetlands, seeps, springs and intermittent streams, and unstable sites that may influence these areas. Riparian management areas are used to maintain and restore the riparian structure and function of intermittent and perennial streams, confer benefits to riparian-dependent plant and animal species, enhance habitat conservation for organisms that are dependent on the transition zone between upslope and riparian areas, and contribute to a greater connectivity of the watershed for both riparian and upland species.

Fish-bearing streams − RMAs consist 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 (600 feet total, including both sides of the stream channel), whichever is greatest. It is expected that RMA widths along fish-bearing streams will not be less than described here.

Permanently flowing non-fish-bearing streams − RMAs consist 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 one site-potential tree, or 150 feet slope distance (300 feet total, including both sides of the stream channel), whichever is greatest.

Constructed ponds and reservoirs, and wetlands greater than one acre – RMAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially 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 wetland greater than one acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest.

Lakes and natural ponds − RMAs consist of the body of water and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable and potentially unstable areas, or to a distance equal to the height of two site-potential trees, or 300 feet slope distance, whichever is greatest.

Seasonally flowing or intermittent streams, wetlands, seeps and springs less than one acre, and unstable and potentially unstable areas − This category applies to features with high variability in size and site-specific characteristics. At a minimum, these RMAs should include:

- The extent of unstable and potentially unstable areas (including earthflows).
- The stream channel and extend to the top of the inner gorge.
- The stream channel or wetland and the area from the edges of the stream channel or wetland to the outer edges of the riparian vegetation or wetland, extending from the edges of the stream channel to a distance equal to the height of one site-potential tree, or 100 feet slope distance, whichever is greatest. A site-potential tree height is the average maximum height of the tallest dominant trees for a given site class.

Intermittent streams are defined as any non-permanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria. Including intermittent streams, springs, and wetlands within RMAs is important for full implementation of aquatic and riparian plan direction. Accurate identification of these features is critical to the correct implementation of the strategy and protection of the intermittent stream and wetland functions and processes. Identification of these features is difficult at times due to the lack of surface water or wet soils during dry periods. Fish- bearing intermittent streams are distinguished from non-fish-bearing intermittent streams by the presence of any species 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 plan components for fish-bearing streams would apply to those sections of the intermittent stream used by the fish.

RMAs overlay all other MAs. Management within RMAs is guided by Desired Conditions, Standards, and Guidelines. The management direction for RMAs are described in detail in Appendix H of the CNF Plan, and Appendix A of this Opinion compares the differences between the Aquatic and Riparian Conservation Strategy (ARCS) and existing INFISH Guidance.

The standards and guidelines cover a variety of management activities including: general riparian and aquatic conditions; chemical application within RMAs; fuelwood cutting; logging activities; road construction and maintenance and road/stream crossings; grazing management; fire and fuels management; lands and special use authorizations; hydroelectic development; and minerals management. Table 6, p.50-51 in BA describes suitable uses for Riparain Management Areas.

Desired Conditions RMA

MA-DC-RMA-01. Composition
Riparian management areas consist of native flora and fauna in a functional system and a distribution of physical, chemical, and biological conditions appropriate to natural disturbance regimes affecting the area.

MA-DC-RMA-02. Key Riparian Processes
Key riparian processes and conditions (including slope stability and associated vegetative root strength, capture and partitioning of water within the soil profile, wood delivery to streams and within the riparian management areas, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality) are operating consistently with local disturbance regimes.

MA-DC-RMA-03. Livestock Grazing
Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment.

MA-DC-RMA-04. Roads
Roads located in or draining to riparian management areas do not present a substantial risk to soil or hydrologic function. Roads do not disrupt riparian and aquatic function.

Objectives RMA

MA-OBJ-RMA-01. Improve Riparian Function at Dispersed and Developed Recreation Sites
Over the next 15 years, restore riparian processes and balance need for occupancy and access to water at 75 dispersed and developed recreation sites, through education, enforcement, and engineering where recreational use results in bank damage, reduction in water quality, and/ or a reduction in stream shade .

MA-OBJ-RMA-02. Restoration of Riparian Habitat and Process on Roads
Restore hydrologic and riparian habitat function within riparian management areas in non-key watersheds by reducing road-related impacts on 80 miles of road within 15 years.

MA-OBJ-RMA-03. Restoration of Late Forest Structure
Move upland vegetation within riparian management areas outside of key watersheds toward historic range of variability on 500 acres within 15 years of plan implementation.

Standards RMA

MA-STD-RMA-01. Aquatic and Riparian Conditions
Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When RMAs are properly functioning" and aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. When RMAs have impaired function or are functioning-at-risk or if aquatic and riparian desired conditions are not yet being achieved and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions2. Short-term adverse effects from project activities may be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of RMA desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

MA-STD-RMA-02. Chemical Application.
Apply herbicides, insecticides, piscicides, and other toxicants, other chemicals, and biological agents only to maintain, protect, or enhance aquatic and riparian resources and/or native plant communities

MA-STD-RMA-03. Personal Fuelwood Cutting
Personal fuelwood cutting shall not be authorized within riparian management areas or source areas for large woody debris.

MA-STD-RMA-04 Timber harvest and Thinning -
Timber harvest and other silvicultural practices can occur in riparian management areas only as necessary to attain desired conditions for aquatic and riparian resources. Vegetation in riparian management areas will not be subject to scheduled timber harvest.

2 Per Watershed Condition Framework Technical Guide, USDA Forest Service (2011b), subsequent versions of this guide and/or other comparable methods. The Watershed Condition Class terminology for functioning properly, "functioning-at-risk," and impaired function are equivalent to "functioning appropriately" or "functioning-at-risk" and "functioning at unacceptable risk" (described in the background of the general water resources section of this document) functioning categories within the matrix of pathways and indicators (USFWS 1998, and respectively equivalent to "Properly Functioning" or "At Risk" or "Not Properly Functioning" categories within the matrix of pathways and indicators used by NMFS (1996).

MA-STD-RMA-05. Yarding Activities
Cable yarding activities, if crossing streams, shall achieve full suspension over the active channel.

MA-STD-RMA-06. Road and Trail Construction and Maintenance
No sidecasting or placement of fill in riparian management areas, except where needed to construct or replace stream crossings. Snowplowing activities shall not allow runoff from roads and trails in locations where it could deliver sediment to streams.

MA-STD-RMA-07. Road Construction at Stream Crossings
At a minimum, all new or replaced permanent stream crossings shall accommodate at least the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change.

MA-STD-RMA-08. Road Construction-Fish Passage
Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic species and for riparian-dependent organisms where connectivity has been identified as an issue. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows.

MA-STD-RMA-09. Management of Livestock Grazing to Attain Desired Conditions
Manage livestock grazing to move toward aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing management. If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures.

MA-STD-RMA-10. Recreational and Permitted Grazing Management-Livestock Handling, Management, and Water Facilities
New and replaced livestock handling and/or management facilities and livestock trailing, salting, and bedding are prohibited in riparian management areas unless they do not prevent or retard attainment of aquatic and riparian desired conditions, inherently must be located in an RMA, or are needed for resource protection.

MA-STD-RMA-11. Permitted Grazing Management-Allotment Management Planning
During allotment management planning, negative impacts to water quality and aquatic and riparian function from existing livestock handling or management facilities located within riparian management areas shall be minimized to allow conditions to move toward the desired condition.

MA-STD-RMA-12. Wildland Fire and Fuels Management – Minimum Impact Suppression Tactics
Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas.

MA-STD-RMA-13. Wildland Fire and Fuels Management – Portable Pumps
Portable pump set-ups shall include containment provisions for fuel spills, and fuel containers shall have appropriate containment provisions. Park vehicles in locations that do not allow entry of spilled fuel into streams.

MA-STD-RMA-14. Pump and Dipping Equipment Cleaning
Fish habitat and water quality shall be protected when withdrawing water for administrative purposes. When drafting, pumps shall be screened at drafting sites to prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use appropriate screening criteria where listed fish or critical habitat are present.

MA-STD-RMA-15. Aerial Application of Fire Chemicals
Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on avoidance area maps and intermittent streams with surface water at the time of retardant use.

MA-STD-RMA-16. Lands and Special Uses Authorizations
Authorizations for all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation, or improvement of those conditions and processes. These authorizations include, but are not limited to, water diversion or transmission facilities (e.g., pipelines, ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals.

MA-STD-RMA-17. Hydroelectric - New Support Facilities
Locate new support facilities outside of riparian management areas. Support facilities include any facilities or improvements (workshops, housing, switchyards, staging areas, transmission lines, etc.) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation, or enhancement measures.

MA-STD-RMA-18. Mineral Operations in RMAs
For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian-dependent resources affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service has limited discretionary authorities. In those cases, project effects shall be minimized and shall not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities.

MA-STD-RMA-19. Operating Plans for Existing Activities
Work with operators to adjust their mineral operations to minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require and best management practices(BMPs) and other appropriate conservation measures to mitigate potential mine operation effects.

MA-STD-RMA-20. Structures and Support Facilities
Work with operators to locate structures, support facilities, and roads outside RMAs. Where no alternative exists, work with operators to locate and manage them to minimize effects upon aquatic and riparian desired conditions. When structures, support facilities, and roads are no longer required for mineral activities, reclaim sites to achieve aquatic and riparian desired conditions. Require operations to provide financial assurance adequate for the forest to reclaim disturbed areas in the absence of a financially solvent operator. Bonding will be posted prior to approval of any Plan of Operations.

MA-STD-RMA-21. Mine Waste
Do not locate mine waste with the potential to generate hazardous substances (as defined by CERCLA) within RMAs and/or areas where groundwater contamination is possible. The exception is short-term staging of waste during abandoned mine cleanup.

MA-STD-RMA-22. Leasable Exploration and Development
Consent decisions to allow mineral leasing will provide Bureau of Land Management (BLM) stipulations for lease management. Once leased, the Forest will actively coordinate and consult with BLM regarding lease exploration and development activities. In consultation with the BLM, the Forest will recommend BMPs and mitigation as Conditions of Approval to support attainment and maintenance of aquatic and riparian desired conditions.

MA-STD-RMA-23. Saleable Minerals
Prohibit saleable mineral activities such as sand and gravel mining and extraction within RMAs unless no alternatives exist and if the action(s) will not retard or prevent attainment of aquatic and riparian desired conditions.

MA-STD-RMA-24. Inspection and monitoring of mineral plans, leases, and permits
Conduct inspections, monitor, and annually review required monitoring for mineral plans, leases, and permits. Evaluate inspection and monitoring results and require mitigations for mineral plans, leases, and permits as needed to eliminate impacts that retard or prevent attainment of aquatic and riparian desired conditions.

MA-STD-RMA-25. Suction Dredge and Placer Mining
Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations and their designated critical habitat.

- All suction dredge mining activities in occupied habitat for aquatic threatened or endangered species/populations and in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or “will likely cause significant disturbance of surface resources."[3] A likelihood that a threatened or endangered species "take" (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics.

- If the district ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the district ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance.

Guidelines RMA

MA-GDL-RMA-01. Fuel Storage
Refueling shall occur with appropriate containment equipment and a spill response plan in place. Wherever possible, storage of petroleum products and refueling will occur outside of RMAs. If refueling or storage of petroleum products is necessary within RMAs, these operations will be conducted no closer than 100 feet from waterways.

MA-GDL-RMA-02. Felling Trees
When trees are felled for safety, they should be retained onsite (channels and adjacent floodplains) to maintain, protect, or enhance aquatic and riparian resources unless otherwise determined that such trees pose a new risk to administrative or developed recreation sites.

MA-GDL-RMA-03. Landings, Skid Trails, Decking, and Temporary Roads
Landings, designated skid trails, staging or decking should not occur in riparian management areas, unless there are no other reasonable alternatives, in which case they should:

- Be of minimum size
- Be located outside the active floodplain
- Minimize effects to large wood, bank integrity, temperature, and sediment levels
- Not result in unnatural modification of flow paths
- Impacted site(s) to be reclaimed as soon as practicable.

Existing infrastructure may be reused with intent of removal and restoration of riparian function as soon as practicable.

MA-GDL-RMA-04. Road Construction
Construction of permanent or temporary roads in riparian management areas should be avoided, except where Forest authorities are limited by laws and regulation, and except where necessary (examples are provided in CNF Plan p.127).

MA-GDL-RMA-05. Temporary Road Reconstruction
Temporary roads in RMAs should be avoided. When avoidance is not possible, temporary roads in RMAs should be managed to protect and restore aquatic and riparian desired conditions.

MA-GDL-RMA-06. Road Construction – Wetlands and Unstable Areas –
Wetlands and unstable areas should be avoided when reconstructing existing roads or constructing new roads and landings. Impacts should be mitigated where avoidance is not possible.

MA-GDL-RMA-07. Road and Trail Management – Drainage
Road and trail drainage should be routed away from potentially unstable channels, fills, and hillslopes.

MA-GDL-RMA-08. Road and Trail Construction – Passage for Riparian-dependent Species
Construction or reconstruction of stream crossings should allow passage for other riparian-dependent species where connectivity has been identified as an issue.

MA-GDL-RMA-09. Road and Trail Construction—Minimization of Diversion Potential
Where feasible, new or reconstructed stream crossings should be designed to prevent the diversion of streamflow out of the channel and down the road or trail in the event of crossing failure. If avoidance is not possible, minimize the potential effects of crossing failure.

MA-GDL-RMA-10. Fish Passage Barriers
Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.

MA-GDL-RMA-11. Annual Grazing Use Indicators
The purpose of this guideline is to manage livestock grazing to help attain and maintain aquatic and riparian desired conditions over time. Specifically, it is intended to maintain or improve vegetative and stream conditions, help ensure the viability of aquatic species, provide important contributions to the recovery of ESA-listed species, and facilitate attainment of State water quality standards.

The annual livestock use and disturbance indicators described below should be applied to help achieve, over longer timeframes, conditions at site and watershed scales that enable attainment and maintenance of desired conditions. The values specified below are starting points for management. Only those indicators and numeric values that are appropriate to the site and necessary for maintaining or moving towards desired conditions should be applied. Specific indicators and indicator values should be prescribed and adjusted, if needed, in a manner that reflects existing and natural conditions for the specific geo-climatic, hydrologic and vegetative setting in which they are being applied[4]. Indicators and 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 ESA consultation documents, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline.

4 For example, the stubble height values contained herein may not be appropriate for some sites (e.g., those with short graminoids).

1. In subwatersheds that are "functioning properly"[5] for water quality, aquatic habitat, and riparian and wetland vegetation, maintain those conditions by managing annual livestock grazing use and disturbance as follows[6]:
   - maintain a minimum of 6-inch residual herbaceous stubble height on the greenline[7], except for sites in late-seral conditions[8] being managed under any grazing system that supports a late-seral ecological stage, where a minimum of 4-inch to 6-inch stubble height should be maintained
   - utilize no more than 30-45% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area
   - Allow no more than 20-25% streambank alteration[9]
   - limit use of woody species to no more than 30-40% of current year's leaders along streambanks and, as needed, in other critical portions of the riparian management area

2. In subwatersheds that are "functioning-at-risk" or that have impaired function for water quality, aquatic habitat, and/or riparian and wetland vegetation and where grazing contributes to those conditions, enable recovery by managing annual livestock grazing use and disturbance as follows:
   - maintain a minimum of 6-inch to 8-inch residual herbaceous stubble height on the greenline
   - on sites with late-season grazing[10] and where willow is or should be an important component of the riparian vegetation community, maintain a minimum of 8-inch residual herbaceous stubble height
   - utilize no more than 30-35% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area
   - Allow no more than 20-25% streambank alteration
   - limit use of woody species to no more than 20-30% of current year's leaders along streambanks and, as needed, other critical portions of the riparian management areas

5 Subwatershed classification as properly functioning, functioning-at-risk, or impaired function should be determined based on a weight-of-evidence approach that considers, at a minimum, the water quality, aquatic habitat, and riparian/wetland vegetation indicators of the Watershed Condition Framework (WCF). Only WCF water quality parameters relevant to livestock grazing (e.g., temperature, nutrients, bacteria, sediment) need be considered. Local inventory, assessment and monitoring data and information (e.g., Multiple Indicator Monitoring, Proper Functioning Condition) can be used to refine initial classifications made per WCF.
6 Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height, streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization.
7 Stubble height criteria apply at the end of the grazing period, when that period ends after the growing season. When the grazing period ends before the growing season does, stubble height criteria can be applied at the end of the grazing period or the end of the growing season.
8 'Late-seral' means the existing riparian vegetation community is >60% similar to the potential natural community composition (per Winward 2000).
9 Streambank alteration criteria are assessed in designated monitoring areas (DMA) following guidance in BLM Technical Reference 1737-23 and apply within 1-2 weeks of removal of livestock from each pasture.
10 Late season grazing generally begins after sugar storage in woody vegetation is complete and leaf fall has started. Upland plant seeds have shattered and mean air temperatures begin to cool.

More conservative values, within and potentially beyond the ranges described above, should be used when: (1) relevant indicators (e.g., water quality, aquatic habitat, riparian vegetation) are highly departed from desired conditions and not improving due to livestock influence; (2) ESA-listed aquatic species or critical habitat sensitive to grazing impacts are present and conditions are not improving; or (3) grazing-related requirements of water quality restoration plans for impaired waters (e.g., site potential shade) are not being met and conditions are not improving.

Implement other applicable actions contained in ESA Recovery Plans and water quality restoration plans.

MA-GDL-RMA-12. Recreational and Permitted Grazing Management – Livestock Handling Activities
Livestock trailing, bedding, loading, and other handling activities should be avoided in riparian management areas, except for those that inherently must occur in a riparian management area.

MA-GDL-RMA-13. Recreational and Permitted Grazing Management – Fish Redds
Avoid livestock trampling of Federally-listed Threatened or Endangered fish redds.

MA-GDL-RMA-14. Recreation Management –
New Facilities and Infrastructure is designed to keep new facilities or infrastructure outside expected long-term channel migration zones. Those facilities that inherently occur in riparian management areas (e.g., road stream crossings, boat ramps, docks, interpretive trails) should be located to minimize impacts on riparian-dependent resource conditions (e.g., within geologically stable areas, avoiding major spawning sites).

MA-GDL-RMA-15. Recreation Management – Existing Facilities
Consider removing, or relocating, or re-designing existing recreation facilities that are not meeting desired conditions in riparian management areas or are in active floodplains.

MA-GDL-RMA-16. Wildland Fire and Fuels Management – Temporary Fire Facilities
Temporary fire facilities (e.g., incident bases, camps, staging areas, helispots, and other centers) for incident activities should be located outside riparian management areas. When no practical alternative exists, all appropriate measures to maintain, restore, or enhance aquatic and riparian-dependent resources should be used.

MA-GDL-RMA-17. Water Drafting Sites
Water drafting sites should be located and managed to minimize adverse effects on stream channel stability and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.

MA-GDL-RMA-18. Wildland Fire and Fuels Management – Fire Line Construction
Water bars on fire lines should be located and configured to minimize sediment delivery to streams and to minimize creation of new stream channels and unauthorized roads and trails.

MA-GDL-RMA-19. Wildland Fire and Fuels Management – Burning Masticated Fuels
To minimize soil damage when burning masticated fuels within riparian management areas, burning of masticated fuel beds greater than 3 inches in depth should be accomplished with moist soil conditions.

MA-GDL-RMA-20. Direct Ignition
Direct ignition in RMAs should not be used unless effects analysis demonstrates that it would not retard attainment of aquatic and riparian desired conditions.

MA-GDL-RMA-21. Hydroelectric – Existing Support Facilities
Existing support facilities that are located within riparian management areas should be operated, maintained, or removed to restore or enhance aquatic and riparian-dependent resources.

Scenic Byways

Two types of federally designated scenic byways are found on the Forest – an All-American Road and a National Forest Scenic Byway (designated by the Forest Service). The State of Washington also designated many of these byways as state scenic byways. Some roads have multiple designations.

A one-half mile distance zone on either side of the byway centerline defines the Scenic Byway Management Area.

Management direction applies only to portions of the byway within NFS lands. The Forest Supervisor authorizes management activities on the scenic byways regardless of designating authority unless especially reserved. There are three National Forest Scenic Byways, the North Pend Oreille Scenic Byway, the International Selkirk Loop, and the Sherman Pass Scenic Byway. The CNF Plan does not propose any new scenic byways. The desired condition for the Scenic Byways, in summary, is to manage for high quality natural scenery, historic and natural features with natural appearing landscapes, and enhance recreation tourism supporting the local communities. Scenic byways are to exhibit natural-appearing landscapes and provide Roaded Natural recreation settings. The only uses not suitable in Scenic Byways are Federal Energy Regulation Commission licenses or permits; above ground infrastructure, leasable minerals-surface occupancy, and saleable minerals.

More detail on CNF Plan components are provided on p.132-134 of the CNF Plan.

Wild and Scenic River

Congress designates wild and scenic rivers as part of the Wild and Scenic Rivers System under the authority of the Wild and Scenic Rivers Act, as amended (1968). Currently, there are no congressionally designated rivers on the Forest. Two rivers are eligible for designation. The South Fork Salmo River is a 5 mile long river that runs through the Salmo-Priest Wilderness and is eligible for as a wild river. A three mile section of the Kettle River is eligible as a recreational river.

Wilderness – Congressionally Designated

The Colville National Forest has one wilderness area, the Salmo-Priest. Wilderness areas are zoned using the Wilderness Resource Spectrum: pristine, primitive, semi-primitive and transition zones offer the spectrum of environmental and bio/physical settings typically found in wilderness. Due to the size, complexity and use patterns of the Salmo-Priest Wilderness, the area administered by the Colville National Forest (a portion of the Wilderness is administered by the Idaho Panhandle National Forest) is designated as "Primitive" in the Wilderness Resource Spectrum, while the outskirts are considered semi-primitive (CNF Plan p. 218, Figure F1)..

The desired conditions for Wilderness and other management direction includes:

Desired Conditions WCD

MA-DC-WCD-01. Wilderness Character
Visitor use does not negatively affect the five qualities of wilderness character (untrammeled, undeveloped, natural, opportunities for solitude or a primitive and unconfined type of recreation) or other features of value.

Wilderness boundaries are posted and visible to visitors.

There are unconfined opportunities for exploration, solitude, risk, and challenge. The non-motorized and non-mechanized trail system enhances the wilderness character. To the extent necessary, where there is public demand, outfitters and guides provide services to visitors seeking a wilderness experience.

Wilderness provides outstanding opportunities for solitude and isolation. Encounters with small groups or individuals are infrequent.

Wilderness areas maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive and/or semi-primitive non-motorized and non-mechanized recreation opportunities.

The wilderness areas are free of invasive species.

Human-caused impacts are limited to relatively small areas along trails and campsites. The ecological, geological, scientific, educational, scenic, and historical values of wilderness are preserved and perpetuated.

MA-DC-WCD-02. Human Developments
Wilderness is undeveloped except for those facilities deemed necessary for administration of the area as wilderness or essential for accommodating provisional uses.
There is little evidence of human developments (e.g., stock tanks, stock corrals, fences).
There is little or no evidence of camping activity, unauthorized trails, trash, or other human impacts on the environment. Most campsites are relatively small and accommodate one to three small tents or one large tent. Large group campsites accommodate the needs of larger groups up

to the maximum group size limit and these sites are generally out of view of focal areas such as where trails first arrive at a destination.

- Campsites generally have at least partial topographic or vegetative screening from the trail, viewpoints, or other sites.
- Vegetated areas (such as meadows) outside of campsites retain native plant communities that are not impacted.
- Social trails are the minimum necessary to access the system trail, water, other campsites, and viewpoints.

MA-DC-WCD-03. Ecological Processes
Ecological conditions are affected primarily by natural ecological processes, with the appearance of little or no human intervention.

Fire functions as a natural ecological process.

Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest.

Wilderness areas are free of invasive species.

Standards WCD

MA-STD-WCD-01. Site Impacts
Human-caused disturbed areas that negatively affect wilderness character will be rehabilitated to a natural appearance, using species or other materials native to the area.

MA-STD-WCD-02. Group Size
Do not authorize wilderness group sizes that exceed the physical capacity, the number of available campsites or the social capacity of the specific area of use. Keep the network of large group campsites at a minimum necessary to provide for the travel patterns of large groups of up to the standard maximum group size limit. At a minimum, partially screen these sites from focal areas, such as where visitors first arrive at destinations. Allow no net increase in the number of large group sites from the date this plan is implemented.

Group size limit within the Salmo-Priest Wilderness is 12 combined people and stock.

MA-STD-WCD-03. Fire
Objective(s) and strategies for all wildfires shall be identified at the time of the fire.

Fire management activities shall be conducted in a manner compatible with the overall wilderness management objectives (minimum impact suppression tactics).

Use prescribed fire only in situations that meet all of the following criteria:

- There is an unnatural buildup of fuel.
- The treatment would increase the probability of accepting naturally occurring wildfire disturbance in wilderness when treating areas outside the wilderness boundary would not fully achieve this outcome.
- Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness.

Guidelines WCD

MA-GDL-WCD-01. Campsite Development
Areas appropriate for camping should only be designated if necessary to resolve resource issues and not to accommodate increasing levels of use. Generally limit recreational site structures to one fire ring and naturally occurring rock or log seats. Authorized recreation developments (such as hitch-racks, high-lines, or site hardening) should rarely be installed. These developments should only be used where they would reduce or eliminate a proliferation of resource impacts and only in locations where other less intrusive tactics (i.e., education and enforcement) would not contain the impacts. Development should be removed when no longer serviceable or needed.

MA-GDL-WCD-02. Communication Facilities
Permanent repeaters should not be authorized in pristine wilderness resource spectrum zones. Permanent Forest Service radio repeaters may be authorized in the primitive, semi-primitive, and transition wilderness resource spectrum zones when radio dead zones within the wilderness cannot be serviced by locations outside of wilderness, and other communication devices are ineffective options due to forest cover or topography. Installation of radio repeaters should be considered only after other mitigation efforts have been tried and proved to be ineffective. Repeaters should be out of sight of trails and destination areas. Communication facilities essential for provisional uses may be co-located with Forest Service repeaters.

MA-GDL-WCD-03. Pets
Pets (such as dogs or other domestic animals that are not categorized as stock) may be authorized so long as their presence does not interfere with wildlife or contribute to resource impacts or user conflicts. Pets should be fully controlled by their owner through voice commands, a leash, or other restraint (such as a shock collar).

MA-GDL-WCD-04. Research, Studies, and Data Gathering
Non-manipulative research or data gathering may be authorized where such use is reliant on a wilderness setting, contributes to the body of science that informs wilderness management and societal understanding of the benefits of wilderness, and where the benefits to preserving wilderness character outweigh the impacts on wilderness character.

Markings should be unobtrusive and not be viewed from trails or occupied areas. Permanent markings should only be authorized when there is a long-term need to relocate the site with a high degree of precision where other technologies are not sufficient. Other than unobtrusive markings, permanent installations should not be authorized.

MA-GDL-WCD-05. Caching
Caching of equipment or supplies should not be authorized in wilderness. Waivers to this guideline may be given when all of the following criteria are met.

1. The requested cache is administratively necessary for agency use or to support a scientific study
2. The cache location is hidden from public view and is non-damaging
3. The cache has an identified date for removal at the completion of the project

MA-GDL-WCD-06. Fish and Wildlife
Wilderness is generally not suitable for the introduction of non-indigenous wildlife species. Fishless waters should not be stocked. Fish stocking can continue where it was an established practice prior to wilderness designation. Stocking should be coordinated with the state to protect wilderness character including preservation of downstream native fish and amphibian populations. Stocked fish that adversely affect native fish and wildlife populations may be removed from lakes, rivers and streams.

MA-GDL-WCD-07. Wildland Fire
Fire camps, helispots, and other temporary facilities should be located outside the wilderness boundary to protect wilderness character.
Firelines and spike camps (i.e., a remote camp usually near a fireline) should not be constructed adjacent to trails or camp areas to protect wilderness character.
Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role or to achieve wilderness desired conditions.
Wildfires should be managed for the benefit of wilderness resources. A full suppression strategy may be used where or when a wildfire:

1. has a high potential to spread outside national forest boundaries, or into areas with extensive recreation or administrative developments;
2. is not meeting wilderness objectives;
3. would adversely affect an ESA-listed species.

MA-GDL-WCD-08. Use of Live Trees
Live trees that are not listed as a threatened, endangered, or sensitive species may be used for administrative purposes such as trail bridge construction.

MA-GDL-WCD-09. Invasive Plants
Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants. Treatments would need to be carried out by measures that have the least adverse impact on the wilderness resource and are compatible with wilderness management objectives.

MA-GDL-WCD-10. Environmental Clean-Up
Environmental clean-up projects (such as mine remediation, chemical spills, aircraft recovery, building removal) should occur promptly following an activity or incident. Project design should provide a greater long-term benefit than long-term impact.

MA-GDL-WCD-11. Trail Management
New trail construction may be considered if the objective is enhancement of the wilderness character (e.g., increase solitude opportunities, restore naturalness).Trails that have minimal use, detract from the wilderness character, or cannot practically be maintained or reconstructed should be obliterated.

MA-SU-WCD-01. Suitable Uses [Suitable uses are listed in Table 4, p. 29-30 in the BA].

Wilderness – Recommended (RW)

There are 44,230 acres of RW proposed within the Pend Oreille subbasin, Abercrombie-Hooknose and Salmo-Priest Adjacent. There is an additional 17,400 acres in the Bald Snow RW for a total of 61630 acres. These areas are lands that have been identified and evaluated through the forest planning process as suited for recommendation for addition to the national wilderness preservation system. Wilderness characteristics are protected until Congress either designates the area as part of the National Wilderness Preservation System or the area is released from consideration. If Congress has not acted by the next planning effort, these areas may be further evaluated for wilderness designation.

Subject to the U.S. mining and leasing laws, recommended wilderness are open to mineral entry. Recommended wilderness must be segregated from mineral entry or withdrawn from mineral entry before congressional designation as "Wilderness." Until that time, mining claims may be filed in recommended wilderness areas. Upon designation as wilderness by Congress, designated wilderness areas are legislatively withdrawn from all mineral entry under the mining and leasing laws, subject to valid claims.

Management direction is to protect and maintain the social and ecological characteristics that provide the basis for the wilderness recommendation.

Desired Conditions RW

MA-DC-RW-01. Uses Prior to Congressional Designation
Prior to congressional designation, mountain bike and chain saw use are allowed to continue on existing trails and as long as their use does not compromise wilderness eligibility.

MA-DC-RW-02. Retention of Wilderness Characteristics
Visitor use does not reduce the five qualities of wilderness character (untrammeled, undeveloped, natural, opportunities for solitude or a primitive and unconfined type of recreation) or other features of value associated with the existing condition identified in the forest plan wilderness evaluations.

There are unconfined opportunities for exploration, solitude, risk, and challenge. The non-motorized trail system enhances the wilderness character. To the extent necessary, where there is public demand, outfitters and guides provide services to visitors seeking a backcountry experience. Recommended wilderness provides outstanding opportunities for solitude and isolation.

Recommended wilderness areas maintain natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive and/or semi-primitive non-motorized recreation opportunities.

Recommended wilderness areas are free of noxious weed species and other invasive species.

Human-caused impacts are limited to relatively small areas along trails and campsites. The ecological, geological, scientific, educational, scenic, and historical values of recommended wilderness areas are preserved and perpetuated.

MA-DC-RW-03. Natural Landscapes
Recommended wilderness areas display natural landscapes where generally only ecological changes occur (very high scenic integrity) and provide primitive or semi-primitive non-motorized recreation opportunities.

MA-DC-RW-04. Wildlife
Recommended wilderness contributes to preserving natural behaviors and processes that sustain native wildlife populations.

Standards RW

MA-STD-RW-01. Existing and Proposed Uses
Management actions must maintain the wilderness characteristics of the recommended wilderness areas that were identified in the 2009 wilderness evaluations for the Abercrombie Hooknose, Salmo-Priest Adjacent, and Bald Snow recommended wilderness areas prior to designation by Congress or release from wilderness consideration.

MA-STD-RW-02. Uses Inconsistent with Wilderness Character
Recreational mountain bike use and the use of chain saws for trail maintenance on existing National Forest System Trails are the only uses inconsistent with wilderness designation allowed in recommended wilderness. If monitoring suggests an increase of user created mountain bike trails, mountain bike use will be curtailed in recommended wilderness. See chapter 4 monitoring [in CNF Plan].

MA-STD-RW-03. Trail Use
No newly constructed National Forest System Trails will be open to uses (mechanized or motorized) that are inconsistent with wilderness designation. User created trails will be closed and naturalized to prevent resource damage. Use of trails closed to mountain biking or off-trail use by mountain bikes that cause resource damage will result in the closure of the recommended wilderness to mountain bike use.

MA-STD-RW-04. Site Impacts
Human-caused disturbed areas that negatively affect wilderness character shall be rehabilitated to a natural appearance, using species or other materials native to the area.

MA-STD-RW-03. Fire
Objective(s) and strategies for all unplanned ignitions shall be identified at the time of the fire. Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact suppression tactics).

Use planned ignitions only in situations that meet all of the following criteria—

- There is an unnatural buildup of fuel.
- The treatment would increase the probability of accepting naturally occurring fire.
- Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness.

MA-STD-RW-05. Fire (Recommended Wilderness)
Objective(s) and strategies for all unplanned ignitions shall be identified at the time of the fire. Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact suppression tactics).
Use planned ignitions only in situations that meet all of the following criteria:

1) There is an unnatural buildup of fuel.
2) The treatment would increase the probability of accepting naturally occurring fire.
3) Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness.

Guidelines RW

MA-GDL-RW-01. Wilderness Characteristics
The wilderness characteristics (untrammeled, undeveloped, natural, opportunities for solitude or a primitive and unconfined type of recreation) of each recommended wilderness should remain intact until a congressional decision on wilderness designation is made.

MA-GDL-RW-02. Trail Use
Mechanized (on existing trails only) and non-motorized travel may occur in recommended wilderness, to retain semi-primitive character, as long as semi-primitive character remains intact.

MA-GDL-RW-04. Campsite Development
Areas appropriate for camping should only be designated if necessary to resolve resource issues and not to accommodate increasing levels of use. Generally limit recreational site structures to one fire ring and naturally occurring rock or log seats. Authorized recreation developments (such as hitch-racks, high-lines, or site hardening) should rarely be installed. These developments should only be used where they would reduce or eliminate a proliferation of resource impacts and only in locations where other less intrusive tactics (i.e. education and enforcement) would not contain the impacts. Development should be removed when no longer serviceable or needed.

MA-GDL-RW-05. Pets
Pets (such as dogs or other domestic animals that are not categorized as stock) may be authorized so long as their presence does not interfere with wildlife or contribute to resource impacts or user conflicts. Pets should be fully controlled by their owner through voice commands, a leash, or other restraint (such as a shock collar).

MA-GDL-RW-06. Fire
Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role.

MA-GDL-RW-07. Use of Live Trees
Live trees may be cut for administrative purposes such as trail bridge construction.

MA-GDL-RW-08. Invasive Plants
Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants

MA-GDL-RW-09. Environmental Clean-Up
Environmental clean-up projects (such as mine remediation, chemical spills, aircraft recovery, building removal) should occur promptly following an activity or incident. Project design should provide a greater long-term benefit than long-term impact.
Suitable and non-suitable uses in RW are listed in Table 5 of the BA (p.33).

CNF Plan Components Relevant to Terrestrial Wildlife (WL)

Below are the plan components that are relevant to the recovery and conservation of federally listed wildlife species on the Colville National Forest, many of these under Wildlife Habitats in the CNF Plan. These components were based on recovery plans, critical habitat (if designated), conservation assessments and strategies, status reviews, scientific literature, and comments received from the US Fish and Wildlife Service.

<u>Desired Conditions</u>

FW-DC-WL-01. Proper Storage of Human Food, Garbage and Other Wildlife Attractants
All administrative sites, developed recreation sites, and dispersed recreation sites where garbage disposal services are provided, are equipped with animal-resistant food and waste storage devices so that food, garbage, and other attractants can be made inaccessible to wildlife.

Forest visitors are aware of the need to properly store all wildlife attractants through one-on-one contacts with campground hosts and agency employees, signage and the media. Compliance with the Forest's food storage order is increasing.

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.

FW-DC-WL-03. Habitat Conditions for all Surrogate Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.

FW-DC-WL-10. Risk Factors for all Surrogate Species
Risk factors (e.g., roads, uncharacteristic wildfire, unregulated livestock use, introduced species, invasive species, disturbance during critical time periods, etc.) for all surrogate species are reduced to contribute to the viability of surrogate species and associated species.

Guidelines

FW-GDL-WL-03. Unique Habitats
Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within recovery areas that occur on National Forest System lands should be retained in public ownership.

CNF Plan Components Specific to Woodland Caribou

Desired Condition

FW-DC-WL-07. Woodland Caribou Seasonal Habitat Components
For the desired conditions for caribou, manage toward the upper 10% of the desired conditions for vegetation in late-successional-closed forest within western hemlock/red cedar and spruce/subalpine fir, measured at the caribou management unit scale. Seasonal habitat components of well-connected, large blocks of late-successional forest provide essential habitat for caribou.

FW-DC-WL-08. Woodland Caribou Habitat – Forage Availability
Preferred lichens (Bryoria and Alectoria) are present in sufficient quantities for woodland caribou forage.

FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation
Winter recreation is managed so that woodland caribou are not displaced from suitable habitat and the caribou can make full use of existing habitat in the recovery area.

Objectives

FW-OBJ-WL-04. Restoration of Late-Successional Forest Habitat and Associated Surrogate Species.
Within 15 years of plan implementation, restore western hemlock/western red cedar vegetation types within late-successional forest habitat for surrogate wildlife species on 1,400 acres within the following watersheds: Sullivan Creek (800 acres), LeClerc (600 acres). Generally focus activity in previously treated areas that are now early to mid-successional forest to enhance large tree development.

Standards

FW-STD-WL-09. Woodland Caribou Recovery Areas – Management Activities
Management activities within lands identified as capable habitat for woodland caribou enhance or facilitate the development of suitable habitat. Management activities within stands identified as suitable habitat are avoided, except when a clear benefit of the activity to habitat conditions can be demonstrated.

FW-STD-WL-10. Woodland Caribou Recovery Area - Management and Caribou Calving
Management activities that cause disturbance shall be avoided in potential caribou calving habitat from June 1 to July 15.

FW-STD-WL-11. Woodland Caribou and Snowmobiles
Restrict over-the-snow vehicle use to designated routes within the caribou recovery area.

Monitoring

MON-FLS-01-04: Woodland caribou: management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable habitat within the caribou recovery area.

CNF Plan Components Specific to Grizzly Bear

Desired Condition

FW-DC-WL-05. Grizzly Bear Recovery Area
Key Habitat Components for Grizzly Bear.
Key grizzly bear habitat components (such as whitebark pine, riparian habitats, berry-producing shrubfields, natural meadows, and forest cover) are available within core areas and in quantities that contribute toward a recovered bear population.

FW-DC-WL-06. Grizzly Bear Recovery Area – Core Areas
The amount of core areas available to grizzly bears within each grizzly bear management unit meets that standards in Table 2 (Table 16 in CNF Plan) . Core areas are expanded where other forest access priorities/obligations can also be met.

Objectives

FW-OBJ-WL-01. Wildlife Habitats-- Proper Storage of Human Food, Garbage, and Other Wildlife Attractants.
Maintain the wildlife-resistant garbage storage devices installed in all developed campgrounds on the Colville National Forest, as needed. Within 15 years of CNF Plan implementation install at least 15 wildlife-resistant food storage lockers at developed campgrounds or heavily used dispersed campsites. Priority will be given to sites within or adjacent to the grizzly bear recovery area.

FW-OBJ-WL-03. Grizzly Bear Recovery Area Habitat Restoration.
Within 15 years of plan implementation, maintain or restore grizzly bear seasonal habitats on 900 acres in the following grizzly bear management units: LeClerc (300 acres), Salmo-Priest (300 acres), and Sullivan-Hughes (300 acres).

Standards

FW-STD-WL-07. Grizzly Bear Recovery Area -Road Densities
Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal actions shall not result in a net increase in open or total road densities above the levels in [Table 2]. Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in).

Table 2. (Table 1 in BA) - Grizzly bear habitat standards for shared GBMUs of the Colville and Idaho Panhandle National Forests.

GBMU	Max. Open Motorized Route Density >1 mi./sq.mi.	Max. Total Motorized Route Density >2 mi./sq.mi.	Mimimum Percent Core Area
Salmo-Priest (99% NFS land)	33%	26%	64%
Sullivan-Hughes (99% NFS land)	24%	19%	61%
LeClerc (64% NFS land)	37%	58%	27%

Definitions for Core Area, Open Road and Total Road are from Interagency Grizzly Bear Committee (IGBC, 1998): Core Area – areas with no motorized use of roads and trails, and restricted roads require effective physical closure devices; a minimum of 0.31 miles (500 m) from any open road or motorized trail. Open Road – a road without restriction on motorized vehicle use. Total Roads include open roads, restricted roads (a road on which motorized vehicle use is restricted seasonally or yearlong), roads not meeting all reclaimed criteria, and all motorized trails.

FW-STD-WL-08. Proper Storage of Human Food, Garbage, and Other Wildlife Attractants.
Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest. Apiaries shall not be placed where they would increase the potential for human-bear conflicts.

Guidelines

FW-GDL-WL-01. Hiding Cover for Wildlife
Where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to created openings. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments.

FW-GDL-WL-02. Proper Storage of Human Food, Garbage, and Other Wildlife Attractants
Agency employees and the public should be informed about the need to properly store food and other wildlife attractants.

FW-GDL-WL-11. Grizzly Bear Recovery Area – Forest Management Activities
Management activities (such as timber harvest, road building, blasting, etc.) and helicopter use that may displace grizzly bears should be scheduled to occur outside of the critical period of den emergence (April 1 to June 15). Administrative, motorized vehicle entries on restricted-use roads should be managed to not exceed levels prescribed by the Interagency Grizzly Bear Committee.

FW-GDL-WL-12. Grizzly Bear Recovery Area – Hiding Cover
Hiding cover for grizzly bears is defined as topography or vegetation capable of screening 90% of a bear at a distance of 200 feet. Within the grizzly bear recovery area, no point in a created opening should be farther than 600 feet from forested hiding cover. Blocks of forested cover retained within harvest units specifically for grizzly bears should be at least 600 feet across. Hiding cover should be maintained where it exists along open roads. Roadside cover can be provided by topography, or by patches of shrubs or trees retained within harvest units.

CNF Plan Components Specific to Canada Lynx

Desired Conditions

FW-DC-WL-04. Habitat Components for Canada Lynx
Forest successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel and denning components) with landscape pattern that is consistent with the historical range of variability (per FW-DC-VEG-03 and Table 5)

Objectives

FW-OBJ-WL-02. Canada Lynx Habitat Restoration
During the expected 15 years of plan implementation, restore an average of 100 acres per year of snowshoe hare and/or lynx habitat within the lynx analysis units located in the Kettle-Wedge core area.

Standards

FW-STD-WL-02. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area

Management projects shall not reduce horizontal cover (snowshoe hare habitat) in late-closed structure Subalpine fir/Lodgepole or Spruce/Subalpine fir vegetation types unless: (1) the subalpine fir/lodgepole pine or spruce/ subalpine fir vegetation types exceed Desired Conditions (historical range of variability) for late-closed structure, (2) the projects are within 200 feet of administrative sites, dwellings, out buildings, recreation sites and special use permit areas, including infrastructure within permitted ski area boundaries; or (3) for research studies or genetic tree test evaluating genetically improved reforestation stock. Lynx analysis units are used to measure changes to lynx habitat.

FW-STD-WL-03. Canada Lynx – Rate of Change within the Kettle-Wedge Lynx Core Area

Do not change more than 15 percent of lynx habitat within any single lynx analysis unit to an unsuitable condition in any 10-year period.

FW-STD-WL-04. Canada Lynx – Groomed and Designated Winter Routes within the Kettle-Wedge Lynx Core Area

Allow no net increase in groomed or designated over-the-snow routes into lynx habitat at the lynx analysis unit scale. Access to non-recreation uses, such as mineral and energy exploration and development sites, will be comprised of designated routes or designated over-the-snow routes. This does not apply to areas within permitted ski area boundaries, winter logging, trails that are rerouted for public safety, or to accessing private in-holdings.

FW-STD-WL-05. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area

When conducting vegetation management of coniferous vegetation, do not reduce the suitability of lynx habitat within a lynx analysis unit below 70 percent of the area that is capable of providing suitable lynx habitat (subalpine fir associated forest types).

FW-STD-WL-06. Canada Lynx – Tree Stem Densities in the Kettle-Wedge Lynx Core Area

Retain a minimum of 20 percent in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types within a lynx analysis unit through mechanical tree removal or prescribed burning, except within 500 feet of structures (i.e., administrative sites, dwellings, out buildings), developed recreation sites and special use permit areas (including infrastructure within permitted ski area boundaries), and along major highways and powerline corridors.

Guidelines

FW-GDL-WL-05. Canada Lynx – Vegetation Management within the Kettle-Wedge Core Area

Vegetation management activities in lynx analysis units should be focused in areas of poor snowshoe hare habitat (poorly developed understories that lack horizontal cover between 3 and 10 feet from the ground) to recruit understories that support dense, horizontal cover.

FW-GDL-WL-06. Canada Lynx – Alternative Prey within the Kettle-Wedge Core Area
Habitat for alternate prey species, primarily red squirrel, should be available in each lynx analysis unit by providing cone bearing late, closed structure conifer forests with coarse woody debris consistent with Desired Conditions for structure FW-DC-VEG-03, and snags and downed wood FW-DC-VEG-04.

FW-GDL-WL-07. Canada Lynx – Recreation and Administrative Facilities within the Kettle-Wedge Core Area
Expansion or new construction of recreation facilities and administrative facilities within a lynx analysis unit should be located in or adjacent to existing areas of development, rather than creating new developed recreation or administrative sites. Recreation developments and operations should be managed so as not to interfere with lynx movement and maintain the effectiveness of lynx habitat.

FW-GDL-WL-08. Canada Lynx – Transportation System within the Kettle-Wedge Core Area
Road reconstruction that results in increased traffic speed and volume should be avoided within lynx analysis units. New permanent roads should not be located on forested ridge-tops, saddles, close to forest stringers or in other areas important for habitat connectivity.

FW-GDL-WL-09. Canada Lynx – Habitat Connectivity within the Kettle-Wedge Core Area
Large, permanent openings (generally greater than 300 feet wide with less than 10 percent overstory canopy) should not be created in prey habitat within lynx analysis units. When temporary openings (resulting from vegetation management treatments) are proposed, adequate forested habitat should be retained between these openings and natural openings to contribute to habitat connectivity.

FW-GDL-WL-10. Canada Lynx – Kettle-Wedge Core Area - LAU adjustment
Lynx analysis unit boundaries should be adjusted based on scientific literature and coordination with the US Fish and Wildlife Service.

Other Objectives, Desired Conditions, Standards, or Guidelines in the CNF Plan that are relevant to Species Addressed in Opinion

<u>Integrated Pest Management</u>

FW-DC-IPM-01. Integrated Pest Management
Unwanted plant, animal (vertebrate and invertebrate) and pathogen species are prevented, suppressed, contained, controlled or eradicated. Native insects and plant and animal disease pathogens exist at endemic levels. Forests are managed for resilience to pests and pathogens…pest response plans are prepared, or existing plans reviewed…to facilitate rapid response to new pest outbreaks and infestations.

FW-DC-VEG-02. Insects and Diseases
Native insects, diseases, fungi, bacteria, and viruses engage in their natural (endemic) role in contributing to ecosystem processes such as pollination, food webs, decay and nutrient cycling, providing habitats, and functioning as natural control agents. Landscapes provide a patchwork of

varied structural, compositional, and successional stages that ensure the continuation of these processes.

FW-OBJ-IPM-01. Integrated Pest Management
Damaging plant, animal, insect and plant and animal disease pest outbreaks are prevented, suppressed, contained, controlled or eradicated in a timely manner in accordance with proactive pest response plans. New outbreaks are addressed within one year of detection through the life of the plan.

FW-STD-IPM-01. Integrated Pest Management
Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest.... Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species.

FW-STD-IPM-02. Pesticide Use and Risk Assessment
Pesticides (including herbicides) may be considered, as appropriate, within all management areas, to respond to native and invasive pests as part of an integrated pest management plan. Minimize use of formulations or tank mixes involving plausible harm to human health, soil organisms, water quality, non-target plants, non-target animals (including invertebrates),

amphibians or fish. Use best available science in pesticide risk assessments to inform decisions about pesticide use.

FW-GDL-IPM-01. Minimize Reliance on Pesticides
Pest management should be planned and conducted to minimize reliance on pesticides by using a combination of effective treatment options and treating pest outbreaks in a timely manner.

<u>Livestock Grazing</u>

FW-DC-LG-01. Plant Community Structure and Diversity
Riparian and upland areas within allotments reflect ecological conditions supporting the desired conditions, including those described in the Wildlife, Aquatic and Riparian, Soil, and Vegetation Desired Conditions.

FW-DC-LG-02. Economic and Social Contributions
Rangelands and forestlands provide forage for use by both livestock and wildlife. Grazing continues to be a viable use of vegetation on the Forest. Availability of lands identified as suited for this use contributes to providing animal products, economic diversity, open space, and promotes cultural values and a traditional local life style. Allotments are generally grazed on an annual basis.

Consistent with sustaining other resource desired conditions, a viable level of forage is available for use under a grazing permit system where use generally occurs on an annual basis generally between June and October. Riparian and upland areas within allotments reflect ecological conditions supporting the desired conditions, including those described in the Wildlife, Aquatic and Riparian, Soil, and Vegetation Desired Conditions.

FW-DC-LG-03. Deer and Elk Forage on Grazing Allotments
Adequate browse and forage occurs on deer and elk summer and winter ranges within commercial grazing allotments during the critical winter period of December 15 to April 1.

FW-GDL-LG-01. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments
If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey.

Lands and Special Uses (LSU)

FW-DC-LSU-01. Lands and Special Uses
Achieve a land ownership pattern and right-of-way acquisition pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land.

FW-STD-LSU-01. Land Acquisition, Conveyance, and Exchange
The Forest has a consolidated land ownership pattern that contributes to ecosystem resilience, allows reasonable public and/or Forest Service administrative access where suitable, and improves land management efficiencies. There is a downward trend in the number of isolated, non-Federal inholdings that occur within the proclaimed Forest boundaries. Congressionally designated areas lack private inholdings.

Minerals

FW-DC-MIN-01. Mineral Materials Availability
Saleable mineral materials are available to Federal, State or local governments for public works, and to the public at the discretion of the authorized officer based upon agency needs, public interest and community needs, material availability, resource protection and capability. Production and administration of mineral material would meet the demand consistent with the management of other surface resources as long as the benefits derived exceed the cost and impacts of resource disturbance.

FW-DC-MIN-02. Reclamation and Extraction
Approved mining operations include concurrent, interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats; and scenic integrity objectives.

Recreation

FW-GDL-REC-01. Recreation Opportunities
Recreation-related project-level decisions and implementation activities should be consistent with mapped classes and setting descriptions in the recreation opportunity spectrum and meet appropriate screening and scenic integrity objectives. Food and other items that attract wildlife should be managed to prevent reliance on humans and to reduce human-wildlife conflicts. Constructed features should be maintained to standard or removed when no longer needed.

FW-GDL-REC-02. Dispersed Recreation
In dispersed areas, the priority for facilities or minor developments should be access and protection of the environment, rather than the comfort or convenience of the visitors.

Kettle Crest Recreation Area (p.134 to 138 in CNF Plan).

A few of the key management components are listed below.

MA-DC-KCRA-03. Wildlife
The area contributes to conserving natural habitats and processes that sustain wildlife populations and provides opportunities to observe wildlife in their natural habitats.

MA-GDL-KCRA-03. Fire (Kettle Crest Recreation Area)
Use of planned and management of unplanned fire ignitions may be authorized. Fire should be allowed to play its natural ecological role in the semi-primitive non-motorized and semi-primitive motorized recreation opportunity spectrum classes of the KCRA. The preferred strategy for managing unplanned fires is to manage for the benefit of resources. A full suppression strategy may be used where or when a fire:
1) has a high potential to spread outside national forest boundaries, or into areas with extensive recreation or administrative developments;
2) is not meeting resource objectives;
3) would adversely affect the long-term recovery of ESA listed species.

MA-GDL-KCRA-04. Invasive Species (Kettle Crest Recreation Area)
Manual, biological, cultural, mechanical or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive species within all recreation opportunity spectrum classes of the recreation area.

CNF Plan Vegetation Management (VEG) Components Relevant to Species in Opinion

Desired Conditions

FW-DC-VEG-01. Plant Species Composition
Native species and native plant communities are the desired dominant vegetation. National Forest System lands contribute to the diversity, species composition, and structural diversity of native upland plant communities. The full range of potential natural vegetation is maintained on

the Forest where it supports plant and animal diversity including pollinators and other invertebrates, and robust ecological function.

FW-DC-VEG-02. Insects and Diseases

Native insects, diseases, fungi, bacteria, and viruses engage in their natural (endemic) role in contributing to ecosystem processes such as pollination, food webs, decay and nutrient cycling, providing habitats, and functioning as natural control agents. Landscapes provide a patchwork of varied structural, compositional, and successional stages that ensure the continuation of these processes.

FW-DC-VEG-03. Forest Structure

Forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to aesthetic settings, particularly along scenic byways and highways.

Forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. In the BA Table 14 contains desired conditions for each vegetation type.

FW-DC-VEG-05. Biological Legacies

Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem.

FW-DC-VEG-08. Threatened, Endangered and Sensitive Plant Species -- Special and Unique Habitats

Special and unique habitats support threatened, endangered, and sensitive plant species populations and contribute to high quality suitable habitat for these species. Degraded or diminished special and unique habitats are restored within their natural range of variation.

FW-DC-VEG-09. Threatened, Endangered and Sensitive Plant Species – Management-Related Disturbance

Ecological conditions and processes that sustain the habitats currently or potentially occupied by threatened, endangered, or sensitive plant species are retained or restored. The geographic distributions of sensitive plant species in the Forest Plan area are maintained. This includes sufficient seed or vegetative reproduction to maintain existing plant populations and associated native plant community biodiversity. Soil disturbance is managed to avoid degradation of threatened, endangered and sensitive plant species and their habitat as well as plant community composition, structure, and productivity.

FW-DC-VEG-10. Threatened, Endangered and Sensitive Plant Species – Habitat and Population Trends

Population trends, amount of occupied habitat, and amount of unoccupied suitable habitat are stable or increasing for threatened, endangered, and sensitive plant species.

FW-DC-VEG-11. Fuels Treatments in Wildland-urban Interface

Fuel treatments continue to reduce surface, ladder, and crown fuels that lower the potential for high-severity wildfires while providing for diversity within the stands. Generally, treated areas consist of open understories with overstory trees (conifers and hardwoods) populated by predominately fire resistant species, with scattered individual or small patches of shrubs and small trees in the understory, maintaining some cover in important wildlife corridors. Surface, ladder, and crown fuels have been treated and maintained to allow low-intensity surface wildland fires (flame lengths of 4 feet or less). Vegetation has been modified (interrupted) to improve community protection and enhance public and firefighter safety.

Crown base heights (height from the forest floor to the bottom most branches of the live tree crown) are managed to avoid crown fires. Crown cover of forest stands allow for adequate spacing between crowns to reduce crown fire potential while minimizing effects on surface wind speeds and drying of surface fuels.

<u>Standards</u>

FW-STD-VEG-02. Threatened, Endangered and Sensitive Plant Species – Surveys

Surveys for threatened, endangered, and sensitive plant species shall be conducted in suitable habitat on National Forest System lands before habitat-disturbing activities to identify and protect vulnerable populations. All existing sites are identified and managed to support rare species recovery on National Forest System lands. Suitable habitat shall be managed to enhance or maintain rare species occurrences on the Forest.

<u>Guidelines</u>

FW-GDL-VEG-01. Threatened, Endangered and Sensitive Plant Species – Disturbance in Occupied Habitat

Soil and habitat disturbance should be managed within occupied habitat to the extent practicable to maintain or enhance threatened, endangered, and sensitive plant populations and avoid invasive plant species establishment or spread. Consequently, occupied habitat should not be used for timber harvest, fuel breaks or developments associated with wildfire suppression, delivery of fire retardant or petroleum products, placement of stock-handling facilities, recreation, or special use developments. A 100-foot buffer between the occupied habitat and these management activities should be maintained, unless habitat restoration activities are designed to benefit to threatened, endangered, and sensitive plant species.

Trees in occupied habitat that are felled for safety reasons should be retained on site as needed to maintain, protect, or enhance habitat unless such action is detrimental to the threatened, endangered, and sensitive species population or habitat and represents a threat through physical impacts or potential uncharacteristic wildfire.

All new road and trail construction should be designed to avoid the occupied habitat of threatened, endangered, and sensitive plant species (minimum 100-foot buffer).

Use of prescribed fire should be avoided in occupied habitat except in areas occupied by fire-dependent or fire-tolerant species. Habitat restoration activities may proceed when designed to avoid impacts to threatened, endangered, and sensitive plant species.

Slash piles and other fuels should be managed to avoid the occupied habitat of threatened, endangered, and sensitive species (minimum 100-foot buffer).

Grazing management (including timing, intensity, duration, frequency of use, and type and class of livestock) should allow for completion of threatened, endangered, and sensitive plant species annual life cycle and development and dispersal of reproductive materials like seed and spores. Salting or water developments should not be authorized or allowed such that they reduce threatened, endangered, or sensitive plant populations.

Mining operations should be authorized or allowed only if activities are planned to avoid threatened, endangered, and sensitive plant species.

FW-GDL-VEG-02. Plant Material Collection for Conservation Purposes
Commercial or non-commercial permits or authorizations should generally be issued for collection of seed or plant materials when project objectives are consistent with rare species conservation practices (these practices could include seed storage in recognized seed banks, or collection of plant material for restoration and rehabilitation purposes, or scientific research that benefits species viability).

FW-GDL-VEG-03. Large Tree Management
Management activities should retain and generally emphasize recruitment of individual large trees (greater than 20 inches diameter at breast height) across the landscape. [Exceptions are listed in the guideline].

- Trees need to be removed to promote special plant habitats (such as, but not limited to, aspen, cottonwood, whitebark pine)

FW-GDL-VEG-04. Planned and unplanned ignitions
Use of planned and management of unplanned ignitions may be authorized. Objectives and strategies for all unplanned ignitions shall be identified at the time of the fire.

Aquatic and Riparian Conservation Strategy

The ARCS is described in detail in Appendix H of the CNF Plan, and Appendix A of this Opinion compares the ARCS to the existing direction expected under INFISH.

The BA, p 43, introduces the ARCS as follows:
The CNF Plan includes plan components for managing watersheds, riparian and aquatic habitats. Collectively these plan components; desired conditions, riparian management areas, key watersheds, standards and guidelines, objectives, and suitability, as well as a monitoring plan

comprise the Colville National Forest's ARCS that will replace the current Inland Native Fish Strategy (INFISH) (USDA Forest Service 1995) direction. Development of the ARCS is described in more detail on p.33-47 of the BA.

The five elements of the Forest's ARCS include riparian management areas, key watersheds, watershed analysis, watershed restoration, and monitoring. The following sections are from the BA p.47-50.

Riparian Management Areas (RMAs)

RMAs were previously described under Management Areas.

Key Watersheds: Protection of Population Strongholds for Listed or Proposed Species

The CNF Plan includes a network of Key Watersheds. As stated in the CNF ARCS, the key watersheds are areas that either provide, or are expected to provide, high quality habitat that will serve as source areas for threatened or endangered fish species, fish species of concern, and fish species of interest, and/or provide high quality water important to these populations downstream and/or their habitats. The key watersheds are expected to contribute to broad scale, ecosystem diversity by providing high quality habitat not only for the species of concern but for other aquatic and riparian dependent species, as well as to conserve or restore critical elements of riparian and aquatic habitat necessary for fish species habitat diversity. The key watersheds represent the fine-filter strategy of the ARCS. The key watersheds are to be managed to serve as refugia for maintaining and recovering habitat for at-risk fish populations on the Forest. The key watersheds can include areas of high quality habitat as well as areas of degraded habitat that have high potential to develop into productive habitat that can provide longer term expansion of populations and habitats. Key watershed networks should complement and support fish and water quality recovery plans. Management direction for habitat is intended to provide within key watersheds the highest relative level of protection and accepts the lowest relative level of risk from activities threatening their integrity and resiliency. CNF Plan components include desired conditions, objectives and standards specific to key watersheds.

Colville National Forest Key Watersheds

The key watershed network was developed using the protocol provided by Reiss et al. (2008). The key watershed network is expected to remain relatively unchanged for the life of the Plan. Future adjustments may be necessary based on substantial, new information (e.g. populations and trends, life history characteristics and needs, distribution and use/non-use of habitats) or new listings of species. Detail of how key watershed were selected is located in the *Fisheries Report* prepared for the Final Environmental Impact Statement (MacDonald et al. 2016).
The CNF selected bull trout, westslope cutthroat trout and interior redband trout to base the key watershed network on. All watersheds with bull trout critical habitat and greater than 25% Forest Service ownership are key watersheds. Figure 1 displays the Key Watersheds. Table 8 in the BA p.52 lists the names and other details of the key watersheds.

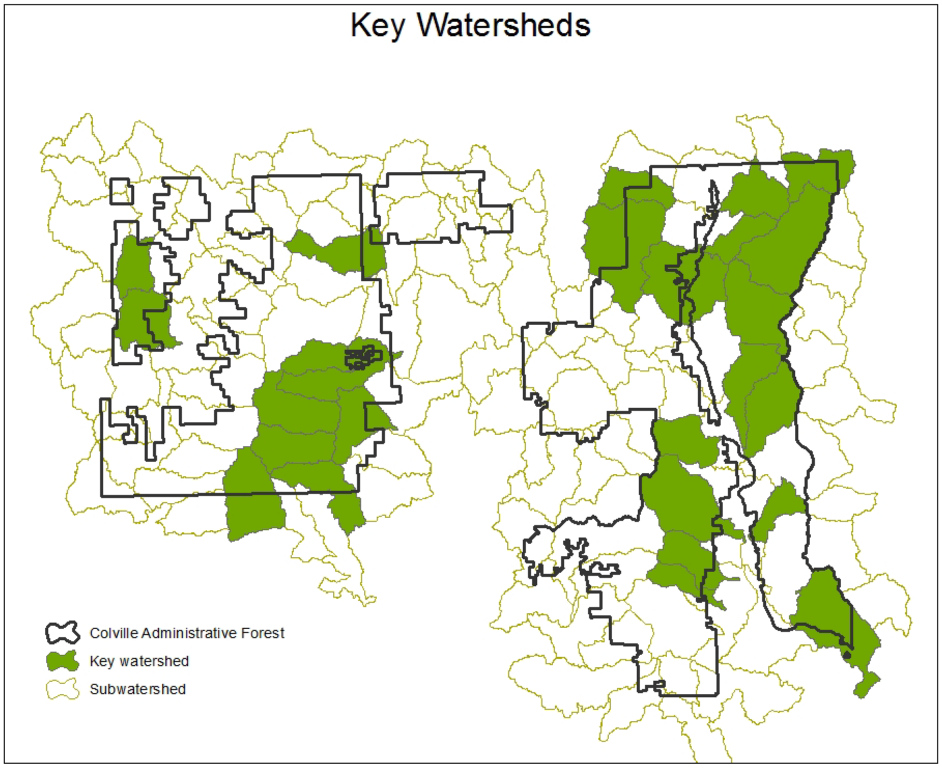


Figure 1. Revised Forest Plan Key Watersheds [Figure 2, p.52 in BA].

Key Watershed Plan Components and Restoration

The CNF Plan includes three specific desired conditions for key watersheds:

FW-DC-WR-16. Key Watershed Network
Networks of watersheds with functional habitat and functionally intact ecosystems contribute to and enhance conservation and recovery of specific threatened, endangered, and/or sensitive aquatic species and high water quality and natural flow regimes. The networks contribute to short-term conservation and long-term recovery at the Recovery Unit or other appropriate population scale.

FW-DC-WR-17. Roads in Key Watersheds
Roads in key watersheds are not a risk to the function of soil and water resources. Roads do not disrupt hydrologic or aquatic habitat function or threatened and endangered species biological and behavioral attributes.

FW-DC-WR-18. Key Watershed Integrity
Key watersheds have high watershed integrity and contribute to resilient aquatic and riparian ecosystems.

FW-DC-WR-19. Focus and Priority Watershed Network
Focus and priority watersheds contribute to the sustainability of aquatic and riparian systems and species and provide resilient, productive habitat and high water quality.

The specific objectives for Key Watersheds are:

FW-OBJ-WR-05. Key Watershed Restoration Prioritization
Management in key watersheds focuses on restoration or preservation of watershed, aquatic, and riparian function and recovery of threatened and endangered species. Improve watershed condition class in key watersheds that are a priority for restoration within 15 years of forest plan implementation. Key watersheds that are a priority for restoration include:

> East Branch LeClerc Creek, West Branch LeClerc Creek, Deadman Creek, Barnaby Creek, Harvey Creek, North Fork Deadman Creek, North Fork Sullivan Creek, Sullivan Creek, Ruby Creek, Tonata Creek, Upper Sherman Creek, and South Fork Sherman Creek subwatersheds.

Additional key watersheds that are a priority for restoration will be identified, as appropriate, through the life of the plan through theWatershed Conditioned Framework (WCF) process.

FW-OBJ-WR-06. Key Watershed Road Treatments
Reduce road-hydrologic connectivity and sediment delivery on roads through storm damage risk reduction treatments, full hydrologic decommissioning, and other accepted treatment measures on 116 miles of hydrologically connected road within 15 years of forest plan implementation. Restore or maintain aquatic organism passage and improve hydrologic and aquatic habitat function at 53 road/stream crossings for all native aquatic species, seasons, flows, and life stages in key watersheds within 15 years of forest plan implementation through culvert replacement or crossing improvement and natural channel design or other acceptable treatment measures that provide for natural stream channel function at all flows.

FW-OBJ-WR-07. Key Watershed Range Infrastructure Improvements
Improve hydrologic and aquatic function through range infrastructure improvements, including riparian fencing, movement and improvement of watering troughs, and other acceptable treatments over 240 acres within 15 years of plan implementation.

FW-OBJ-WR-08. Upland Vegetation Structure in Riparian Management Areas in Key Watersheds
Move upland vegetation within riparian management areas in key watersheds toward historic range of variability on 1,500 acres within 15 years of plan implementation.

FW-OBJ-WR-09. Stream Restoration in Key Watersheds
Restore hydrologic, geomorphic, and riparian process and function on 81 miles of stream within 15 years of forest plan implementation through activities including streambank stabilization, restoration of lateral and vertical hydrologic connectivity and improvement of stream channel and floodplain function.

Table 9, p.55-56 in BA displays the key watersheds that are priorities for restoration, and quantifies the projected restoration activities. Table 10, p.56 in the BA lists the restoration priorities in key watersheds with bull trout or critical habitat.

Finally, three standards specific to key watersheds are:

FW-STD-WR-06. Road Construction and Hydrologic Risk Reduction in Key Watersheds
In Key Watersheds and in subwatersheds with ESA critical habitat for aquatic species that are "functioning properly" with respect to roads, there will be no net increase (at least one mile of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. In Key Watersheds and in subwatersheds with ESA critical habitat for aquatic species that are "functioning-at-risk" or have impaired function with respect to roads, there will be a net decrease (for every mile of road construction there would be greater than one mile of road-related risk reduction) in system roads that affect hydrologic function to move toward proper function. Treatment priority shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction.

FW-STD-WR-07 Hydroelectric and Other Water Development Authorizations in Key Watersheds
Hydroelectric and other water development authorizations shall include requirements for in-stream 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.

FW-STD-WR-08 New Hydroelectric Facilities and Water Developments,
New hydroelectric facilities and water developments shall not be located in a key watershed unless it can be demonstrated they have minimal risks and/or no adverse effects to fish and water resources for which the key watershed was established.

<u>Multiscale Analysis</u>

The ARCS 2016 (USDA Forest Service 2016) defines multi-scale or watershed analysis as an interdisciplinary evaluation of important geomorphic and ecological processes operating in specific watersheds. This analysis (1) evaluates the condition and trend of watersheds, riparian zones and aquatic ecosystems, (2) assesses connectivity of the watershed for terrestrial and aquatic flora and fauna species, (3) identifies and evaluates resource conditions and trends, and (4) provides the context for management. Watershed analysis provides a basis for development of watershed-scale management and restoration strategies and is a tool for more specifically defining desired conditions, developing management objectives and strategies, and designing monitoring strategies. The ARCS 2008 did not include multi-scale analysis (USDA Forest Service 2008).

As discussed in ARCS 2016, watershed, or multi-scale analysis is an interdisciplinary analysis of the status and trends of watershed and aquatic ecosystem conditions, key State-designated beneficial uses of water (e.g., municipal water supply), and the hydrologic, geomorphic, and biological processes that strongly influence them. Watershed analysis is intended to guide plan implementation by providing decision-makers: 1) information to identify activities that would maintain watershed and aquatic and riparian ecological conditions or move them towards desired conditions; and 2) the context for developing projects and evaluating their consistency, via the National Environmental Policy Act process, with plan direction (i.e., desired conditions, objectives, standards, and guidelines associated with watershed and aquatic resources). This includes ensuring that management activities in Key Watersheds and RMAs maintain, restore, or enhance aquatic and riparian resources (USDA Forest Service 2016, pages 60-61).

Multiscale analysis was used during the development of the Draft Environmental Impact Statement and Plan. The current status of the focal species and watershed and habitat conditions were assessed at the subwatershed scale and discussed by subbasin. Trend in habitat conditions were reported at the Forest and subbasin scales. The current viability of the focal species' populations and the Forest Service Contribution to Viability Assessment due to CNF Plan implementation were assessed at the subbasin scale. The results of these subwatershed and subbasin assessments will be discussed further in section 5.0 (Environmental Baseline) and section 6.0 (Effects of the Action) of this BA.

In the future, assessing the status of the CNF Plan watershed desired conditions (section 2.2.5 of this BA) is to happen at multiple scales depending on the specific desired condition. The scales at which the desired conditions are assessed imply that an analysis greater than the site scale will be required during project implementation. The Forest will be using the WCF approach to landscape and watershed restoration. Mid-scale watershed analysis will be critical to identify key ecological processes influencing watershed condition and function and will be important in identifying specific protection and/or treatment objectives. The Forest will complete a Forest wide review of the WCF every 5 years. Approximately every 2-3 years the Forest will complete a Watershed Analysis and Watershed Action CNF Plan on a priority watershed.

The BA (p.58-68) provides details on the WCF, including categories and processes.

<u>Restoration Priorities and Guidance</u>

Key watersheds are a priority for restoration and specific restoration objectives have been identified for key watersheds. Additionally there are what are called Priority watersheds and Focused subwatersheds that are also expected to have restoration actions implemented. Forest Service Region 6 recognized that the most efficient and effective way to improve watershed conditions and riparian and aquatic habitat would be to work with partners to target restoration efforts in specific watersheds. In these "targeted" watersheds restoration needs are identified and restoration efforts focused on the factors degrading watershed, riparian and aquatic habitat conditions within the identified watersheds that are technically feasible and socially acceptable before moving to restore other watersheds. The Forest Service Pacific Northwest Region developed the Region 6 Aquatic Restoration Strategy (ARS; UDSA Forest Service 2007). The ARS was developed to provide guidance for watershed, riparian and aquatic habitat restoration at

a regional scale using both passive and active restoration.[11]
Through implementation of the ARS, the region prioritized basins for active restoration. Forests identified focus watersheds at the 5th field watershed (Hydrologic Unit Code (HUC)10) scale to be priorities for active watershed, riparian, and aquatic restoration. The Colville National Forest identified three focus watersheds: LeClerc-Pend Oreille River, Upper San Poil and Chewelah Creek- Colville River. Of these bull trout critical habitat is found in the LeClerc-Pend Oreille River watershed. Working with the partners, Forests are to then develop a Watershed Restoration Action Plan that identifies the needed restoration work that is technically and socially feasible.

In 2010, the national forests throughout the U.S. were mandated to assess the current condition of NFS watersheds utilizing the Watershed Condition Framework (WCF; Potyondy and Geier 2010). A full description of the WCF is available at: http://www.fs.fed.us/biology/watershed/condition_framework.html.

The results of the WCF were used to identify priority subwatersheds where focused restoration over a 5- to 10-year period would improve impaired watershed condition. Once essential projects in existing subwatersheds are completed, additional priority subwatersheds will be identified. The current CNF Focus Watersheds are the LeClerc-Pend Oreille River (HUC 171021602), The Upper Sanpoil River (HUC 1702000401) and Chewelah Creek-Colville River (HUC 1702000301). Watershed Restoration Action Plans have been prepared for the Upper and West Forks Sanpoil River, and LeClerc Creek. A Watershed Restoration Action Plan has not been completed to date for the Chewelah Creek-Colville River.

In some cases, Focus Watersheds (e.g., LeClerc Creek-Pend Oreille River) include Key Watersheds and Priority Watersheds overlap with the identified Key Watersheds (West Branch and East Branches LeClerc Creek). Specific restoration objectives have been identified for Key Watersheds in the CNF Plan and the Key Watersheds are the priority for active restoration. The Focus and Priority Watersheds that are not in the Key Watershed network are used to target implementation of short-term, opportunistic restoration work such as in subwatersheds that are a restoration priority for partners but not necessarily a priority to benefit the aquatic focal species.

CNF Plan components for the Focus and Priority watersheds include one desired condition:

FW-DC-WR-19. Focus and Priority Watershed Network
Focus and priority watersheds contribute to the sustainability of aquatic and riparian systems and species and provide resilient, productive habitat and high water quality.
There is one objective specifically for Focus and Priority watersheds:

11 Passive restoration is the broad-scale natural recovery of the ecosystem and includes coordination, analysis, planning, and design activities to maintain or improve habitat conditions while implementing projects across multiple resource areas.
Active restoration includes management actions with the specific goal of restoring the watershed processes that improve aquatic and riparian habitat function. Active restoration is focused on a more limited scale than passive restoration.

FW-OBJ-WR-10. Watershed Restoration in Focus and Priority Watersheds
Over 15 years, implement the watershed condition framework through completion of essential projects outlined in watershed action plans in existing focus and priority watersheds to improve watershed condition class. Focus watersheds designated at the 5th field watershed scale include Upper Sanpoil, Chewelah Creek-Colville River, and Le Clerc Creek-Pend Oreille River watersheds. Priority watersheds designated at the subwatershed scale include Ninemile Creek, and West Branch LeClerc Creek subwatersheds.

The CNF Plan also includes forest-wide restoration objectives for Aquatic Invasive Species (AIS), fish habitat improvement, and RMAs.

FW-OBJ-WR-01. Aquatic Invasive Species
Within the next 15 years, implement aquatic invasive species prevention measures at all developed recreation sites providing direct and/or indirect access to water bodies, such as boat ramps, campgrounds, and day use areas that provide portal zones for hand carried watercraft. Implement aquatic invasive species prevention measures as part of all aquatic survey and inventory procedures and other management activities that pose high potential for invasion vectors to occur. For guidance on invasive riparian plants see Vegetation Desired Condition section.

FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species
Within the next 15 years, implement aquatic invasive species control and eradication at 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and ecological systems are determined to be unacceptable.

FW-OBJ-WR-03. General Watershed Function and Restoration
Within the next 15 years, decrease sediment delivery from management activities on 1,000 acres including but not limited to roads, trails, livestock, unauthorized off-highway vehicle use, vegetation management, and dispersed and developed campsites. Restore hydrologic, aquatic and riparian processes through activities that stabilize stream bank erosion, and other accelerated channel destabilizing processes (i.e., headcutting), improve lateral and vertical hydrologic connectivity, and improve stream channel and floodplain function on 10 miles of streams.

FW-OBJ-WR-04. Fish Habitat Improvement
Within 15 years restore aquatic organism passage for all life stages of native species at 45 road/stream crossings and man-made instream structures such as water diversions and dams outside of key watersheds. Culverts and other passage improvements are to be designed to restore and maintain hydrologic and aquatic habitat function and stream channel resiliency to a range of flows through natural channel design and other acceptable treatment measures.

Water Resources Management Direction Applied Forest Wide

Management direction including desired conditions and standards and guidelines for RMAs and key watersheds were discussed in previously discussed. In addition to those CNF Plan components there are desired conditions and standards and guidelines that are to be applied Forest-wide included in the CNF Plan under the Water Resources Program. The Forest-wide desired conditions, standards and guidelines are to work in concert with the plan components for key watersheds and RMAs to establish the general direction and sideboards for managing for healthy watersheds and contribute to the viability of native aquatic and riparian species during Plan implementation.

In addition to the three key watershed and one focus and priority watershed desired conditions there are fifteen desired conditions that establish the goals of the plan for the ecological integrity of watersheds, riparian, and aquatic habitats. The desired conditions include a description of the scale for assessing attainment of the desired conditions.

FW-DC-WR-01. Natural Disturbance Regime of Aquatic and Riparian Systems
National Forest System lands contribute to the distribution, diversity, and resiliency of watershed and landscape-scale features, including natural disturbance regimes, of the aquatic, riparian, and wetland ecosystems to which plant and animal species, populations, and communities are adapted. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity
National Forest System lands contribute to uninterrupted physical and biological processes within and between watersheds. Floodplains, groundwater-dependent systems, upslope areas, headwater tributaries, and intact habitat refugia provide vertical, horizontal, and drainage network connections. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-dependent, and many terrestrial species of plants and animals. Subbasin scale is used for Forest planning, and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-03. Self-Sustaining Native and Aquatic and Riparian-Dependent Species
National Forest System lands contribute to habitat and ecological conditions that are capable of supporting self-sustaining populations of native aquatic and riparian-dependent plant and animal species. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat
National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning.

FW-DC-WR-05. Water Quality
National Forest System lands contribute to water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality is within the range that maintains the biological, physical, and chemical integrity and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities, and meets appropriate Washington State water quality standards. Subbasin scale is used for forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-06. Sediment Regimes
National Forest System lands contribute to the sediment regime within the natural range of variation. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport. Watershed scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-07. In-stream Flows
National Forest System lands contribute to in-stream flows and groundwater sufficient to create and sustain riparian, aquatic, and wetland habitats, retain patterns of sediment, temperature, nutrient, and wood routing, and provide for (permitted or certificated) consumptive uses. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows functions in concert with local geology, valley types, soils and geomorphology. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-08. Floodplain Inundation
National Forest System lands contribute to the timing, variability, and duration of floodplain inundation that are within the natural range of variation. Fifth field watershed or subwatershed scale is used for both Forest and project planning.

FW-DC-WR-09. Groundwater-Dependent Systems: Seeps, Springs, and Groundwater-fed Wetlands (Fens)
National Forest System lands contribute to the timing, variability, and water table elevation in groundwater-fed wetlands, seeps, springs and other groundwater-dependent systems. These features are within or moving toward proper functioning condition. Subwatershed scale is used for both Forest and project planning.

FW-DC-WR-10. Water Production for Downstream Uses
National Forest System lands produce high-quality water for downstream ecological communities (including human communities) dependent upon them. Watershed scale is used for both Forest and project planning.

FW-DC-WR-11. Native Plant Communities
National Forest System lands contribute to the species composition and structural diversity of native plant communities in riparian management areas (including wetlands). These contribute to adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration; and supply amounts and distributions of coarse woody debris and fine particulate organic matter sufficient to sustain physical complexity and

stability. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-12. Aquatic Invasive and Non-Native Species
Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native species for critical resources. Subbasin scale is used for Forest planning. Fifth field watershed or subwatershed scale is used for project planning.

FW-DC-WR-13. Aquatic Threatened, Endangered, and Sensitive Species
National Forest System lands contribute to the recovery of federally threatened and endangered aquatic species and conservation of Regional Forester's sensitive aquatic species. Aquatic habitat supports spawning, rearing, and/or other key life history requirements. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-14. Resiliency to Climate Change
Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin scale is used for Forest planning and 5th field watershed scale is used for project planning.

FW-DC-WR-15. Water Quality Standards in Source Water Protection Areas
National Forest system lands in ground and surface source water protection areas provide water that meets or exceeds state water quality standards for drinking water with appropriate treatment.

FW-STD-WR-01. Properly Functioning Watersheds
When aquatic and riparian desired conditions are being achieved and watersheds are "functioning properly", projects shall maintain those conditions. When aquatic and riparian desired conditions are not yet achieved or watersheds have impaired function or are "functioning-at-risk" 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 be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

FW-STD-WR-02. Best Management Practices
All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides.

FW-STD-WR-03. Aquatic Invasive Species - In-Water Work
Implement prevention measures for in-water projects to decrease the potential for aquatic invasive species transference into non-infested water bodies.

FW-STD-WR-04. Aquatic Invasive Species - Aquatic Resource Sampling
Aquatic sampling equipment should be disinfected prior to use in new stream or lake locations.

FW-STD-WR-05. Construction of New Roads, Trails and Developed Recreation Sites
New roads and trails will be designed to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over land drainage features. New roads, trails and developed recreation sites will integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

FW-GDL-WR-01. Aquatic Invasive Species - Wildfire Suppression Equipment
During wildfire suppression, cross contamination between streams and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident.

FW-GDL-WR-02. Aquatic Invasive Species - Early Detection and Rapid Response
Principles and processes of early detection and rapid response (EDRR) to find, identify and quantify new aquatic invasive species occurrences should be utilized. EDRR should be coupled with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species.

FW-GDL-WR-03. Watershed Restoration
Use the restoration methods that maximize the use of natural ecological processes for long-term sustainability and minimize the need for long-term maintenance.

FW-GDL-WR-04. Hydrologic Function of Roads, Trails, and Developed Recreation Sites
Roads and trails should be maintained to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over-land drainage features. Roads and trails should integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

FW-GDL-WR-05. Chemical Fire Suppression
Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by threatened, endangered, proposed, candidate, or sensitive species, or their habitats.

Monitoring / Active Management

The CNF Plan monitoring program was developed to provide feedback by testing assumptions, tracking relevant conditions over time, measuring management effectiveness, and evaluating effects of management practices. Monitoring information should enable the Forest to determine if a change in plan components or other plan management guidance may be needed, forming a basis for adaptive management.

The Plan monitoring program addresses the most critical components for informed management of the Forest's resources within the financial and technical capability of the agency. Every

monitoring question links to one or more goals, desired conditions, objectives, standards, or guidelines.

Monitoring Component: this provides a monitoring program that evaluates how the on-the-ground management is maintaining or making progress toward desired conditions and objectives of this Plan. The CNF Plan provides the items to be monitored per the monitoring and evaluation requirements found at 36 CFR 219.12 (2012 planning rule). Details on methodology, data storage, and responsibility are not considered plan components and are not included in the plan. Specific monitoring items, such as measuring frequencies, methodologies, precision, and reliability are identified in the annual monitoring guide.

Monitoring Questions: Monitoring questions ask whether management in the plan area is maintaining or progressing toward desired conditions and meeting objectives. Monitoring questions may be designed to pertain directly to desired conditions or to relate to objectives or guidelines. Monitoring information in the plan set of documents may be changed or updated as appropriate. Such changes and updates require a plan amendment or revision.
Monitoring questions identify specific CNF Plan direction to monitor and evaluate. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

Table 38 in the CNF Plan lists the monitoring questions. Several questions and indicators from the table that are relevant to the Opinion species are listed below.

<u>Vegetation Monitoring Questions</u>

MON-VEG-01
To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

MON-VEG-02
Have management activities met Plan objectives and trended towards desired conditions for invasive terrestrial plant species?

<u>Watershed Monitoring Questions</u>
MON-WTS-01: Are management actions contributing to improved watershed condition class within focus, key, and priority watersheds, and other watersheds identified for restoration?

MON-WTS-02: Are management actions reducing road impacts to watershed and aquatic habitat function and water quality within all watersheds across the Forest? Within Key, Focus, and Priority Watersheds?

MON-WTS-03: Are management actions improving key riparian processes within Riparian Management Areas?

MON-WTS-04: Are water resources and RMA standards, guidelines, and BMPs being implemented at project sites? Are standards, guidelines, and BMPs effective at achieving desired conditions?

MON-WTS-05-01: What is the status and trend of water quality?

<u>Aquatic Habitat Monitoring Questions</u>

MON-AQH-01: Are management activities across the Forest contributing to the viability of riparian and wetland-dependent TES and surrogate species?

MON-AQH-02: Are management actions improving conditions within Riparian Management Areas where livestock grazing is permitted?

MON-AQH-03: Are management actions preventing the spread of aquatic invasive species?

<u>Federally Listed Species Monitoring Questions and Indicators</u>
MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

MON-FLS-01-01: Grizzly Bear: progress toward achieving and maintaining standards for percent core area, open motorized road density (OMRD) and total motorized road density (TMRD) within the Recovery Zones.

MON-FLS-01-02: Canada lynx: changes in lynx habitat as a result of moving towards the desired conditions for vegetation through providing a mosaic of lynx habitat with landscape pattern that is consistent with the historical range of variability.

MON-FLS-01-03: Woodland caribou: maintenance of seasonal habitat components of well-connected, large blocks of late-successional forest at or above current levels.

MON-FLS-01-04: Woodland caribou: management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable habitat within the caribou recovery area.

<u>Wildlife Monitoring Questions</u>
MON-WL-01: Have management activities met plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions.

Evaluation: The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments. Evaluation reports keep the plan set of documents up to date. The CNF Plan annual and five year monitoring reports will be shared with the U.S. Fish and Wildlife Service.

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). In delineating the action area, we evaluated the farthest reaching physical, chemical, and biotic effects of the action on the environment. The action area for this proposed federal action is based on the geographic extent of the CNF and includes all federal land managed or administered by the CNF which occupies about one-third of the total area in Ferry, Pend Oreille, and Stevens Counties, Washington. The Action Area also includes non-federal lands within the outer CNF boundary. The CNF includes 1.1 million acres of national forest lands located in northeastern Washington. To the north, the Forest is border by British Columbia, the Okanogan-Wenatchee National Forest to the west, the Idaho Panhandle National Forest to the east, and to the south a portion of the Colville Confederated Tribes Indian Reservation and Pend Oreille National Wildlife Refuge.

Two north-south oriented mountain ranges comprise the bulk of the Colville National Forest. The 7,000 foot Selkirk Range lies on the eastern edge of the Forest, while the Kettle River Range lies in the western portion. The Pend Oreille River, flowing along the western edge of the Selkirk Range, is surrounded mostly by private lands. The 130 mile long Lake Roosevelt National Recreation Area, a portion of the Columbia River reservoir behind Grand Coulee Dam, divides the national forest and separates the Selkirk and Kettle mountain ranges.

ANALYTICAL FRAMEWORK FOR THE JEOPARDY AND ADVERSE MODIFICATION DETERMINATIONS

Jeopardy Determination

The following analysis relies on the following four components: (1) the *Status of the Species*, which evaluates the rangewide condition of the listed species addressed, the factors responsible for that condition, and the species' survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) *Cumulative Effects,* which evaluates the effects of future, non-federal activities in the action area on the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the effects of the proposed federal action in the context of the species' current status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of listed species in the wild. The jeopardy analysis in this Opinion emphasizes the rangewide survival and recovery needs of the listed species and the role of the action area in providing for those needs. It is within this context that we evaluate the significance of the proposed Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.

Adverse Modification Determination

Section 7(a)(2) of the ESA requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of "destruction or adverse modification of critical habitat" was published on February 11, 2016 (USFWS and NMFS 2016). The final rule became effective on March 14, 2016. The revised definition states: "Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features."

Past designations of critical habitat have used the terms "primary constituent elements" (PCEs), "physical or biological features" (PBFs) or "essential features" to characterize the key components of critical habitat that provide for the conservation of the listed species. The new critical habitat regulations (79 FR 27066) discontinue use of the terms "PCEs" or "essential features," and rely exclusively on use of the term "PBFs" for that purpose because that term is contained in the statute. However, the shift in terminology does not change the approach used in conducting a ''destruction or adverse modification'' analysis, which is the same regardless of whether the original designation identified PCEs, PBFs or essential features. For those reasons, in this biological opinion, references to PCEs or essential features should be viewed as synonymous with PBFs. All of these terms characterize the key components of critical habitat that provide for the conservation of the listed species.

Our analysis for destruction or adverse modification of critical habitat relies on the following four components: (1) the Status of Critical Habitat, which evaluates the range-wide condition of designated critical habitat for the species, in terms of essential features, PCEs, or PBFs, depending on which of these terms was relied upon in the designation, the factors responsible for that condition, and the intended recovery function of the critical habitat overall; (2) the Environmental Baseline, which evaluates the condition of the critical habitat in the action area, the factors responsible for that condition, and the recovery role of the critical habitat in the action area; (3) the Effects of the Action, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the essential features, PCEs, or PBFs and how those effects are likely to influence the recovery role of affected critical habitat units; and (4) Cumulative Effects, which evaluates the effects of future, non-Federal activities in the action area on the essential features, PCEs, or PBFs and how those effects are likely to influence the recovery role of affected critical habitat units.

For purposes of making the destruction or adverse modification finding, the effects of the proposed Federal action, together with any cumulative effects, are evaluated to determine if the critical habitat rangewide would remain functional (or retain the current ability for the PBFs to be functionally re-established in areas of currently unsuitable but capable habitat) to serve its intended conservation/recovery role for the listed species.

STATUS OF THE SPECIES

Each species addressed in this Opinion will have individual status discussions in the following sections.

ENVIRONMENTAL BASELINE (General for all species)

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated impacts of all proposed federal projects in the action area that have undergone section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress.

The following Opinion is arranged to discuss one species at a time, first the listed resources, then the unlisted species in the Conference Opinion. The environmental baseline will be discussed for each species and critical habitat. Some aspects of the baseline are common to all, for example federal projects in the action area that have undergone section 7 consultation.

Table 3 briefly describes key actions that have undergone section 7 consultation, and are either relevant to the CNF Plan management direction, or are ongoing programmatic actions.

Table 3. Previous Relevant Section 7 Consultations.

Date	USFWS Consultation Reference #	Name of Action Summary
August 20, 2007	1-9-07-I-013	Sullivan Lake Ranger District Winter Recreation Management Program Letter of concurrence for gray wolf, grizzly bear, Canada lynx, and woodland caribou
December 6, 2011	--	Effects to Listed Species from U.S. Forest Service Aerial Application of Fire Retardants on National Forest System Lands
July 1, 2013	01E0FW00-2013-F-0090	Aquatic Restoration Biological Opinion II
April 27, 2001	1-9-00-F-4	Amended biological opinion for continued implementation of the Colville National Forest Land and Resource Plan.

More detail relevant to each covered species is provided in the species-specific environmental baseline sections of the Opinion, below.

Climate Change (general for all species)

Consistent with USFWS policy, our analyses under the ESA include consideration of ongoing and projected changes in climate. The term "climate" refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2014a, pp. 119-120). The term "climate change" thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2014a, p. 119). Various types of changes in climate can have direct or indirect effects on species and critical habitats. These effects may be positive, neutral, or negative, and they may change over time. The nature of the effect depends on the species' life history, the magnitude and speed of climate change, and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2014b, pp. 64, 67-69, 94, 299). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change and its effects on species and their critical habitats. We focus in particular on how climate change affects the capability of species to successfully complete their life cycles, and the capability of critical habitats to support that outcome.

Climate Change Vulnerability of Habitats

The Final Environmental Impact Statement for the CNF Plan (United States Department of Agriculture (USDA) Forest Service (FS) review draft April 17, 2017) discusses regional climate change, and climate change in northeastern Washington as follows.

Increasing temperatures and a greater annual variation in precipitation in northeastern Washington are predicted from expected increases in anthropogenic CO_2. The Pacific Northwest has warmed, on average, 1.3 °F between 1895 and 2011, with statistically significant warming occurring in all seasons except for spring. All but five of the years from 1980 to 2011 were warmer than the 1901 to 1960 average. The trend is for continued future warming. The frost-free season (and the associated growing season) has lengthened by 35 days from 1895 to 2011 in the Pacific Northwest (Snover et al. 2013, Parks 2010). Temperature records show significant seasonal and annual decreases in the number of frost days and changes in spring minimum temperatures. Warmer spring temperatures coupled with increases in mean and variance of spring precipitation correspond strongly to earlier snowmelt, an increased number of snow-free days, and observed changes in stream flow timing and discharge (Pederson et al. 2011).

The variation in precipitation will have effects on water release timing, length of the growing season, and soil moisture conditions. Predicted increases in early season snowmelt/late season precipitation (Miller et al. 2003) (which will increase fuel loading due to greater understory growth) and hotter, drier summers have the high potential to increase wildfire activity and associated carbon emissions from forested areas (Miller and Urban 1999; Kim 2005). Research shows increases in understory biomass with amplified pollution and climate change, suggesting future increases in fire severity and fire size (Hurteau and North 2009). Climate change modelers agree that climate will become more extreme as oscillations between wet and drought conditions become more common. It is suggested that land managers not recreate a fixed pre-settlement condition, but strive for forest conditions that are more resilient and resistant to uncharacteristic disturbance impacts (North et al. 2009 and Miller et al. 2008).

There has been a general decline in snowpack; Cascade spring snowpack has declined 23 percent between 1930 and 2007. There is predicted a relatively steady loss rate of snowpack at 2.0 percent per decade, yielding a loss of 16 percent from 1930 to 2007 (Stoelinga et al. 2010). Over the past four decades, records show a tendency toward decreased snowpack with peak snow water equivalent arriving and melting out earlier. The declining snowpack will result in earlier stream flow timing, small increase in annual stream flow, increasing winter stream flow, and declining summer stream flow (Snover et al. 2013).

The final EIS for the CNF Plan (USDA FS review draft April 17, 2017) also discusses forest carbon sequestration and storage.

The Washington Department of Wildlife assessed climate change vulnerability rankings for Washington State habitats of greatest conservation need (WDFW 2015 p.5-28-31). The habitats most relevant to the species considered in this opinion include the following, with the summarized descriptions of vulnerability (From WDFW 2015 Table 5-3):

- Flooded and Swamp Forest
  Flooded and swamp forests are generally adapted to high moisture levels, making them vulnerable to projected climate changes in hydrology and fluvial processes from precipitation shifts, reduced snowpack and earlier snowmelt, drought, and altered flow regimes. Declining summer and spring stream flows, particularly when combined with drought, could reduce available water for riparian communities, affecting seedling germination and adult survival and potentially contributing to shifts to more xeric and drought-adapted vegetation. Increasing winter flood frequency and volume may also affect vegetation composition, potentially selecting for hardwoods, smaller trees, and younger age classes. Alteration of seasonal and annual flooding regimes will likely alter vegetation establishment, succession, and composition. Drought periods may exacerbate fire risk.
- Open Water
  Climate changes such as reduced glacial and snowpack runoff as well as more frequent, intense, and longer-lasting droughts may affect replenishment of open water systems. Increased water temperatures and changes in precipitation type, timing, and amount that lead to altered flow regimes and/or shifts in water supply represent important climatic stressors for open water. Warming water temperatures may cause shifts in species distribution, phenology, and life histories. Changes in precipitation type, timing, and amount may affect habitat complexity, quality, and quantity; reduce connectivity of aquatic habitats; modify food web structure or productivity; or cause range contraction and/or loss of local species.

- Temperate Forest
  Increasing temperatures, decreased moisture availability, and altered fire regimes represent the most significant climate stressors to temperate forests. Altered fire regimes appear to be the greatest threat, particularly given fire suppression practices of the past century that have led to the invasion of shade-tolerant and fire-intolerant species and/or altered forest structure and composition (i.e., increased stand density, smaller diameter trees. Warmer temperatures and decreased moisture availability may increase insect outbreaks in some temperate forests.

BULL TROUT CHAPTER
STATUS OF THE SPECIES: BULL TROUT

Taxonomy

The bull trout (*Salvelinus confluentus*) is a native char found in the coastal and intermountain west of North America. Dolly Varden (*Salvelinus malma)* and bull trout were previously considered a single species and were thought to have coastal and interior forms. However, Cavender (1978, entire) described morphometric, meristic and osteological characteristics of the two forms, and provided evidence of specific distinctions between the two. Despite an overlap in the geographic range of bull trout and Dolly Varden in the Puget Sound area and along the British Columbia coast, there is little evidence of introgression (Haas and McPhail 1991, p. 2191). The Columbia River Basin is considered the region of origin for the bull trout. From the Columbia, dispersal to other drainage systems was accomplished by marine migration and headwater stream capture. Behnke (2002, p. 297) postulated dispersion to drainages east of the continental divide may have occurred through the North and South Saskatchewan Rivers (Hudson Bay drainage) and the Yukon River system. Marine dispersal may have occurred from Puget Sound north to the Fraser, Skeena and Taku Rivers of British Columbia.

Species Description

Bull trout have unusually large heads and mouths for salmonids. Their body colors can vary tremendously depending on their environment, but are often brownish green with lighter (often ranging from pale yellow to crimson) colored spots running along their dorsa and flanks, with spots being absent on the dorsal fin, and light colored to white under bellies. They have white leading edges on their fins, as do other species of char. Bull trout have been measured as large as 103 centimeters (41 inches) in length, with weights as high as 14.5 kilograms (32 pounds) (Fishbase 2015, p. 1). Bull trout may be migratory, moving throughout large river systems, lakes, and even the ocean in coastal populations, or they may be resident, remaining in the same stream their entire lives (Rieman and McIntyre 1993, p. 2; Brenkman and Corbett 2005, p. 1077). Migratory bull trout are typically larger than resident bull trout (USFWS 1998, p. 31668).

Legal Status

The coterminous United States population of the bull trout was listed as threatened on November 1, 1999 (USFWS 1999, entire). The threatened bull trout generally occurs in the Klamath River Basin of south-central Oregon; the Jarbidge River in Nevada; the Willamette River Basin in Oregon; Pacific Coast drainages of Washington, including Puget Sound; major rivers in Idaho, Oregon, Washington, and Montana, within the Columbia River Basin; and the St. Mary-Belly River, east of the Continental Divide in northwestern Montana (Bond 1992, p. 4; Brewin and Brewin 1997, pp. 209-216; Cavender 1978, pp. 165-166; Leary and Allendorf 1997, pp. 715-720).

Throughout its range, the bull trout are threatened by the combined effects of habitat degradation, fragmentation, and alterations associated with dewatering, road construction and maintenance, mining, grazing, the blockage of migratory corridors by dams or other diversion structures, poor water quality, entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels, and introduced non-native species (USFWS 1999, p. 58910). Although all salmonids are likely to be affected by climate change, bull trout are especially vulnerable given that spawning and rearing are constrained by their location in upper watersheds and the requirement for cold water temperatures (Battin et al. 2007, entire; Rieman et al. 2007, entire; Porter and Nelitz. 2009, pages 4-8). Poaching and incidental mortality of bull trout during other targeted fisheries are additional threats.

Life History

The iteroparous reproductive strategy of bull trout has important repercussions for the management of this species. Bull trout require passage both upstream and downstream, not only for repeat spawning but also for foraging. Most fish ladders, however, were designed specifically for anadromous semelparous salmonids (fishes that spawn once and then die, and require only one-way passage upstream). Therefore, even dams or other barriers with fish passage facilities may be a factor in isolating bull trout populations if they do not provide a downstream passage route. Additionally, in some core areas, bull trout that migrate to marine waters must pass both upstream and downstream through areas with net fisheries at river mouths. This can increase the likelihood of mortality to bull trout during these spawning and foraging migrations.

Growth varies depending upon life-history strategy. Resident adults range from 6 to 12 inches total length, and migratory adults commonly reach 24 inches or more (Goetz 1989, p. 30; Pratt 1985, pp. 28-34). The largest verified bull trout is a 32-pound specimen caught in Lake Pend Oreille, Idaho, in 1949 (Simpson and Wallace 1982, p. 95).

Bull trout typically spawn from August through November during periods of increasing flows and decreasing water temperatures. Preferred spawning habitat consists of low-gradient stream reaches with loose, clean gravel (Fraley and Shepard 1989, p. 141). Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Goetz 1989, pp. 15-16; Pratt 1992, pp. 6-7; Rieman and McIntyre 1996, p. 133). Depending on water temperature, incubation is normally 100 to 145 days (Pratt 1992, p. 1). After hatching, fry remain in the substrate, and time from egg deposition to emergence may surpass 200 days. Fry normally emerge from early April through May, depending on water temperatures and increasing stream flows (Pratt 1992, p. 1; Ratliff and Howell 1992, p. 10).

Early life stages of fish, specifically the developing embryo, require the highest inter-gravel dissolved oxygen (IGDO) levels, and are the most sensitive life stage to reduced oxygen levels. The oxygen demand of embryos depends on temperature and on stage of development, with the greatest IGDO required just prior to hatching.

A literature review conducted by the Washington Department of Ecology (WDOE 2002, p. 9) indicates that adverse effects of lower oxygen concentrations on embryo survival are magnified as temperatures increase above optimal (for incubation). Normal oxygen levels seen in rivers used by bull trout during spawning ranged from 8 to 12 mg/L (in the gravel), with corresponding instream levels of 10 to 11.5 mg/L (Stewart et al. 2007, p. 10). In addition, IGDO concentrations, water velocities in the water column, and especially the intergravel flow rate, are interrelated variables that affect the survival of incubating embryos (ODEQ 1995, Ch 2 pp.

23-24). Due to a long incubation period of 220+ days, bull trout are particularly sensitive to adequate IGDO levels. An IGDO level below 8 mg/L is likely to result in mortality of eggs, embryos, and fry.

Population Dynamics

Population Structure

Bull trout exhibit both resident and migratory life history strategies. Both resident and migratory forms may be found together, and either form may produce offspring exhibiting either resident or migratory behavior (Rieman and McIntyre 1993, p. 2). Resident bull trout complete their entire life cycle in the tributary (or nearby) streams in which they spawn and rear. The resident form tends to be smaller than the migratory form at maturity and also produces fewer eggs (Goetz 1989, p. 15). Migratory bull trout spawn in tributary streams where juvenile fish rear 1 to 4 years before migrating to either a lake (adfluvial form), river (fluvial form) (Fraley and Shepard 1989, p. 138; Goetz 1989, p. 24), or saltwater (anadromous form) to rear as subadults and to live as adults (Brenkman and Corbett 2005, entire; McPhail and Baxter 1996, p. i; WDFW et al. 1997, p. 16). Bull trout normally reach sexual maturity in 4 to 7 years and may live longer than 12 years. They are iteroparous (they spawn more than once in a lifetime). Repeat- and alternate-year spawning has been reported, although repeat-spawning frequency and post-spawning mortality are not well documented (Fraley and Shepard 1989, p. 135; Leathe and Graham 1982, p. 95; Pratt 1992, p. 8; Rieman and McIntyre 1996, p. 133).

Bull trout are naturally migratory, which allows them to capitalize on temporally abundant food resources and larger downstream habitats. Resident forms may develop where barriers (either natural or manmade) occur or where foraging, migrating, or overwintering habitats for migratory fish are minimized (Brenkman and Corbett 2005, pp. 1075-1076; Goetz et al. 2004, p. 105). For example, multiple life history forms (e.g., resident and fluvial) and multiple migration patterns have been noted in the Grande Ronde River (Baxter 2002, pp. 96, 98-106). Parts of this river system have retained habitat conditions that allow free movement between spawning and rearing areas and the mainstem Snake River. Such multiple life history strategies help to maintain the stability and persistence of bull trout populations to environmental changes. Benefits to migratory bull trout include greater growth in the more productive waters of larger streams, lakes, and marine waters; greater fecundity resulting in increased reproductive potential; and dispersing the population across space and time so that spawning streams may be recolonized should local populations suffer a catastrophic loss (Frissell 1999, pp. 861-863; MBTSG 1998, p. 13; Rieman and McIntyre 1993, pp. 2-3). In the absence of the migratory bull trout life form, isolated populations cannot be replenished when disturbances make local habitats temporarily unsuitable. Therefore, the range of the species is diminished, and the potential for a greater reproductive contribution from larger size fish with higher fecundity is lost (Rieman and McIntyre 1993, p. 2).

Whitesel et al. (2004, p. 2) noted that although there are multiple resources that contribute to the subject, Spruell et al. (2003, entire) best summarized genetic information on bull trout population structure. Spruell et al. (2003, entire) analyzed 1,847 bull trout from 65 sampling locations, four located in three coastal drainages (Klamath, Queets, and Skagit Rivers), one in the Saskatchewan

River drainage (Belly River), and 60 scattered throughout the Columbia River Basin. They concluded that there is a consistent pattern among genetic studies of bull trout, regardless of whether examining allozymes, mitochondrial DNA, or most recently microsatellite loci. Typically, the genetic pattern shows relatively little genetic variation within populations, but substantial divergence among populations. Microsatellite loci analysis supports the existence of at least three major genetically differentiated groups (or evolutionary lineages) of bull trout (Spruell et al. 2003, p. 17). They were characterized as:

i. "Coastal", including the Deschutes River and all of the Columbia River drainage downstream, as well as most coastal streams in Washington, Oregon, and British Columbia. A compelling case also exists that the Klamath Basin represents a unique evolutionary lineage within the coastal group.
ii. "Snake River", which also included the John Day, Umatilla, and Walla Walla rivers. Despite close proximity of the John Day and Deschutes Rivers, a striking level of divergence between bull trout in these two systems was observed.
iii. "Upper Columbia River" which includes the entire basin in Montana and northern Idaho. A tentative assignment was made by Spruell et al. (2003, p. 25) of the Saskatchewan River drainage populations (east of the continental divide), grouping them with the upper Columbia River group.

Spruell et al. (2003, p. 17) noted that within the major assemblages, populations were further subdivided, primarily at the level of major river basins. Taylor et al. (1999, entire) surveyed bull trout populations, primarily from Canada, and found a major divergence between inland and coastal populations. Costello et al. (2003, p. 328) suggested the patterns reflected the existence of two glacial refugia, consistent with the conclusions of Spruell et al. (2003, p. 26) and the biogeographic analysis of Haas and McPhail (2001, entire). Both Taylor et al. (1999, p. 1166) and Spruell et al. (2003, p. 21) concluded that the Deschutes River represented the most upstream limit of the coastal lineage in the Columbia River Basin.

More recently, the U.S. Fish and Wildlife Service (Service) identified additional genetic units within the coastal and interior lineages (Ardren et al. 2011, p. 18). Based on a recommendation in the Service's 5-year review of the species' status (USFWS 2008a, p. 45), the Service reanalyzed the 27 recovery units identified in the draft bull trout recovery plan (USFWS 2002a, p. 48) by utilizing, in part, information from previous genetic studies and new information from additional analysis (Ardren et al. 2011, entire). In this examination, the Service applied relevant factors from the joint Service and National Marine Fisheries Service Distinct Population Segment (DPS) policy (USFWS 1996, entire) and subsequently identified six draft recovery units that contain assemblages of core areas that retain genetic and ecological integrity across the range of bull trout in the coterminous United States. These six draft recovery units were used to inform designation of critical habitat for bull trout by providing a context for deciding what habitats are essential for recovery (USFWS 2010, p. 63898). The six draft recovery units identified for bull trout in the coterminous United States include: Coastal, Klamath, Mid-Columbia, Columbia Headwaters, Saint Mary, and Upper Snake. These six draft recovery units were also identified in the Service's revised recovery plan (USFWS 2015, p. vii) and designated as final recovery units.

Population Dynamics

Although bull trout are widely distributed over a large geographic area, they exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993, p. 4). Increased habitat fragmentation reduces the amount of available habitat and increases isolation from other populations of the same species (Saunders et al. 1991, entire). Burkey (1989, entire) concluded that when species are isolated by fragmented habitats, low rates of population growth are typical in local populations and their probability of extinction is directly related to the degree of isolation and fragmentation. Without sufficient immigration, growth for local populations may be low and probability of extinction high (Burkey 1989, entire; Burkey 1995, entire). Metapopulation concepts of conservation biology theory have been suggested relative to the distribution and characteristics of bull trout, although empirical evidence is relatively scant (Rieman and McIntyre 1993, p. 15; Dunham and Rieman 1999, entire; Rieman and Dunham 2000, entire). A metapopulation is an interacting network of local populations with varying frequencies of migration and gene flow among them (Meffe and Carroll 1994, pp. 189-190). For inland bull trout, metapopulation theory is likely most applicable at the watershed scale where habitat consists of discrete patches or collections of habitat capable of supporting local populations; local populations are for the most part independent and represent discrete reproductive units; and long-term, low-rate dispersal patterns among component populations influences the persistence of at least some of the local populations (Rieman and Dunham 2000, entire). Ideally, multiple local populations distributed throughout a watershed provide a mechanism for spreading risk because the simultaneous loss of all local populations is unlikely. However, habitat alteration, primarily through the construction of impoundments, dams, and water diversions has fragmented habitats, eliminated migratory corridors, and in many cases isolated bull trout in the headwaters of tributaries (Rieman and Clayton 1997, pp. 10-12; Dunham and Rieman 1999, p. 645; Spruell et al. 1999, pp. 118-120; Rieman and Dunham 2000, p. 55).

Human-induced factors as well as natural factors affecting bull trout distribution have likely limited the expression of the metapopulation concept for bull trout to patches of habitat within the overall distribution of the species (Dunham and Rieman 1999, entire). However, despite the theoretical fit, the relatively recent and brief time period during which bull trout investigations have taken place does not provide certainty as to whether a metapopulation dynamic is occurring (e.g., a balance between local extirpations and recolonizations) across the range of the bull trout or whether the persistence of bull trout in large or closely interconnected habitat patches (Dunham and Rieman 1999, entire) is simply reflective of a general deterministic trend towards extinction of the species where the larger or interconnected patches are relics of historically wider distribution (Rieman and Dunham 2000, pp. 56-57). Recent research (Whiteley et al. 2003, entire) does, however, provide genetic evidence for the presence of a metapopulation process for bull trout, at least in the Boise River Basin of Idaho.

Habitat Characteristics

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993, p. 4). Habitat components that influence bull trout distribution and abundance include water temperature, cover, channel form and stability, valley form, spawning and rearing substrate, and migratory corridors (Fraley and Shepard 1989, entire; Goetz 1989, pp. 23, 25; Hoelscher and Bjornn 1989, pp. 19, 25; Howell and Buchanan 1992, pp. 30, 32; Pratt 1992, entire; Rich 1996, p. 17; Rieman and McIntyre 1993, pp. 4-6; Rieman and McIntyre 1995, entire; Sedell and Everest 1991, entire; Watson and Hillman 1997, entire). Watson and Hillman (1997, pp. 247-250) concluded that watersheds must have specific physical characteristics to provide the habitat requirements necessary for bull trout to successfully spawn and rear and that these specific characteristics are not necessarily present throughout these watersheds. Because bull trout exhibit a patchy distribution, even in pristine habitats (Rieman and McIntyre 1993, pp. 4-6), bull trout should not be expected to simultaneously occupy all available habitats.

Migratory corridors link seasonal habitats for all bull trout life histories. The ability to migrate is important to the persistence of bull trout (Rieman and McIntyre 1993, p. 2). Migrations facilitate gene flow among local populations when individuals from different local populations interbreed or stray to nonnatal streams. Local populations that are extirpated by catastrophic events may also become reestablished by bull trout migrants. However, it is important to note that the genetic structuring of bull trout indicates there is limited gene flow among bull trout populations, which may encourage local adaptation within individual populations, and that reestablishment of extirpated populations may take a long time (Rieman and McIntyre 1993, p. 2; Spruell et al. 1999, entire). Migration also allows bull trout to access more abundant or larger prey, which facilitates growth and reproduction. Additional benefits of migration and its relationship to foraging are discussed below under "Diet."

Cold water temperatures play an important role in determining bull trout habitat quality, as these fish are primarily found in colder streams, and spawning habitats are generally characterized by temperatures that drop below 9 °C in the fall (Fraley and Shepard 1989, p. 137; Pratt 1992, p. 5; Rieman and McIntyre 1993, p. 2).

Thermal requirements for bull trout appear to differ at different life stages. Spawning areas are often associated with cold-water springs, groundwater infiltration, and the coldest streams in a given watershed (Pratt 1992, pp 7-8; Rieman and McIntyre 1993, p. 7). Optimum incubation temperatures for bull trout eggs range from 2 °C to 6 °C whereas optimum water temperatures for rearing range from about 6 °C to 10 °C (Buchanan and Gregory 1997, p. 4; Goetz 1989, p. 22). In Granite Creek, Idaho, Bonneau and Scarnecchia (1996, entire) observed that juvenile bull trout selected the coldest water available in a plunge pool, 8 °C to 9 °C, within a temperature gradient of 8 °C to 15 °C. In a landscape study relating bull trout distribution to maximum water temperatures, Dunham et al. (2003, p. 900) found that the probability of juvenile bull trout occurrence does not become high (i.e., greater than 0.75) until maximum temperatures decline to 11 °C to 12 °C.

Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems throughout the Columbia River basin (Buchanan and Gregory 1997, p. 2; Fraley and Shepard 1989, pp. 133, 135; Rieman and McIntyre 1993, pp. 3-4; Rieman and McIntyre 1995, p. 287). Availability and proximity of cold water patches and food productivity can influence bull trout ability to survive in warmer rivers (Myrick 2002, pp. 6 and 13).

All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Fraley and Shepard 1989, p. 137; Goetz 1989, p. 19; Hoelscher and Bjornn 1989, p. 38; Pratt 1992, entire; Rich 1996, pp. 4-5; Sedell and Everest 1991, entire; Sexauer and James 1997, entire; Thomas 1992, pp. 4-6; Watson and Hillman 1997, p. 238). Maintaining bull trout habitat requires natural stability of stream channels and maintenance of natural flow patterns (Rieman and McIntyre 1993, pp. 5-6). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Sexauer and James 1997, p. 364). These areas are sensitive to activities that directly or indirectly affect stream channel stability and alter natural flow patterns. For example, altered stream flow in the fall may disrupt bull trout during the spawning period, and channel instability may decrease survival of eggs and young juveniles in the gravel from winter through spring (Fraley and Shepard 1989, p. 141; Pratt 1992, p. 6; Pratt and Huston 1993, p. 70). Pratt (1992, p. 6) indicated that increases in fine sediment reduce egg survival and emergence.

Diet

Bull trout are opportunistic feeders, with food habits primarily a function of size and life-history strategy. Fish growth depends on the quantity and quality of food that is eaten, and as fish grow their foraging strategy changes as their food changes, in quantity, size, or other characteristics (Quinn 2005, pp. 195-200). Resident and juvenile migratory bull trout prey on terrestrial and aquatic insects, macrozooplankton, and small fish (Boag 1987, p. 58; Donald and Alger 1993, pp. 242-243; Goetz 1989, pp. 33-34). Subadult and adult migratory bull trout feed on various fish species (Donald and Alger 1993, pp. 241-243; Fraley and Shepard 1989, pp. 135, 138; Leathe and Graham 1982, pp. 13, 50-56). Bull trout of all sizes other than fry have been found to eat fish half their length (Beauchamp and VanTassell 2001, p. 204). In nearshore marine areas of western Washington, bull trout feed on Pacific herring (*Clupea pallasi*), Pacific sand lance (*Ammodytes hexapterus*), and surf smelt (*Hypomesus pretiosus*) (Goetz et al. 2004, p. 105; WDFW et al. 1997, p. 23).

Bull trout migration and life history strategies are closely related to their feeding and foraging strategies. Migration allows bull trout to access optimal foraging areas and exploit a wider variety of prey resources. For example, in the Skagit River system, anadromous bull trout make migrations as long as 121 miles between marine foraging areas in Puget Sound and headwater spawning grounds, foraging on salmon eggs and juvenile salmon along their migration route (WDFW et al. 1997, p. 25). Anadromous bull trout also use marine waters as migration corridors to reach seasonal habitats in non-natal watersheds to forage and possibly overwinter (Brenkman and Corbett 2005, pp. 1078-1079; Goetz et al. 2004, entire).

Status and Distribution

<u>Distribution and Demography</u>

The historical range of bull trout includes major river basins in the Pacific Northwest at about 41 to 60 degrees North latitude, from the southern limits in the McCloud River in northern California and the Jarbidge River in Nevada to the headwaters of the Yukon River in the Northwest Territories, Canada (Cavender 1978, pp. 165-166; Bond 1992, p. 2). To the west, the bull trout's range includes Puget Sound, various coastal rivers of British Columbia, Canada, and southeast Alaska (Bond 1992, p. 2). Bull trout occur in portions of the Columbia River and tributaries within the basin, including its headwaters in Montana and Canada. Bull trout also occur in the Klamath River basin of south-central Oregon. East of the Continental Divide, bull trout are found in the headwaters of the Saskatchewan River in Alberta and Montana and in the MacKenzie River system in Alberta and British Columbia, Canada (Cavender 1978, pp. 165-166; Brewin et al. 1997, entire).

Each of the following recovery units (below) is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions. No new local populations have been identified and no local populations have been lost since listing.

Coastal Recovery Unit

The Coastal Recovery Unit is located within western Oregon and Washington. Major geographic regions include the Olympic Peninsula, Puget Sound, and Lower Columbia River basins. The Olympic Peninsula and Puget Sound geographic regions also include their associated marine waters (Puget Sound, Hood Canal, Strait of Juan de Fuca, and Pacific Coast), which are critical in supporting the anadromous[12] life history form, unique to the Coastal Recovery Unit. The Coastal Recovery Unit is also the only unit that overlaps with the distribution of Dolly Varden (*Salvelinus malma*) (Ardren et al. 2011), another native char species that looks very similar to the bull trout (Haas and McPhail 1991). The two species have likely had some level of historic introgression in this part of their range (Redenbach and Taylor 2002). The Lower Columbia River major geographic region includes the lower mainstem Columbia River, an important migratory waterway essential for providing habitat and population connectivity within this region. In the Coastal Recovery Unit, there are 21 existing bull trout core areas which have been designated, including the recently reintroduced Clackamas River population, and 4 core areas have been identified that could be re-established. Core areas within the recovery unit are distributed among these three major geographic regions (Puget Sound also includes one core area that is actually part of the lower Fraser River system in British Columbia, Canada) (USFWS 2015a, p. A-1).

The current demographic status of bull trout in the Coastal Recovery Unit is variable across the unit. Populations in the Puget Sound region generally tend to have better demographic status, followed by the Olympic Peninsula, and finally the Lower Columbia River region. However, population strongholds do exist across the three regions. The Lower Skagit River and Upper Skagit River core areas in the Puget Sound region likely contain two of the most abundant bull trout populations with some of the most intact habitat within this recovery unit. The Lower Deschutes River core area in the Lower Columbia River region also contains a very abundant bull trout population and has been used as a donor stock for re-establishing the Clackamas River population (USFWS 2015a, p. A-6).

12 Anadromous: Life history pattern of spawning and rearing in fresh water and migrating to salt water areas to mature.

Puget Sound Region

In the Puget Sound region, bull trout populations are concentrated along the eastern side of Puget Sound with most core areas concentrated in central and northern Puget Sound. Although the Chilliwack River core area is considered part of this region, it is technically connected to the Fraser River system and is transboundary with British Columbia making its distribution unique within the region. Most core areas support a mix of anadromous and fluvial life history forms, with at least two core areas containing a natural adfluvial life history (Chilliwack River core area [Chilliwack Lake] and Chester Morse Lake core area). Overall demographic status of core areas generally improves as you move from south Puget Sound to north Puget Sound. Although comprehensive trend data are lacking, the current condition of core areas within this region are likely stable overall, although some at depressed abundances. Two core areas (Puyallup River and Stillaguamish River) contain local populations at either very low abundances (Upper Puyallup and Mowich Rivers) or that have likely become locally extirpated (Upper Deer Creek, South Fork Canyon Creek, and Greenwater River). Connectivity among and within core areas of this region is generally intact. Most core areas in this region still have significant amounts of headwater habitat within protected and relatively pristine areas (e.g., North Cascades National Park, Mount Rainier National Park, Skagit Valley Provincial Park, Manning Provincial Park, and various wilderness or recreation areas) (USFWS 2015a, p. A-7).

Olympic Peninsula Region

In the Olympic Peninsula region, distribution of core areas is somewhat disjunct, with only one located on the west side of Hood Canal on the eastern side of the peninsula, two along the Strait of Juan de Fuca on the northern side of the peninsula, and three along the Pacific Coast on the western side of the peninsula. Most core areas support a mix of anadromous and fluvial life history forms, with at least one core area also supporting a natural adfluvial life history (Quinault River core area [Quinault Lake]). Demographic status of core areas is poorest in Hood Canal and Strait of Juan de Fuca, while core areas along the Pacific Coast of Washington likely have the best demographic status in this region. The connectivity between core areas in these disjunct regions is believed to be naturally low due to the geographic distance between them.

Internal connectivity is currently poor within the Skokomish River core area (Hood Canal) and is being restored in the Elwha River core area (Strait of Juan de Fuca). Most core areas in this region still have their headwater habitats within relatively protected areas (Olympic National Park and wilderness areas) (USFWS 2015a, p. A-7).

Lower Columbia River Region

In the Lower Columbia River region, the majority of core areas are distributed along the Cascade Crest on the Oregon side of the Columbia River. Only two of the seven core areas in this region are in Washington. Most core areas in the region historically supported a fluvial life history form, but many are now adfluvial due to reservoir construction. However, there is at least one core area supporting a natural adfluvial life history (Odell Lake) and one supporting a natural, isolated, resident life history (Klickitat River [West Fork Klickitat]). Status is highly variable across this region, with one relative stronghold (Lower Deschutes core area) existing on the Oregon side of the Columbia River. The Lower Columbia River region also contains three watersheds (North Santiam River, Upper Deschutes River, and White Salmon River) that could potentially become re-established core areas within the Coastal Recovery Unit. Although the South Santiam River has been identified as a historic core area, there remains uncertainty as to whether or not historical observations of bull trout represented a self-sustaining population. Current habitat conditions in the South Santiam River are thought to be unable to support bull trout spawning and rearing. Adult abundances within the majority of core areas in this region are relatively low, generally 300 or fewer individuals.

Most core populations in this region are not only isolated from one another due to dams or natural barriers, but they are internally fragmented as a result of manmade barriers. Local populations are often disconnected from one another or from potential foraging habitat. In the Coastal Recovery Unit, adult abundance may be lowest in the Hood River and Odell Lake core areas, which each contain fewer than 100 adults. Bull trout were reintroduced in the Middle Fork Willamette River in 1990 above Hills Creek Reservoir. Successful reproduction was first documented in 2006, and has occurred each year since (USFWS 2015a, p. A-8). Natural reproducing populations of bull trout are present in the McKenzie River basin (USFWS 2008d, pp. 65-67). Bull trout were more recently reintroduced into the Clackamas River basin in the summer of 2011 after an extensive feasibility analysis (Shively et al. 2007, Hudson et al. 2015). Bull trout from the Lower Deschutes core area are being utilized for this reintroduction effort (USFWS 2015a, p. A-8).

<u>Klamath Recovery Unit</u>

Bull trout in the Klamath Recovery Unit have been isolated from other bull trout populations for the past 10,000 years and are recognized as evolutionarily and genetically distinct (Minckley et al. 1986; Leary et al. 1993; Whitesel et al. 2004; USFWS 2008a; Ardren et al. 2011). As such, there is no opportunity for bull trout in another recovery unit to naturally re- colonize the Klamath Recovery Unit if it were to become extirpated. The Klamath Recovery Unit lies at the southern edge of the species range and occurs in an arid portion of the range of bull trout.
Bull trout were once widespread within the Klamath River basin (Gilbert 1897; Dambacher et al. 1992; Ziller 1992; USFWS 2002b), but habitat degradation and fragmentation, past and present land use practices, agricultural water diversions, and past fisheries management practices have greatly reduced their distribution. Bull trout abundance also has been severely reduced, and the remaining populations are highly fragmented and vulnerable to natural or manmade factors that place them at a high risk of extirpation (USFWS 2002b). The presence of nonnative brook trout (*Salvelinus fontinalis*), which compete and hybridize with bull trout, is a particular threat to bull trout persistence throughout the Klamath Recovery Unit (USFWS 2015b, pp. B-3-4).

Upper Klamath Lake Core Area

The Upper Klamath Lake core area comprises two bull trout local populations (Sun Creek and Threemile Creek). These local populations likely face an increased risk of extirpation because they are isolated and not interconnected with each other. Extirpation of other local populations in the Upper Klamath Lake core area has occurred in recent times (1970s). Populations in this core area are genetically distinct from those in the other two core areas in the Klamath Recovery Unit (USFWS 2008b), and in comparison, genetic variation within this core area is lowest. The two local populations have been isolated by habitat fragmentation and have experienced population bottlenecks. As such, currently unoccupied habitat is needed to restore connectivity between the two local populations and to establish additional populations. This unoccupied habitat includes canals, which now provide the only means of connectivity as migratory corridors. Providing full volitional connectivity for bull trout, however, also introduces the risk of invasion by brook trout, which are abundant in this core area.

Bull trout in the Upper Klamath Lake core area formerly occupied Annie Creek, Sevenmile Creek, Cherry Creek, and Fort Creek, but are now extirpated from these locations. The last remaining local populations, Sun Creek and Threemile Creek, have received focused attention. Brook trout have been removed from bull trout occupied reaches, and these reaches have been intentionally isolated to prevent brook trout reinvasion. As such, over the past few generations these populations have become stable and have increased in distribution and abundance. In 1996, the Threemile Creek population had approximately 50 fish that occupied a 1.4-km (0.9-mile) reach (USFWS 2002b). In 2012, a mark-resight population estimate was completed in Threemile Creek, which indicated an abundance of 577 (95 percent confidence interval = 475 to 679) age-1+ fish (ODFW 2012). In addition, the length of the distribution of bull trout in Threemile Creek had increased to 2.7 km (1.7 miles) by 2012 (USFWS unpublished data). Between 1989 and 2010, bull trout abundance in Sun Creek increased approximately tenfold (from approximately 133 to 1,606 age-1+ fish) and distribution increased from approximately 1.9 km (1.2 miles) to 11.2 km (7.0 miles) (Buktenica et al. 2013) (USFWS 2015b, p. B-5).

Sycan River Core Area

The Sycan River core area is comprised of one local population, Long Creek. Long Creek likely faces greater risk of extirpation because it is the only remaining local population due to extirpation of all other historic local populations. Bull trout previously occupied Calahan Creek, Coyote Creek, and the Sycan River, but are now extirpated from these locations (Light et al. 1996). This core area's local population is genetically distinct from those in the other two core areas (USFWS 2008b). This core area also is essential for recovery because bull trout in this core area exhibit both resident[13] and fluvial life histories, which are important for representing diverse life history expression in the Klamath Recovery Unit. Migratory bull trout are able to grow larger than their resident counterparts, resulting in greater fecundity and higher reproductive potential (Rieman and McIntyre 1993). Migratory life history forms also have been shown to be important for population persistence and resilience (Dunham et al. 2008).

13 Resident: Life history pattern of residing in tributary streams for the fish's entire life without migrating.

The last remaining population (Long Creek) has received focused attention in an effort to ensure it is not also extirpated. In 2006, two weirs were removed from Long Creek, which increased the amount of occupied foraging, migratory, and overwintering (FMO) habitat by 3.2 km (2.0 miles). Bull trout currently occupy approximately 3.5 km (2.2 miles) of spawning/rearing habitat, including a portion of an unnamed tributary to upper Long Creek, and seasonally use 25.9 km (16.1 miles) of FMO habitat. Brook trout also inhabit Long Creek and have been the focus of periodic removal efforts. No recent statistically rigorous population estimate has been completed for Long Creek; however, the 2002 Draft Bull Trout Recovery Plan reported a population estimate of 842 individuals (USFWS 2002b). Currently unoccupied habitat is needed to establish additional local populations, although brook trout are widespread in this core area and their management will need to be considered in future recovery efforts. In 2014, the Klamath Falls Fish and Wildlife Office of the Service established an agreement with the U.S. Geological Survey to undertake a structured decision making process to assist with recovery planning of bull trout populations in the Sycan River core area (USFWS 2015b, p. B-6).

Upper Sprague River Core Area

The Upper Sprague River core area comprises five bull trout local populations, placing the core area at an intermediate risk of extinction. The five local populations include Boulder Creek, Dixon Creek, Deming Creek, Leonard Creek, and Brownsworth Creek. These local populations may face a higher risk of extirpation because not all are interconnected. Bull trout local populations in this core area are genetically distinct from those in the other two Klamath Recovery Unit core areas (USFWS 2008b). Migratory bull trout have occasionally been observed in the North Fork Sprague River (USFWS 2002b). Therefore, this core area also is essential for recovery in that bull trout here exhibit a resident life history and likely a fluvial life history, which are important for conserving diverse life history expression in the Klamath Recovery Unit as discussed above for the Sycan River core area.

The Upper Sprague River core area population of bull trout has experienced a decline from historic levels, although less is known about historic occupancy in this core area. Bull trout are reported to have historically occupied the South Fork Sprague River, but are now extirpated from this location (Buchanan et al. 1997). The remaining five populations have received focused attention. Although brown trout (*Salmo trutta*) co-occur with bull trout and exist in adjacent habitats, brook trout do not overlap with existing bull trout populations. Efforts have been made to increase connectivity of existing bull trout populations by replacing culverts that create barriers. Thus, over the past few generations, these populations have likely been stable and increased in distribution. Population abundance has been estimated recently for Boulder Creek (372 + 62 percent; Hartill and Jacobs 2007), Dixon Creek (20 + 60 percent; Hartill and Jacobs 2007), Deming Creek (1,316 + 342; Moore 2006), and Leonard Creek (363 + 37 percent; Hartill and Jacobs 2007). No statistically rigorous population estimate has been completed for the Brownsworth Creek local population; however, the 2002 Draft Bull Trout Recovery Plan reported a population estimate of 964 individuals (USFWS 2002b). Additional local populations need to be established in currently unoccupied habitat within the Upper Sprague River core area, although brook trout are widespread in this core area and will need to be considered in future recovery efforts (USFWS 2015b, p. B-7).

Mid-Columbia Recovery Unit

The Mid-Columbia Recovery Unit (RU) comprises 24 bull trout core areas, as well as 2 historically occupied core areas and 1 research needs area. The Mid-Columbia RU is recognized as an area where bull trout have co-evolved with salmon, steelhead, lamprey, and other fish populations. Reduced fish numbers due to historic overfishing and land management changes have caused changes in nutrient abundance for resident migratory fish like the bull trout. The recovery unit is located within eastern Washington, eastern Oregon, and portions of central Idaho. Major drainages include the Methow River, Wenatchee River, Yakima River, John Day River, Umatilla River, Walla Walla River, Grande Ronde River, Imnaha River, Clearwater River, and smaller drainages along the Snake River and Columbia River (USFWS 2015c, p. C-1).

The Mid-Columbia RU can be divided into four geographic regions the Lower Mid-Columbia, which includes all core areas that flow into the Columbia River below its confluence with the 1) Snake River; 2) the Upper Mid-Columbia, which includes all core areas that flow into the Columbia River above its confluence with the Snake River; 3) the Lower Snake, which includes all core areas that flow into the Snake River between its confluence with the Columbia River and Hells Canyon Dam; and 4) the Mid-Snake, which includes all core areas in the Mid-Columbia RU that flow into the Snake River above Hells Canyon Dam. These geographic regions are composed of neighboring core areas that share similar bull trout genetic, geographic (hydrographic), and/or habitat characteristics. Conserving bull trout in geographic regions allows for the maintenance of broad representation of genetic diversity, provides neighboring core areas with potential source populations in the event of local extirpations, and provides a broad array of options among neighboring core areas to contribute recovery under uncertain environmental change (USFWS 2015c, pp. C-1-2).

The current demographic status of bull trout in the Mid-Columbia Recovery Unit is highly variable at both the RU and geographic region scale. Some core areas, such as the Umatilla, Asotin, and Powder Rivers, contain populations so depressed they are likely suffering from the deleterious effects of small population size. Conversely, strongholds do exist within the recovery unit, predominantly in the Lower Snake geographic area. Populations in the Imnaha, Little Minam, Clearwater, and Wenaha Rivers are likely some of the most abundant. These populations are all completely or partially within the bounds of protected wilderness areas and have some of the most intact habitat in the recovery unit. Status in some core areas is relatively unknown, but all indications in these core areas suggest population trends are declining, particularly in the core areas of the John Day Basin (USFWS 2015c, p. C-5).

Lower Mid-Columbia Region

In the Lower Mid-Columbia Region, core areas are distributed along the western portion of the Blue Mountains in Oregon and Washington. Only one of the six core areas is located completely in Washington. Demographic status is highly variable throughout the region. Status is the poorest in the Umatilla and Middle Fork John Day Core Areas. However, the Walla Walla River core area contains nearly pristine habitats in the headwater spawning areas and supports the most abundant populations in the region. Most core areas support both a resident and fluvial life history; however, recent evidence suggests a significant decline in the resident and fluvial life history in the Umatilla River and John Day core areas respectively. Connectivity between the core areas of the Lower Mid-Columbia Region is unlikely given conditions in the connecting FMO habitats. Connection between the Umatilla, Walla Walla and Touchet core areas is uncommon but has been documented, and connectivity is possible between core areas in the John Day Basin. Connectivity between the John Day core areas and Umatilla/Walla Walla/Touchet core areas is unlikely (USFWS 2015c, pp. C-5-6).

Upper Mid-Columbia Region

In the Upper Mid-Columbia Region, core areas are distributed along the eastern side of the Cascade Mountains in Central Washington and part of northeastern Washington. This area contains five core areas (Yakima, Wenatchee, Entiat, Methow, and South Salmo), the Lake Chelan historic core area, Northeast Washington Research Needs Area, and the Chelan River, Okanogan River, and Columbia River FMO areas. The core area populations are generally considered migratory, though they currently express both migratory (fluvial and adfluvial) and resident forms. Residents are located both above and below natural barriers (*i.e.*, Early Winters Creek above a natural falls; and Ahtanum in the Yakima likely due to long lack of connectivity from irrigation withdrawal). In terms of uniqueness and connectivity, the genetics baseline, radio-telemetry, and PIT tag studies identified unique local populations in all core areas. Movement patterns within the core areas; between the lower river, lakes, and other core areas; and between the Chelan, Okanogan, and Columbia River FMO occurs regularly for some of the Wenatchee, Entiat, and Methow core area populations. This type of connectivity has been displayed by one or more fish, typically in non-spawning movements within FMO. More recently, connectivity has been observed between the Entiat and Yakima core areas by a juvenile bull trout tagged in the Entiat moving in to the Yakima at Prosser Dam and returning at an adult size back to the Entiat. Genetics baselines identify unique populations in all four core areas (USFWS 2015c, p. C-6).

The demographic status is variable in the Upper-Mid Columbia region and ranges from good to very poor. The Service's 2008 5-year Review and Conservation Status Assessment described the Methow and Yakima Rivers at risk, with a rapidly declining trend. The Entiat River was listed at risk with a stable trend, and the Wenatchee River as having a potential risk, and with a stable trend. Currently, the Entiat River is considered to be declining rapidly due to much reduced redd counts. The Wenatchee River is able to exhibit all freshwater life histories with connectivity to Lake Wenatchee, the Wenatchee River and all its local populations, and to the Columbia River and/or other core areas in the region. In the Yakima core area some populations exhibit life history forms different from what they were historically. Migration between local populations and to and from spawning habitat is generally prevented or impeded by headwater storage dams on irrigation reservoirs, connectivity between tributaries and reservoirs, and within lower portions of spawning and rearing habitat and the mainstem Yakima River due to changed flow patterns, low instream flows, high water temperatures, and other habitat impediments. Currently, the connectivity in the Yakima Core area is truncated to the degree that not all populations are able to contribute gene flow to a functional metapopulation (USFWS 2015c, pp. C-6-7). Very little is known about the demographic status of the South Salmo Core Area. Irregular surveys conducted between 2005 and 2016, indicated multiple life stages and healthy presence.

Lower Snake Region

Demographic status is variable within the Lower Snake Region. Although trend data are lacking, several core areas in the Grande Ronde Basin and the Imnaha core area are thought to be stable. The upper Grande Ronde Core Area is the exception where population abundance is considered depressed. Wenaha, Little Minam, and Imnaha Rivers are strongholds (as mentioned above), as are most core areas in the Clearwater River basin. Most core areas contain populations that express both a resident and fluvial life history strategy. There is potential that some bull trout in the upper Wallowa River are adfluvial. There is potential for connectivity between core areas in the Grande Ronde basin, however conditions in FMO are limiting (USFWS 2015c, p. C-7).

Middle Snake Region

In the Middle Snake Region, core areas are distributed along both sides of the Snake River above Hells Canyon Dam. The Powder River and Pine Creek basins are in Oregon and Indian Creek and Wildhorse Creek are on the Idaho side of the Snake River. Demographic status of the core areas is poorest in the Powder River Core Area where populations are highly fragmented and severely depressed. The East Pine Creek population in the Pine-Indian-Wildhorse Creeks core area is likely the most abundant within the region. Populations in both core areas primarily express a resident life history strategy; however, some evidence suggests a migratory life history still exists in the Pine-Indian-Wildhorse Creeks core area. Connectivity is severely impaired in the Middle Snake Region. Dams, diversions and temperature barriers prevent movement among populations and between core areas. Brownlee Dam isolates bull trout in Wildhorse Creek from other populations (USFWS 2015c, p. C-7).

<u>Columbia Headwaters Recovery Unit</u>

The Columbia Headwaters Recovery Unit (CHRU) includes western Montana, northern Idaho, and the northeastern corner of Washington. Major drainages include the Clark Fork River basin and its Flathead River contribution, the Kootenai River basin, and the Coeur d'Alene Lake basin. In this implementation plan for the CHRU we have slightly reorganized the structure from the 2002 Draft Recovery Plan, based on latest available science and fish passage improvements that have rejoined previously fragmented habitats. We now identify 35 bull trout core areas (compared to 47 in 2002) for this recovery unit. Fifteen of the 35 are referred to as "complex" core areas as they represent large interconnected habitats, each containing multiple spawning streams considered to host separate and largely genetically identifiable local populations. The 15 complex core areas contain the majority of individual bull trout and the bulk of the designated critical habitat (USFWS 2010).

However, somewhat unique to this recovery unit is the additional presence of 20 smaller core areas, each represented by a single local population. These "simple" core areas are found in remote glaciated headwater basins, often in Glacier National Park or federally-designated wilderness areas, but occasionally also in headwater valley bottoms. Many simple core areas are upstream of waterfalls or other natural barriers to fish migration. In these simple core areas bull trout have apparently persisted for thousands of years despite small populations and isolated existence. As such, simple core areas meet the criteria for core area designation and continue to be valued for their uniqueness, despite limitations of size and scope. Collectively, the 20 simple core areas contain less than 3 percent of the total bull trout core area habitat in the CHRU, but represent significant genetic and life history diversity (Meeuwig et al. 2010). Throughout this recovery unit implementation plan, we often separate our analyses to distinguish between complex and simple core areas, both in respect to threats as well as recovery actions (USFWS 2015d, pp. D-1-2).

In order to effectively manage the recovery unit implementation plan (RUIP) structure in this large and diverse landscape, the core areas have been separated into the following five natural geographic assemblages.

Upper Clark Fork Geographic Region

Starting at the Clark Fork River headwaters, the *Upper Clark Fork Geographic Region* comprises seven complex core areas, each of which occupies one or more major watersheds contributing to the Clark Fork basin (*i.e.*, Upper Clark Fork River, Rock Creek, Blackfoot River, Clearwater River and Lakes, Bitterroot River, West Fork Bitterroot River, and Middle Clark Fork River core areas) (USFWS 2015d, p. D-2).

Lower Clark Fork Geographic Region

The seven headwater core areas flow into the *Lower Clark Fork Geographic Region*, which comprises two complex core areas, Lake Pend Oreille and Priest Lake. Because of the systematic and jurisdictional complexity (three States and a Tribal entity) and the current degree of migratory fragmentation caused by five mainstem dams, the threats and recovery actions in the Lake Pend Oreille (LPO) core area are very complex and are described in three parts. LPO-A is upstream of Cabinet Gorge Dam, almost entirely in Montana, and includes the mainstem Clark Fork River upstream to the confluence of the Flathead River as well as the portions of the lower Flathead River (*e.g.*, Jocko River) on the Flathead Indian Reservation. LPO-B is the Pend Oreille lake basin proper and its tributaries, extending between Albeni Falls Dam downstream from the outlet of Lake Pend Oreille and Cabinet Gorge Dam just upstream of the lake; almost entirely in Idaho. LPO-C is the lower basin (*i.e.*, lower Pend Oreille River), downstream of Albeni Falls Dam to Boundary Dam (1 mile upstream from the Canadian border) and bisected by Box Canyon Dam; including portions of Idaho, eastern Washington, and the Kalispel Reservation (USFWS 2015d, p. D-2).

Historically, and for current purposes of bull trout recovery, migratory connectivity among these separate fragments into a single entity remains a primary objective.

Flathead Geographic Region

The Flathead Geographic Region includes a major portion of northwestern Montana upstream of Kerr Dam on the outlet of Flathead Lake. The complex core area of Flathead Lake is the hub of this area, but other complex core areas isolated by dams are Hungry Horse Reservoir (formerly South Fork Flathead River) and Swan Lake. Within the glaciated basins of the Flathead River headwaters are 19 simple core areas, many of which lie in Glacier National Park or the Bob

Marshall and Great Bear Wilderness areas and some of which are isolated by natural barriers or other features (USFWS 2015d,
p. D-2).

Kootenai Geographic Region

To the northwest of the Flathead, in an entirely separate watershed, lies the *Kootenai Geographic Region*. The Kootenai is a uniquely patterned river system that originates in southeastern British Columbia, Canada. It dips, in a horseshoe configuration, into northwest Montana and north Idaho before turning north again to re-enter British Columbia and eventually join the Columbia River headwaters in British Columbia. The *Kootenai Geographic Region* contains two complex core areas (Lake Koocanusa and the Kootenai River) bisected since the 1970's by Libby Dam, and also a single naturally isolated simple core area (Bull Lake). Bull trout in both of the complex core areas retain strong migratory connections to populations in British Columbia (USFWS 2015d, p. D-3).

Coeur d'Alene Geographic Region

Finally, the *Coeur d'Alene Geographic Region* consists of a single, large complex core area centered on Coeur d'Alene Lake. It is grouped into the CHRU for purposes of physical and ecological similarity (adfluvial bull trout life history and nonanadromous linkage) rather than due to watershed connectivity with the rest of the CHRU, as it flows into the mid-Columbia River far downstream of the Clark Fork and Kootenai systems (USFWS 2015d, p. D-3).

<u>Upper Snake Recovery Unit</u>

The Upper Snake Recovery Unit includes portions of central Idaho, northern Nevada, and eastern Oregon. Major drainages include the Salmon River, Malheur River, Jarbidge River, Little Lost River, Boise River, Payette River, and the Weiser River. The Upper Snake Recovery Unit contains 22 bull trout core areas within 7 geographic regions or major watersheds: Salmon River (10 core areas, 123 local populations), Boise River (2 core areas, 29 local populations), Payette River (5 core areas, 25 local populations), Little Lost River (1 core area, 10 local populations), Malheur River (2 core areas, 8 local populations), Jarbidge River (1 core area, 6 local populations), and Weiser River (1 core area, 5 local populations). The Upper Snake Recovery Unit includes a total of 206 local populations, with almost 60 percent being present in the Salmon River watershed (USFWS 2015e, p. E-1).

Three major bull trout life history expressions are present in the Upper Snake Recovery Unit, adfluvial[14], fluvial[15], and resident populations. Large areas of intact habitat exist primarily in the Salmon drainage, as this is the only drainage in the Upper Snake Recovery Unit that still flows directly into the Snake River; most other drainages no longer have direct connectivity due to irrigation uses or instream barriers. Bull trout in the Salmon basin share a genetic past with bull

14 Adfluvial: Life history pattern of spawning and rearing in tributary streams and migrating to lakes or reservoirs to mature.
15 Fluvial: Life history pattern of spawning and rearing in tributary streams and migrating to larger rivers to mature.

trout elsewhere in the Upper Snake Recovery Unit. Historically, the Upper Snake Recovery Unit is believed to have largely supported the fluvial life history form; however, many core areas are now isolated or have become fragmented watersheds, resulting in replacement of the fluvial life history with resident or adfluvial forms. The Weiser River, Squaw Creek, Pahsimeroi River, and North Fork Payette River core areas contain only resident populations of bull trout (USFWS 2015e, pp. E-1-2).

Salmon River

The Salmon River basin represents one of the few basins that are still free-flowing down to the Snake River. The core areas in the Salmon River basin do not have any major dams and a large extent (approximately 89 percent) is federally managed, with large portions of the Middle Fork Salmon River and Middle Fork Salmon River - Chamberlain core areas occurring within the Frank Church River of No Return Wilderness. Most core areas in the Salmon River basin contain large populations with many occupied stream segments. The Salmon River basin contains 10 of the 22 core areas in the Upper Snake Recovery Unit and contains the majority of the occupied habitat. Over 70 percent of occupied habitat in the Upper Snake Recovery Unit occurs in the Salmon River basin as well as 123 of the 206 local populations. Connectivity between core areas in the Salmon River basin is intact; therefore it is possible for fish in the mainstem Salmon to migrate to almost any Salmon River core area or even the Snake River. Connectivity within Salmon River basin core areas is mostly intact except for the Pahsimeroi River and portions of the Lemhi River. The Upper Salmon River, Lake Creek, and Opal Lake core areas contain adfluvial populations of bull trout, while most of the remaining core areas contain fluvial populations; only the Pahsimeroi contains strictly resident populations. Most core areas appear to have increasing or stable trends but trends are not known in the Pahsimeroi, Lake Creek, or Opal Lake core areas. The Idaho Department of Fish and Game reported trend data from 7 of the 10 core areas. This trend data indicated that populations were stable or increasing in the Upper Salmon River, Lemhi River, Middle Salmon River-Chamberlain, Little Lost River, and the South Fork Salmon River (IDFG 2005, 2008). Trends were stable or decreasing in the Little-Lower Salmon River, Middle Fork Salmon River, and the Middle Salmon River-Panther (IDFG 2005, 2008).

Boise River

In the Boise River basin, two large dams are impassable barriers to upstream fish movement: Anderson Ranch Dam on the South Fork Boise River, and Arrowrock Dam on the mainstem Boise River. Fish in Anderson Ranch Reservoir have access to the South Fork Boise River upstream of the dam. Fish in Arrowrock Reservoir have access to the North Fork Boise River, Middle Fork Boise River, and lower South Fork Boise River. The Boise River basin contains 2 of the 22 core areas in the Upper Snake Recovery Unit. The core areas in the Boise River basin account for roughly 12 percent of occupied habitat in the Upper Snake Recovery Unit and contain 29 of the 206 local populations. Approximately 90 percent of both Arrowrock and Anderson Ranch core areas are federally owned; most lands are managed by the U.S. Forest Service, with some portions occurring in designated wilderness areas. Both the Arrowrock core area and the Anderson Ranch core area are isolated from other core areas. Both core areas contain fluvial bull trout that exhibit adfluvial characteristics and numerous resident populations. The Idaho Department of Fish and Game in 2014 determined that the Anderson Ranch core area had an increasing trend while trends in the Arrowrock core area is unknown (USFWS 2015e).

Payette River

The Payette River basin contains three major dams that are impassable barriers to fish: Deadwood Dam on the Deadwood River, Cascade Dam on the North Fork Payette River, and Black Canyon Reservoir on the Payette River. Only the Upper South Fork Payette River and the Middle Fork Payette River still have connectivity, the remaining core areas are isolated from each other due to dams. Both fluvial and adfluvial life history expression are still present in the Payette River basin but only resident populations are present in the Squaw Creek and North Fork Payette River core areas. The Payette River basin contains 5 of the 22 core areas and 25 of the 206 local populations in the recovery unit. Less than 9 percent of occupied habitat in the recovery unit is in this basin. Approximately 60 percent of the lands in the core areas are federally owned and the majority is managed by the U.S. Forest Service. Trend data are lacking and the current condition of the various core areas is unknown, but there is concern due to the current isolation of three (North Fork Payette River, Squaw Creek, Deadwood River) of the five core areas; the presence of only resident local populations in two (North Fork Payette River, Squaw Creek) of the five core areas; and the relatively low numbers present in the North Fork core area (USFWS 2015e, p. E-8).

Jarbidge River

The Jarbidge River core area contains two major fish barriers along the Bruneau River: the Buckaroo diversion and C. J. Strike Reservoir. Bull trout are not known to migrate down to the Snake River. There is one core area in the basin, with populations in the Jarbidge River; this watershed does not contain any barriers. Approximately 89 percent of the Jarbidge core area is federally owned. Most lands are managed by either the Forest Service or Bureau of Land Management. A large portion of the core area is within the Bruneau-Jarbidge Wilderness area. A tracking study has documented bull trout population connectivity among many of the local populations, in particular between West Fork Jarbidge River and Pine Creek. Movement between the East and West Fork Jarbidge River has also been documented; therefore both resident and fluvial populations are present. The core area contains six local populations and 3 percent of the occupied habitat in the recovery unit. Trend data are lacking within this core area (USFWS 2015e, p. E-9).

Little Lost River

The Little Lost River basin is unique in that the watershed is within a naturally occurring hydrologic sink and has no connectivity with other drainages. A small fluvial population of bull trout may still exist, but it appears that most populations are predominantly resident populations. There is one core area in the Little Lost basin, and approximately 89 percent of it is federally owned by either the U.S. Forest Service or Bureau of Land Management. The core area contains 10 local populations and less than 3 percent of the occupied habitat in the recovery unit. The current trend condition of this core area is likely stable, with most bull trout residing in Upper Sawmill Canyon (IDFG 2014).

Malheur River

The Malheur River basin contains major dams that are impassable to fish. The largest are Warm Springs Dam, impounding Warm Springs Reservoir on the mainstem Malheur River, and Agency Valley Dam, impounding Beulah Reservoir on the North Fork Malheur River. The dams result in two core areas that are isolated from each other and from other core areas. Local populations in the two core areas are limited to habitat in the upper watersheds. The Malheur River basin contains 2 of the 22 core areas and 8 of the 206 local populations in the recovery unit. Fluvial and resident populations are present in both core areas while adfluvial populations are present in the North Fork Malheur River. This basin contains less than 3 percent of the occupied habitat in the recovery unit, and approximately 60 percent of lands in the two core areas are federally owned. Trend data indicates that populations are declining in both core areas (USFWS 2015e, p. E-9).

Weiser River

The Weiser River basin contains local populations that are limited to habitat in the upper watersheds. The Weiser River basin contains only a single core area that consists of 5 of the 206 local populations in the recovery unit. Local populations occur in only three stream complexes in the upper watershed: 1) Upper Hornet Creek, 2) East Fork Weiser River, and 3) Upper Little Weiser River. These local populations include only resident life histories. This basin contains less than 2 percent of the occupied habitat in the recovery unit, and approximately 44 percent of lands are federally owned. Trend data from the Idaho Department of Fish and Game indicate that the populations in the Weiser core area are increasing (IDFG 2014) but it is considered vulnerable because local populations are isolated and likely do not express migratory life histories (USFWS 2015e, p.E-10).

<u>St. Mary Recovery Unit</u>

The Saint Mary Recovery Unit is located in northwest Montana east of the Continental Divide and includes the U.S. portions of the Saint Mary River basin, from its headwaters to the international boundary with Canada at the 49th parallel. The watershed and the bull trout population are linked to downstream aquatic resources in southern Alberta, Canada; the U.S. portion includes headwater spawning and rearing (SR) habitat in the tributaries and a portion of the FMO habitat in the mainstem of the Saint Mary River and Saint Mary lakes (Mogen and Kaeding 2001).

The Saint Mary Recovery Unit comprises four core areas; only one (Saint Mary River) is a complex core area with five described local bull trout populations (Divide, Boulder, Kennedy, Otatso, and Lee Creeks). Roughly half of the linear extent of available FMO habitat in the mainstem Saint Mary system (between Saint Mary Falls at the upstream end and the downstream Canadian border) is comprised of Saint Mary and Lower Saint Mary Lakes, with the remainder in the Saint Mary River. The other three core areas (Slide Lakes, Cracker Lake, and Red Eagle Lake) are simple core areas. Slide Lakes and Cracker Lake occur upstream of seasonal or permanent barriers and are comprised of genetically isolated single local bull trout populations, wholly within Glacier National Park, Montana. In the case of Red Eagle Lake, physical isolation does not occur, but consistent with other lakes in the adjacent Columbia Headwaters Recovery Unit, there is likely some degree of spatial separation from downstream Saint Mary Lake. As noted, the extent of isolation has been identified as a research need (USFWS 2015f, p. F-1). Bull trout in the Saint Mary River complex core area are documented to exhibit primarily the migratory fluvial life history form (Mogen and Kaeding 2005a, 2005b), but there is doubtless some occupancy (though less well documented) of Saint Mary Lakes, suggesting a partly adfluvial adaptation. Since lake trout and northern pike are both native to the Saint Mary River system (headwaters of the South Saskatchewan River drainage draining to Hudson Bay), the conventional wisdom is that these large piscivores historically outcompeted bull trout in the lacustrine environment (Donald and Alger 1993, Martinez et al. 2009), resulting in a primarily fluvial niche and existence for bull trout in this system. This is an untested hypothesis and additional research into this aspect is needed (USFWS 2015f, p. F-3).

Bull trout populations in the simple core areas of the three headwater lake systems (Slide, Cracker, and Red Eagle Lakes) are, by definition, adfluvial; there are also resident life history components in portions of the Saint Mary River system such as Lower Otatso Creek (Mogen and Kaeding 2005a), further exemplifying the overall life history diversity typical of bull trout. Mogen and Kaeding (2001) reported that bull trout continue to inhabit nearly all suitable habitats accessible to them in the Saint Mary River basin in the United States. The possible exception is portions of Divide Creek, which appears to be intermittently occupied despite a lack of permanent migratory barriers, possibly due to low population size and erratic year class production (USFWS 2015f, p. F-3).

It should be noted that bull trout are found in minor portions of two additional U.S. watersheds (Belly and Waterton rivers) that were once included in the original draft recovery plan (USFWS 2002) but are no longer considered core areas in the final recovery plan (USFWS 2015) and are not addressed in that document. In Alberta, Canada, the Saint Mary River bull trout population is considered at “high risk,” while the Belly River is rated as “at risk” (ACA 2009). In the Belly River drainage, which enters the South Saskatchewan system downstream of the Saint Mary River in Alberta, some bull trout spawning is known to occur on either side of the international boundary. These waters are in the drainage immediately west of the Saint Mary River headwaters. However, the U.S. range of this population constitutes only a minor headwater migratory spawning rearing segment of an otherwise wholly Canadian population, extending less than 1 mile (0.6 km) into backcountry waters of Glacier National Park. The Belly River population is otherwise totally dependent on management within Canadian jurisdiction, with no natural migratory connection to the Saint Mary (USFWS 2015f, p. F-3).

Current status of bull trout in the Saint Mary River core area (U.S.) is considered strong (Mogen 2013). Migratory bull trout redd counts are conducted annually in the two major SR streams, Boulder and Kennedy creeks. Boulder Creek redd counts have ranged from 33 to 66 in the past decade, with the last 4 counts all 53 or higher. Kennedy Creek redd counts are less robust, ranging from 5 to 25 over the last decade, with a 2014 count of 20 (USFWS 2015f, p. F-3). Generally, the demographic status of the Saint Mary River core area is believed to be good, with the exception of the Divide Creek local population. In this local population, there is evidence that a combination of ongoing habitat manipulation (Smillie and Ellerbroek 1991,F-5 NPS 1992) resulting in occasional historical passage issues, combined with low and erratic recruitment (DeHaan et al. 2011) has caused concern for the continuing existence of the local population. While less is known about the demographic status of the three simple cores where redd counts are not conducted, all three appear to be self-sustaining and fluctuating within known historical population demographic bounds. Of the three simple core areas, demographic status in Slide Lakes and Cracker Lake appear to be functioning appropriately, but the demographic status in Red Eagle Lake is less well documented and believed to be less robust (USFWS 2015f, p. F-3).

Reasons for Listing

Bull trout distribution, abundance, and habitat quality have declined rangewide (Bond 1992, pp. 2-3; Schill 1992, p. 42; Thomas 1992, entire; Ziller 1992, entire; Rieman and McIntyre 1993, p. 1; Newton and Pribyl 1994, pp. 4-5; McPhail and Baxter 1996, p. 1). Several local extirpations have been documented, beginning in the 1950s (Rode 1990, pp. 26-32; Ratliff and Howell 1992, entire; Donald and Alger 1993, entire; Goetz 1994, p. 1; Newton and Pribyl 1994, pp. 8-9; Light et al. 1996, pp. 6-7; Buchanan et al. 1997, p. 15; WDFW 1998, pp. 2-3). Bull trout were extirpated from the southernmost portion of their historic range, the McCloud River in California, around 1975 (Rode 1990, p. 32). Bull trout have been functionally extirpated (i.e., few individuals may occur there but do not constitute a viable population) in the Coeur d'Alene River basin in Idaho and in the Lake Chelan and Okanogan River basins in Washington (USFWS 1998, pp. 31651-31652).

These declines result from the combined effects of habitat degradation and fragmentation, the blockage of migratory corridors; poor water quality, angler harvest and poaching, entrainment (process by which aquatic organisms are pulled through a diversion or other device) into diversion channels and dams, and introduced nonnative species. Specific land and water management activities that depress bull trout populations and degrade habitat include the effects of dams and other diversion structures, forest management practices, livestock grazing, agriculture, agricultural diversions, road construction and maintenance, mining, and urban and rural development (Beschta et al. 1987, entire; Chamberlain et al. 1991, entire; Furniss et al. 1991, entire; Meehan 1991, entire; Nehlsen et al. 1991, entire; Sedell and Everest 1991, entire; Craig and Wissmar 1993pp, 18-19; Henjum et al. 1994, pp. 5-6; McIntosh et al. 1994, entire;

Wissmar et al. 1994, entire; MBTSG 1995a, p. 1; MBTSG 1995b. pp. i-ii; MBTSG 1995c, pp. i-ii; MBTSG 1995d, p. 22; MBTSG 1995e, p. i; MBTSG 1996a, p. i-ii; MBTSG 1996b, p. i; MBTSG 1996c, p. i; MBTSG 1996d, p. i; MBTSG 1996e, p. i; MBTSG 1996f, p. 11; Light et al. 1996, pp. 6-7; USDA and USDI 1995, p. 2).

Emerging Threats

Climate Change

Climate change was not addressed as a known threat when bull trout was listed. The 2015 bull trout recovery plan and RUIPs summarize the threat of climate change and acknowledges that some extant bull trout core area habitats will likely change (and may be lost) over time due to anthropogenic climate change effects, and use of best available information will ensure future conservation efforts that offer the greatest long-term benefit to sustain bull trout and their required coldwater habitats (USFWS 2015, p. vii, and pp. 17-20, USFWS 2015a-f).
Global climate change and the related warming of global climate have been well documented (IPCC 2007, entire; ISAB 2007, entire; Combes 2003, entire). Evidence of global climate change/warming includes widespread increases in average air and ocean temperatures and accelerated melting of glaciers, and rising sea level. Given the increasing certainty that climate change is occurring and is accelerating (IPCC 2007, p. 253; Battin et al. 2007, p. 6720), we can no longer assume that climate conditions in the future will resemble those in the past.

Patterns consistent with changes in climate have already been observed in the range of many species and in a wide range of environmental trends (ISAB 2007, entire; Hari et al. 2006, entire; Rieman et al. 2007, entire). In the northern hemisphere, the duration of ice cover over lakes and rivers has decreased by almost 20 days since the mid-1800's (Magnuson et al. 2000, p. 1743). The range of many species has shifted poleward and elevationally upward. For cold-water associated salmonids in mountainous regions, where their upper distribution is often limited by impassable barriers, an upward thermal shift in suitable habitat can result in a reduction in range, which in turn can lead to a population decline (Hari et al. 2006, entire).

In the Pacific Northwest, most models project warmer air temperatures and increases in winter precipitation and decreases in summer precipitation. Warmer temperatures will lead to more precipitation falling as rain rather than snow. As the seasonal amount of snow pack diminishes, the timing and volume of stream flow are likely to change and peak river flows are likely to increase in affected areas. Higher air temperatures are also likely to increase water temperatures (ISAB 2007, pp. 15-17). For example, stream gauge data from western Washington over the past 5 to 25 years indicate a marked increasing trend in water temperatures in most major rivers. Climate change has the potential to profoundly alter the aquatic ecosystems upon which the bull trout depends via alterations in water yield, peak flows, and stream temperature, and an increase in the frequency and magnitude of catastrophic wildfires in adjacent terrestrial habitats (Bisson et al. 2003, pp 216-217).

All life stages of the bull trout rely on cold water. Increasing air temperatures are likely to impact the availability of suitable cold water habitat. For example, ground water temperature is generally correlated with mean annual air temperature, and has been shown to strongly influence the distribution of other chars. Ground water temperature is linked to bull trout selection of spawning sites, and has been shown to influence the survival of embryos and early juvenile rearing of bull trout (Baxter 1997, p. 82). Increases in air temperature are likely to be reflected in increases in both surface and groundwater temperatures.

Climate change is likely to affect the frequency and magnitude of fires, especially in warmer drier areas such as are found on the eastside of the Cascade Mountains. Bisson et al. (2003, pp. 216-217) note that the forest that naturally occurred in a particular area may or may not be the forest that will be responding to the fire regimes of an altered climate. In several studies related to the effect of large fires on bull trout populations, bull trout appear to have adapted to past fire disturbances through mechanisms such as dispersal and plasticity. However, as stated earlier, the future may well be different than the past and extreme fire events may have a dramatic effect on bull trout and other aquatic species, especially in the context of continued habitat loss, simplification and fragmentation of aquatic systems, and the introduction and expansion of exotic species (Bisson et al. 2003, pp. 218-219).

Migratory bull trout can be found in lakes, large rivers and marine waters. Effects of climate change on lakes are likely to impact migratory adfluvial bull trout that seasonally rely upon lakes for their greater availability of prey and access to tributaries. Climate-warming impacts to lakes will likely lead to longer periods of thermal stratification and coldwater fish such as adfluvial bull trout will be restricted to these bottom layers for greater periods of time. Deeper thermoclines resulting from climate change may further reduce the area of suitable temperatures in the bottom layers and intensify competition for food (Shuter and Meisner 1992. p. 11).
Bull trout require very cold water for spawning and incubation. Suitable spawning habitat is often found in accessible higher elevation tributaries and headwaters of rivers. However, impacts on hydrology associated with climate change are related to shifts in timing, magnitude and distribution of peak flows that are also likely to be most pronounced in these high elevation stream basins (Battin et al. 2007, p. 6720). The increased magnitude of winter peak flows in high elevation areas is likely to impact the location, timing, and success of spawning and incubation for the bull trout and Pacific salmon species. Although lower elevation river reaches are not expected to experience as severe an impact from alterations in stream hydrology, they are unlikely to provide suitably cold temperatures for bull trout spawning, incubation and juvenile rearing.

As climate change progresses and stream temperatures warm, thermal refugia will be critical to the persistence of many bull trout populations. Thermal refugia are important for providing bull trout with patches of suitable habitat during migration through or to make feeding forays into areas with greater than optimal temperatures.

There is still a great deal of uncertainty associated with predictions relative to the timing, location, and magnitude of future climate change. It is also likely that the intensity of effects will vary by region (ISAB 2007, p 7) although the scale of that variation may exceed that of States. For example, several studies indicate that climate change has the potential to impact ecosystems in nearly all streams throughout the State of Washington (ISAB 2007, p. 13; Battin et al. 2007, p. 6722; Rieman et al. 2007, pp. 1558-1561). In streams and rivers with temperatures approaching or at the upper limit of allowable water temperatures, there is little if any likelihood that bull trout will be able to adapt to or avoid the effects of climate change/warming. There is little doubt that climate change is and will be an important factor affecting bull trout distribution. As its distribution contracts, patch size decreases and connectivity is truncated, bull trout populations that may be currently connected may face increasing isolation, which could accelerate the rate of local extinction beyond that resulting from changes in stream temperature alone (Rieman et al. 2007, pp. 1559-1560). Due to variations in land form and geographic location across the range of the bull trout, it appears that some populations face higher risks than others. Bull trout in areas with currently degraded water temperatures and/or at the southern edge of its range may already be at risk of adverse impacts from current as well as future climate change.

The ability to assign the effects of gradual global climate change to bull trout or to a specific location on the ground is beyond our technical capabilities at this time.

<u>Conservation</u>

Conservation Needs

The 2015 recovery plan for bull trout established the primary strategy for recovery of bull trout in the coterminous United States: 1) conserve bull trout so that they are geographically widespread across representative habitats and demographically stable1 in six recovery units; 2) effectively manage and ameliorate the primary threats in each of six recovery units at the core area scale such that bull trout are not likely to become endangered in the foreseeable future; 3) build upon the numerous and ongoing conservation actions implemented on behalf of bull trout since their listing in 1999, and improve our understanding of how various threat factors potentially affect the species; 4) use that information to work cooperatively with our partners to design, fund, prioritize, and implement effective conservation actions in those areas that offer the greatest long-term benefit to sustain bull trout and where recovery can be achieved; and 5) apply adaptive management principles to implementing the bull trout recovery program to account for new information (USFWS 2015, p. v.).

Information presented in prior draft recovery plans published in 2002 and 2004 (USFWS 2002a, 2004) have served to identify recovery actions across the range of the species and to provide a framework for implementing numerous recovery actions by our partner agencies, local working groups, and others with an interest in bull trout conservation.

The 2015 recovery plan (USFWS 2015) integrates new information collected since the 1999 listing regarding bull trout life history, distribution, demographics, conservation successes, etc., and integrates and updates previous bull trout recovery planning efforts across the range of the single DPS listed under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The Service has developed a recovery approach that: 1) focuses on the identification of and effective management of known and remaining threat factors to bull trout in each core area; 2) acknowledges that some extant bull trout core area habitats will likely change (and may be lost) over time; and 3) identifies and focuses recovery actions in those areas where success is likely to meet our goal of ensuring the certainty of conservation of genetic diversity, life history features, and broad geographical representation of remaining bull trout populations so that the protections of the Act are no longer necessary (USFWS 2015, p. 45-46).

To implement the recovery strategy, the 2015 recovery plan establishes categories of recovery actions for each of the six Recovery Units (USFWS 2015, p. 50-51):

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 nonnative fishes and other nonnative 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.

Bull trout recovery is based on a geographical hierarchical approach. Bull trout are listed as a single DPS within the five-state area of the coterminous United States. The single DPS is subdivided into six biologically-based recovery units: 1) Coastal Recovery Unit; 2) Klamath Recovery Unit; 3) Mid-Columbia Recovery Unit; 4) Upper Snake Recovery Unit; 5) Columbia Headwaters Recovery Unit; and 6) Saint Mary Recovery Unit (USFWS 2015, p. 23). A viable recovery unit should demonstrate that the three primary principles of biodiversity have been met: representation (conserving the genetic makeup of the species); resiliency (ensuring that each population is sufficiently large to withstand stochastic events); and redundancy (ensuring a sufficient number of populations to withstand catastrophic events) (USFWS 2015, p. 33).
Each of the six recovery units contain multiple bull trout core areas, 116 total, which are non-overlapping watershed-based polygons, and each core area includes one or more local populations. Currently there are 109 occupied core areas, which comprise 611 local populations (USFWS 2015, p. 3). There are also six core areas where bull trout historically occurred but are now extirpated, and one research needs area where bull trout were known to occur historically, but their current presence and use of the area are uncertain (USFWS 2015, p. 3). Core areas can be further described as complex or simple (USFWS 2015, p. 3-4). Complex core areas contain multiple local bull trout populations, are found in large watersheds, have multiple life history forms, and have migratory connectivity between spawning and rearing habitat and FMO habitats. Simple core areas are those that contain one bull trout local population. Simple core areas are small in scope, isolated from other core areas by natural barriers, and may contain unique genetic or life history adaptations.

A local population is a group of bull trout that spawn within a particular stream or portion of a stream system (USFWS 2015, p. 73). A local population is considered to be the smallest group of fish that is known to represent an interacting reproductive unit. For most waters where specific information is lacking, a local population may be represented by a single headwater tributary or complex of headwater tributaries. Gene flow may occur between local populations (e.g., those within a core population), but is assumed to be infrequent compared with that among individuals within a local population.

Recovery Units and Local Populations

The final recovery plan (USFWS 2015) designates six bull trout recovery units as described above. These units replace the 5 interim recovery units previously identified (USFWS 1999). The Service will address the conservation of these final recovery units in our section 7(a)(2) analysis for proposed Federal actions. The recovery plan (USFWS 2015), identified threats and factors affecting the bull trout within these units. A detailed description of recovery implementation for each recovery unit is provided in separate RUIPs (USFWS 2015a-f), which identify conservation actions and recommendations needed for each core area, forage/ migration/ overwinter areas, historical core areas, and research needs areas. Each of the following recovery units (below) is necessary to maintain the bull trout's distribution, as well as its genetic and phenotypic diversity, all of which are important to ensure the species' resilience to changing environmental conditions.

Coastal Recovery Unit

The coastal recovery unit implementation plan describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015a). The Coastal Recovery Unit is located within western Oregon and Washington. The Coastal Recovery Unit is divided into three regions: Puget Sound, Olympic Peninsula, and the Lower Columbia River Regions. This recovery unit contains 20 core areas comprising 84 local populations and a single potential local population in the historic Clackamas River core area where bull trout had been extirpated and were reintroduced in 2011, and identified four historically occupied core areas that could be re-established (USFWS 2015, pg. 47; USFWS 2015a, p. A-2). Core areas within Puget Sound and the Olympic Peninsula currently support the only anadromous local populations of bull trout. This recovery unit also contains ten shared FMO habitats which are outside core areas and allows for the continued natural population dynamics in which the core areas have evolved (USFWS 2015a, p. A-5). There are four core areas within the Coastal Recovery Unit that have been identified as current population strongholds: Lower Skagit, Upper Skagit, Quinault River, and Lower Deschutes River (USFWS 2015, p.79). These are the most stable and abundant bull trout populations in the recovery unit. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, loss of functioning estuarine and nearshore marine habitats, development and related impacts (e.g., flood control, floodplain disconnection, bank armoring, channel straightening, loss of instream habitat complexity), agriculture (e.g., diking, water control structures, draining of wetlands, channelization, and the removal of riparian vegetation, livestock grazing), fish passage (e.g., dams, culverts, instream flows) residential development, urbanization, forest management practices (e.g., timber harvest and associated road building activities), connectivity impairment, mining, and the introduction of non-native species. Conservation measures or recovery actions implemented include relicensing of major hydropower facilities that have provided upstream and downstream fish passage or complete removal of dams, land acquisition to conserve bull trout habitat, floodplain restoration, culvert removal, riparian revegetation, levee setbacks, road removal, and projects to protect and restore important nearshore marine habitats.

Klamath Recovery Unit

The Klamath recovery unit implementation plan describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015b). The Klamath Recovery Unit is located in southern Oregon and northwestern California. The Klamath Recovery Unit is the most significantly imperiled recovery unit, having experienced considerable extirpation and geographic contraction of local populations and declining demographic condition, and natural re-colonization is constrained by dispersal barriers and presence of nonnative brook trout (USFWS 2015, p. 39). This recovery unit currently contains three core areas and eight local populations (USFWS 2015, p. 47; USFWS 2015b, p. B-1). Nine historic local populations of bull trout have become extirpated (USFWS 2015b, p. B-1). All three core areas have been isolated from other bull trout populations for the past 10,000 years (USFWS 2015b, p. B-3. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, habitat degradation and fragmentation, past and present land use practices, agricultural water diversions, nonnative species, and past fisheries management practices. Conservation measures or recovery actions implemented include removal of nonnative fish (e.g., brook trout, brown trout, and hybrids), acquiring water rights for instream flows, replacing diversion structures, installing fish screens, constructing bypass channels, installing riparian fencing, culver replacement, and habitat restoration.

Mid-Columbia Recovery Unit

The Mid-Columbia recovery unit implementation plan describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015c). The Mid-Columbia Recovery Unit is located within eastern Washington, eastern Oregon, and portions of central Idaho. The Mid-Columbia Recovery Unit is divided into four geographic regions: Lower Mid-Columbia, Upper Mid-Columbia, Lower Snake, and Mid-Snake Geographic Regions. This recovery unit contains 24 occupied core areas comprising 142 local populations, two historically occupied core areas, one research needs area, and seven FMO habitats (USFWS 2015, pg. 47; USFWS 2015c, p. C-1–4). The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, agricultural practices (e.g. irrigation, water withdrawals, livestock grazing), fish passage (e.g. dams, culverts), nonnative species, forest management practices, and mining. Conservation measures or recovery actions implemented include road removal, channel restoration, mine reclamation, improved grazing management, removal of fish barriers, and instream flow requirements.

Columbia Headwaters Recovery Unit

The Columbia headwaters recovery unit implementation plan describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015d, entire). The Columbia Headwaters Recovery Unit is located in western Montana, northern Idaho, and the northeastern corner of Washington. The Columbia

Headwaters Recovery Unit is divided into five geographic regions: Upper Clark Fork, Lower Clark Fork, Flathead, Kootenai, and Coeur d'Alene Geographic Regions (USFWS 2015d, pp. D-2 – D-4). This recovery unit contains 35 bull trout core areas; 15 of which are complex core areas as they represent larger interconnected habitats and 20 simple core areas as they are isolated headwater lakes with single local populations. The 20 simple core areas are each represented by a single local population, many of which may have persisted for thousands of years despite small populations and isolated existence (USFWS 2015d, p. D-1). Fish passage improvements within the recovery unit have reconnected some previously fragmented habitats (USFWS 2015d, p. D-1), while others remain fragmented. Unlike the other recovery units in Washington, Idaho and Oregon, the Columbia Headwaters Recovery Unit does not have any anadromous fish overlap. Therefore, bull trout within the Columbia Headwaters Recovery Unit do not benefit from the recovery actions for salmon (USFWS 2015d, p. D-41). The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, mostly historical mining and contamination by heavy metals, expanding populations of nonnative fish predators and competitors, modified instream flows, migratory barriers (e.g., dams), habitat fragmentation, forest practices (e.g., logging, roads), agriculture practices (e.g. irrigation, livestock grazing), and residential development. Conservation measures or recovery actions implemented include habitat improvement, fish passage, and removal of nonnative species.

Upper Snake Recovery Unit

The Upper Snake recovery unit implementation plan describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015e, entire). The Upper Snake Recovery Unit is located in central Idaho, northern Nevada, and eastern Oregon. The Upper Snake Recovery Unit is divided into seven geographic regions: Salmon River, Boise River, Payette River, Little Lost River, Malheur River, Jarbidge River, and Weiser River. This recovery unit contains 22 core areas and 207 local populations (USFWS 2015, p. 47), with almost 60 percent being present in the Salmon River Region. The current condition of the bull trout in this recovery unit is attributed to the adverse effects of climate change, dams, mining, forest management practices, nonnative species, and agriculture (e.g., water diversions, grazing). Conservation measures or recovery actions implemented include instream habitat restoration, instream flow requirements, screening of irrigation diversions, and riparian restoration.

St. Mary Recovery Unit

The St. Mary recovery unit implementation plan describes the threats to bull trout and the site-specific management actions necessary for recovery of the species within the unit (USFWS 2015f). The Saint Mary Recovery Unit is located in Montana but is heavily linked to downstream resources in southern Alberta, Canada. Most of the Saskatchewan River watershed which the St. Mary flows into is located in Canada. The United States portion includes headwater spawning and rearing habitat and the upper reaches of FMO habitat. This recovery unit contains four core areas, and seven local populations (USFWS 2015f, p. F-1) in the U.S. Headwaters. The current condition of the bull trout in this recovery unit is attributed primarily to the outdated design and operations of the Saint Mary Diversion operated by the Bureau of

Reclamation (e.g., entrainment, fish passage, instream flows), and, to a lesser extent habitat impacts from development and nonnative species.

Tribal Conservation Activities
Many Tribes throughout the range of the bull trout are participating on bull trout conservation working groups or recovery teams in their geographic areas of interest. Some tribes are also implementing projects which focus on bull trout or that address anadromous fish but benefit bull trout (e.g., habitat surveys, passage at dams and diversions, habitat improvement, and movement studies).

STATUS OF BULL TROUT CRITICAL HABITAT

Past designations of critical habitat have used the terms "primary constituent elements" (PCEs), “physical and biological features” (PBFs) or "essential features" to characterize the key components of critical habitat that provide for the conservation of the listed species. The new critical habitat regulations (81 FR 7214) discontinue use of the terms “PCEs” or “essential features” and rely exclusively on use of the term PBFs for that purpose because that term is contained in the statute. To be consistent with that shift in terminology and in recognition that the terms PBFs, PCEs, and essential habit features are synonymous in meaning, we are only referring to PBFs herein. Therefore, if a past critical habitat designation defined essential habitat features or PCEs, they will be referred to as PBFs in this document. This does not change the approach outlined above for conducting the ‘‘destruction or adverse modification’’ analysis, which is the same regardless of whether the original designation identified PCEs, PBFs or essential features.

Current Legal Status of the Critical Habitat

Current Designation

The U.S. Fish and Wildlife Service (Service) published a final critical habitat designation for the coterminous United States population of the bull trout on October 18, 2010 (USFWS 2010, entire); the rule became effective on November 17, 2010. A justification document was also developed to support the rule and is available on the Service’s website: (http://www.fws.gov/pacific/bulltrout). The scope of the designation involved the species’ coterminous range, which includes the Coastal, Klamath, Mid-Columbia, Upper Snake, Columbia Headwaters and St. Mary’s Recovery Unit population segments. Rangewide, the Service designated reservoirs/lakes and stream/shoreline miles as bull trout critical habitat (Table 3). Designated bull trout critical habitat is of two primary use types: 1) spawning and rearing, and 2) foraging, migration, and overwintering (FMO).

Table 4. Stream/Shoreline Distance and Reservoir/Lake Area Designated as Bull Trout Critical Habitat.

State	Stream/Shoreline Miles	Stream/Shoreline Kilometers	Reservoir/ Lake Acres	Reservoir/ Lake Hectares
Idaho	8,771.6	14,116.5	170,217.5	68,884.9
Montana	3,056.5	4,918.9	221,470.7	89,626.4
Nevada	71.8	115.6	-	-
Oregon[1]	2,835.9	4,563.9	30,255.5	12,244.0
Oregon/Idaho[2]	107.7	173.3	-	-
Washington	3,793.3	6,104.8	66,308.1	26,834.0
Washington (marine)	753.8	1,213.2	-	-
Washington/Idaho	37.2	59.9	-	-
Washington/Oregon	301.3	484.8	-	-
Total[3]	19,729.0	31,750.8	488,251.7	197,589.2

[1] No shore line is included in Oregon
[2] Pine Creek Drainage which falls within Oregon
[3] Total of freshwater streams: 18,975

The 2010 revision increases the amount of designated bull trout critical habitat by approximately 76 percent for miles of stream/shoreline and by approximately 71 percent for acres of lakes and reservoirs compared to the 2005 designation.

The final rule also identifies and designates as critical habitat approximately 1,323.7 km (822.5 miles) of streams/shorelines and 6,758.8 ha (16,701.3 acres) of lakes/reservoirs of unoccupied habitat to address bull trout conservation needs in specific geographic areas in several areas not occupied at the time of listing. No unoccupied habitat was included in the 2005 designation. These unoccupied areas were determined by the Service to be essential for restoring functioning migratory bull trout populations based on currently available scientific information. These unoccupied areas often include lower main stem river environments that can provide seasonally important migration habitat for bull trout. This type of habitat is essential in areas where bull trout habitat and population loss over time necessitates reestablishing bull trout in currently unoccupied habitat areas to achieve recovery.

The final rule continues to exclude some critical habitat segments based on a careful balancing of the benefits of inclusion versus the benefits of exclusion. Critical habitat does not include: 1) waters adjacent to non-Federal lands covered by legally operative incidental take permits for habitat conservation plans (HCPs) issued under section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (Act), in which bull trout is a covered species on or before the publication of this final rule; 2) waters within or adjacent to Tribal lands subject to certain commitments to conserve bull trout or a conservation program that provides aquatic resource protection and restoration through collaborative efforts, and where the Tribes indicated that inclusion would impair their relationship with the Service; or 3) waters where impacts to national security have been identified (USFWS 2010, p. 63903). Excluded areas are approximately 10 percent of the stream/shoreline miles and 4 percent of the lakes and reservoir acreage of designated critical habitat. Each excluded area is identified in the relevant Critical Habitat Unit

(CHU) text, as identified in paragraphs (e)(8) through (e)(41) of the final rule. It is important to note that the exclusion of waterbodies from designated critical habitat does not negate or diminish their importance for bull trout conservation. Because exclusions reflect the often complex pattern of land ownership, designated critical habitat is often fragmented and interspersed with excluded stream segments.

The Physical and Biological Features

Conservation Role and Description of Critical Habitat

The conservation role of bull trout critical habitat is to support viable core area populations (USFWS 2010, p. 63898). The core areas reflect the metapopulation structure of bull trout and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. CHUs generally encompass one or more core areas and may include FMO areas, outside of core areas, that are important to the survival and recovery of bull trout. Thirty-two CHUs within the geographical area occupied by the species at the time of listing are designated under the revised rule. Twenty-nine of the CHUs contain all of the physical or biological features identified in this final rule and support multiple life-history requirements. Three of the mainstem river units in the Columbia and Snake River Basins contain most of the physical or biological features necessary to support the bull trout's particular use of that habitat, other than those physical biological features associated with physical and PBFs 5 and 6, which relate to breeding habitat.

The primary function of individual CHUs is to maintain and support core areas, which 1) contain bull trout populations with the demographic characteristics needed to ensure their persistence and contain the habitat needed to sustain those characteristics (Rieman and McIntyre 1993, p. 19); 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish (MBTSG 1998, pp. 48-49; Rieman and McIntyre 1993, pp. 22-23); 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations (Hard 1995, pp. 314-315; Healey and Prince 1995, p. 182; MBTSG 1998, pp. 48-49; Rieman and McIntyre 1993, pp. 22-23); and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations (Hard 1995, pp. 321-322; MBTSG 1998, pp. 13-16; Rieman and Allendorf 2001, p. 763; Rieman and McIntyre 1993, p. 23).

Physical and Biological Features for Bull Trout

Within the designated critical habitat areas, the PBF for bull trout are those habitat components that are essential for the primary biological needs of foraging, reproducing, rearing of young, dispersal, genetic exchange, or sheltering. Based on our current knowledge of the life history, biology, and ecology of this species and the characteristics of the habitat necessary to sustain its essential life-history functions, we have determined that the PBFs, (also used interchangeably with Primary Constituent Elements) as described within USFWS 2010, are essential for the conservation of bull trout. A summary of those PBFs follows.

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.
3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.
4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.
5. Water temperatures ranging from 2 °C to 15 °C, with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.
6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the-year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system.
7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.
8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.
9. Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

The revised PBF's are similar to those previously in effect under the 2005 designation. The most significant modification is the addition of a ninth PBF to address the presence of nonnative predatory or competitive fish species. Although this PBF applies to both the freshwater and marine environments, currently no non-native fish species are of concern in the marine environment, though this could change in the future.

Note that only PBFs 2, 3, 4, 5, and 8 apply to marine nearshore waters identified as critical habitat. Also, lakes and reservoirs within the CHUs also contain most of the physical or biological features necessary to support bull trout, with the exception of those associated with PBFs 1 and 6. Additionally, all except PBF 6 apply to FMO habitat designated as critical habitat.

Critical habitat includes the stream channels within the designated stream reaches and has a lateral extent as defined by the bankfull elevation on one bank to the bankfull elevation on the opposite bank. Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge that generally has a recurrence interval of

1 to 2 years on the annual flood series. If bankfull elevation is not evident on either bank, the ordinary high-water line must be used to determine the lateral extent of critical habitat. The lateral extent of designated lakes is defined by the perimeter of the waterbody as mapped on standard 1:24,000 scale topographic maps. The Service assumes in many cases this is the full-pool level of the waterbody. In areas where only one side of the waterbody is designated (where only one side is excluded), the mid-line of the waterbody represents the lateral extent of critical habitat.

In marine nearshore areas, the inshore extent of critical habitat is the mean higher high-water (MHHW) line, including the uppermost reach of the saltwater wedge within tidally influenced freshwater heads of estuaries. The MHHW line refers to the average of all the higher high-water heights of the two daily tidal levels. Marine critical habitat extends offshore to the depth of 10 meters (m) (33 ft) relative to the mean low low-water (MLLW) line (zero tidal level or average of all the lower low-water heights of the two daily tidal levels). This area between the MHHW line and minus 10 m MLLW line (the average extent of the photic zone) is considered the habitat most consistently used by bull trout in marine waters based on known use, forage fish availability, and ongoing migration studies and captures geological and ecological processes important to maintaining these habitats. This area contains essential foraging habitat and migration corridors such as estuaries, bays, inlets, shallow subtidal areas, and intertidal flats. Adjacent shoreline riparian areas, bluffs, and uplands are not designated as critical habitat. However, it should be recognized that the quality of marine and freshwater habitat along streams, lakes, and shorelines is intrinsically related to the character of these adjacent features, and that human activities that occur outside of the designated critical habitat can have major effects on physical and biological features of the aquatic environment.

Activities that cause adverse effects to critical habitat are evaluated to determine if they are likely to "destroy or adversely modify" critical habitat by no longer serving the intended conservation role for the species or retaining those PBFs that relate to the ability of the area to at least periodically support the species. Activities that may destroy or adversely modify critical habitat are those that alter the PBFs to such an extent that the conservation value of critical habitat is appreciably reduced (USFWS 2010, pp. 63898-63943; USFWS 2004a, pp. 140-193; USFWS 2004b, pp. 69-114). The Service's evaluation must be conducted at the scale of the entire critical habitat area designated, unless otherwise stated in the final critical habitat rule (USFWS and NMFS 1998, Ch. 4 p. 39). Thus, adverse modification of bull trout critical habitat is evaluated at the scale of the final designation, which includes the critical habitat designated for the Klamath River, Jarbidge River, Columbia River, Coastal-Puget Sound, and Saint Mary-Belly River population segments. However, we consider all 32 CHUs to contain features or areas essential to the conservation of the bull trout (USFWS 2010, pp. 63898:63901, 63944). Therefore, if a proposed action would alter the physical or biological features of critical habitat to an extent that appreciably reduces the conservation function of one or more critical habitat units for bull trout, a finding of adverse modification of the entire designated critical habitat area may be warranted (USFWS 2010, pp. 63898:63943).

Current Critical Habitat Condition Rangewide

The condition of bull trout critical habitat varies across its range from poor to good. Although still relatively widely distributed across its historic range, the bull trout occurs in low numbers in many areas, and populations are considered depressed or declining across much of its range (Ratliff and Howell 1992, entire; Schill 1992, p. 40; Thomas 1992, p. 28; Buchanan et al. 1997, p. vii; Rieman et al. 1997, pp. 15-16; Quigley and Arbelbide 1997, pp. 1176-1177). This condition reflects the condition of bull trout habitat. The decline of bull trout is primarily due to habitat degradation and fragmentation, blockage of migratory corridors, poor water quality, past fisheries management practices, impoundments, dams, water diversions, and the introduction of nonnative species (USFWS 1998, pp. 31648-31649; USFWS 1999, p. 17111).

There is widespread agreement in the scientific literature that many factors related to human activities have impacted bull trout and their habitat, and continue to do so. Among the many factors that contribute to degraded PBFs, those which appear to be particularly significant and have resulted in a legacy of degraded habitat conditions are as follows: 1) fragmentation and isolation of local populations due to the proliferation of dams and water diversions that have eliminated habitat, altered water flow and temperature regimes, and impeded migratory movements (Dunham and Rieman 1999, p. 652; Rieman and McIntyre 1993, p. 7); 2) degradation of spawning and rearing habitat and upper watershed areas, particularly alterations in sedimentation rates and water temperature, resulting from forest and rangeland practices and intensive development of roads (Fraley and Shepard 1989, p. 141; MBTSG 1998, pp. ii - v, 20-45); 3) the introduction and spread of nonnative fish species, particularly brook trout and lake trout, as a result of fish stocking and degraded habitat conditions, which compete with bull trout for limited resources and, in the case of brook trout, hybridize with bull trout (Leary et al. 1993, p. 857; Rieman et al. 2006, pp. 73-76); 4) in the Coastal-Puget Sound region where amphidromous bull trout occur, degradation of mainstem river FMO habitat, and the degradation and loss of marine nearshore foraging and migration habitat due to urban and residential development; and 5) degradation of FMO habitat resulting from reduced prey base, roads, agriculture, development, and dams.

Effects of Climate Change on Bull Trout Critical Habitat

One objective of the final rule was to identify and protect those habitats that provide resiliency for bull trout use in the face of climate change. Over a period of decades, climate change may directly threaten the integrity of the essential physical or biological features described in PBFs 1, 2, 3, 5, 7, 8, and 9. Protecting bull trout strongholds and cold water refugia from disturbance and ensuring connectivity among populations were important considerations in addressing this potential impact. Additionally, climate change may exacerbate habitat degradation impacts both physically (e.g., decreased base flows, increased water temperatures) and biologically (e.g., increased competition with non-native fishes).

Many of the PBFs for bull trout may be affected by the presence of toxics and/or increased water temperatures within the environment. The effects will vary greatly depending on a number of factors which include which toxic substance is present, the amount of temperature increase, the likelihood that critical habitat would be affected (probability), and the severity and intensity of any effects that might occur (magnitude).

The ability to assign the effects of gradual global climate change bull trout critical habitat or to a specific location on the ground is beyond our technical capabilities at this time.

ENVIRONMENTAL BASELINE

A general environmental baseline description, applicable to all listed, proposed, or candidate species was previously described and is incorporated here by reference. The following discussion provides a more specific environmental baseline for the bull trout and its designated critical habitat.

To understand the current status of bull trout in the action area, it is necessary to discuss the status within the core area. In the 2002 Draft Recovery Plan, the entirety of the CNF fell within the Northeast Washington Recovery Unit. Within that unit, there were two areas: the Pend Oreille River core area and the Eastern Washington Research Needs Area. In the 2015 Final Recovery Plan (USFWS 2015a), the boundaries of these areas and the recovery unit were redefined to coincide with the boundaries identified in the critical habitat designation for bull trout. The CNF falls within two recovery units identified in the final plan: the Mid-Columbia and the Columbia Headwaters. The Lake Pend Oreille Core Area, encompassing much of the eastern portion of the CNF, is included in a recovery unit identified as the Columbia Headwaters. The South Salmo Core Area (northeast corner of Washington) and the Northeast Washington Research Needs Area (most of western portion of CNF) are delineated under the Mid-Columbia Recovery Unit.

Current Condition of Bull Trout in the South Salmo Core Area

The Salmo River basin is a transboundary system flowing from the Selkirk Mountains of British Columbia and northern Idaho and Washington in the United States. The Salmo River drains into the Pend Oreille River approximately 3 miles downstream of the international border. Major tributaries of the Salmo River include Apex, Clearwater, Hall, Barrett, Ymir, Porcupine, Hidden, Boulder Mill, Erie, and Sheep creeks, and the South Fork of the Salmo River (South Fork). Out of all the major Salmo River tributaries, only the South Fork originates in the United States. The headwaters of the South Fork originate in northern Idaho, with the entire US portion located within the Salmo Priest Wilderness Area. Several small tributaries drain into the South Fork, including Watch and Lead creeks. The core area contains four local populations in the upper Salmo mainstem: Clearwater Creek, Sheep Creek, Stagleap Creek, and the South Fork (Green et al. 2006).

Bull trout in the Salmo River watershed exhibit primarily a fluvial migratory life history with FMO habitat occurring from approximately River KM 44 to the confluence with Pend Oreille River (Green et al 2006). In Canada, the Salmo River is identified as having one of the most threatened populations of bull trout in British Columbia, with an estimated number of redds per year between 38 and 109 (1998 to 2009) and an estimated population size between fewer than 50 to as many as 250 adults (Hagen and Decker 2011). Thirty six adult bull trout were observed between 1974 and 2014 in the South Fork of Salmo River within Washington (Andonaegui 2003; Kalispel unpublished data). Recent fish surveys conducted by the Kalispel Tribe of Indians and Seattle City Light in the South Fork and its tributaries in August 2014 yielded 51 sub-adult and 9 adult in the main stem and one sub adult bull trout in Watch Creek. While exhaustive surveys of the South Fork have not been completed, recent data suggests that the US portion of the watershed is significant to the overall persistence of the core area. Field surveys in 2006 by the United States Forest Service (USFS) did not observe any bull trout in Lead Creek (USFS 2009). Several natural barriers in the South Fork may represent barriers to bull trout upstream of Watch Creek (Connor *in litt.* 2015).

The US portion of the South Fork is located within the Salmo Priest Wilderness Area with streams and riparian areas supporting adequate shade, detritus, and large instream wood that are likely to provide abundant food base and cover (USFS 1999 as referenced in Andonaegui 2003) (see Figure 2). Hagen and Decker (2011) determined that habitat in Canadian waters for bull trout is marginal due to: 1) high water temperatures; 2) lack of fish prey base; 3) high risk of hybridization due to abundant brook trout populations; and 4) reservoir conditions that favor non-native fish. Recently, partners in British Columbia and the US have begun developing a Salmo Watershed Aquatic Ecosystem Health Action Plan (Nellestijn *in litt.* 2015). The draft action plan further identified habitat degradation, illegal harvest, high water temperatures, nonnative species, and loss of in-basin connectivity as threats to the persistence of Salmo River populations. Historically, some gene flow between Salmo River and other core areas in the Columbia and Pend Oreille Rivers was probable (Dunham et al. 2014). However, the evidence suggests that bull trout from upstream likely provided genetic material to the Salmo River but life history and natural barriers limited upstream movement and genetic connection (75 FR 63898; Dunham et al. 2014). Due to reduced population numbers and existing threats within the Salmo River, Dunham et al. (2014) concluded that providing upstream passage over Boundary Dam may pose significant risks to Salmo River populations.

Colville National Forest
South Salmo Core Area for Bull Trout

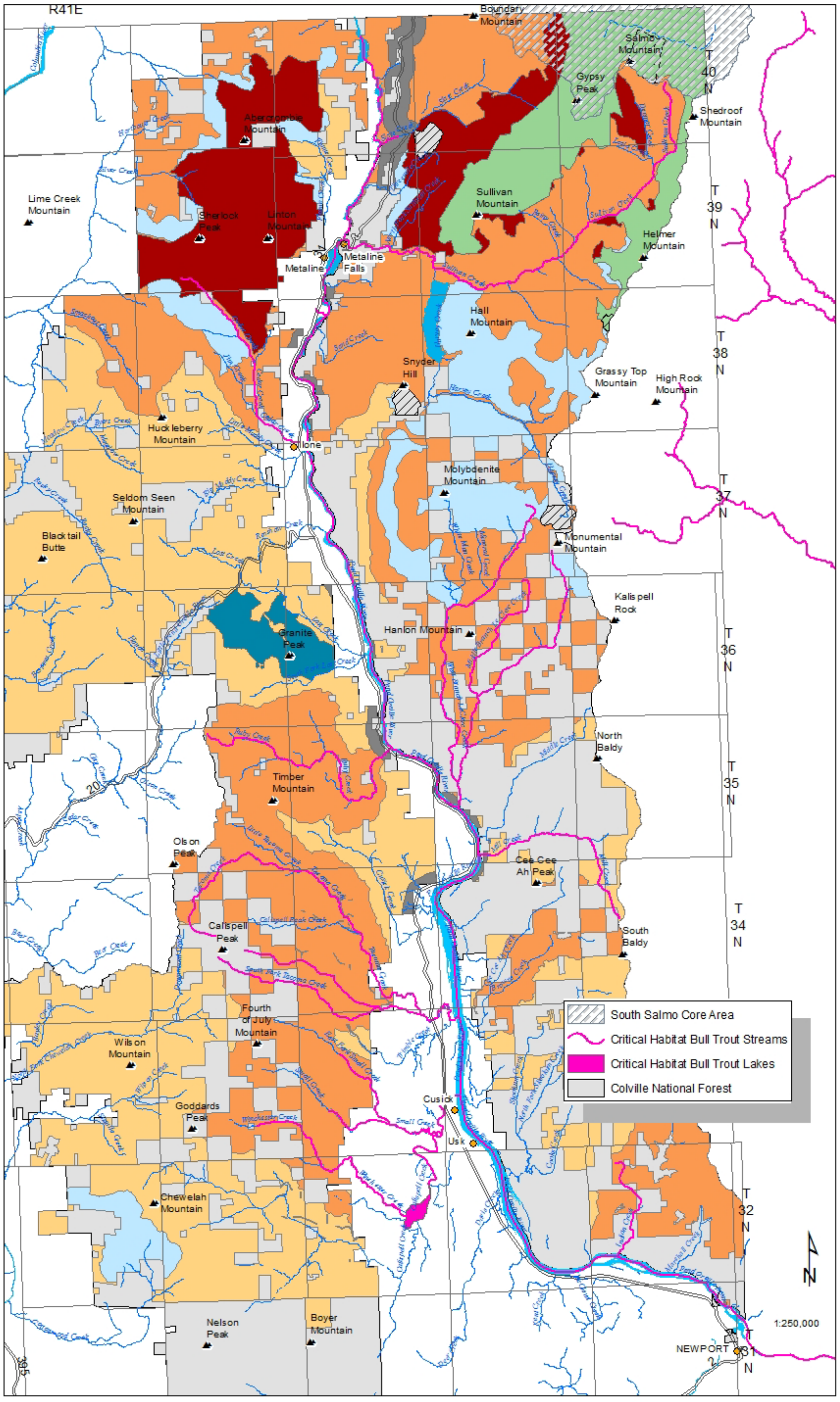


Figure 2. South Salmo Core Area.

Current Condition of Bull Trout in the Northeast Washington Research Needs Area

The Northeastern Washington Research Needs Area encompasses the mainstem Columbia River and its tributaries above Chief Joseph Dam upstream to the Canadian Border, Spokane River and tributaries upstream to Post Falls Dam, and the Pend Oreille River mainstem and its tributaries, in the United States, downstream of Boundary Dam. Previously, this area was identified as the Eastern Washington Research Needs Area of the Northeast Washington Draft Recovery Unit. Geographically, the area is located in the Okanogan Highlands and bounded by the Kettle, Calispell, and Huckleberry Mountain Ranges. Ceded lands of the Colville and Spokane tribes and National Forest overlap much of the area. Major tributaries include the Nespelem, Sanpoil, Spokane (up to Post Falls Dam), Kettle, Colville, and Pend Oreille rivers. Approximately 90 percent of this Research Needs Area is in public or tribal ownership managed by the U.S. Forest Service, Confederated Tribes of the Colville, and the Spokane Tribe of Indians. Lake Roosevelt is managed by the National Park Service. Lake Roosevelt and numerous other tributaries with sufficient water and temperatures to support bull trout are also present in the area, including Big Sheep, Wilmont, Barnaby, Deep, Sherman, Onion, Ninemile, Stranger, and Hall creeks. Operation of the Federal Columbia River Power System, which includes Chief Joseph and Grand Coulee Dams, altered bull trout habitat and populations. These dams impound the mainstem Columbia River as managed reservoirs: Lake Rufus Woods, the 51 mile long reservoir behind Chief Joseph Dam, and Lake Roosevelt, 154 miles long reservoir above Grand Coulee Dam. Some of the major impacts include: changed flow regimes, barriers to movement, and increased interactions with non-native species (Craig and Wissmar 1993; Reiman and McIntyre 1993). A significant loss of range in North East Washington and Canada as well as connectivity between core areas throughout the Columbia River basin has occurred.

Based on interviews with Tribal elders, bull trout appear to have been ubiquitous throughout streams on the Colville Reservation (Hunner and Jones 1996). Accounts by Colville Tribal elders confirm historic presence of bull trout in several of the larger creeks that are direct tributaries to Lake Roosevelt, including: Ninemile Creek, Wilmont Creek, Twin Lakes/Stranger Creek, Hall Creek and Barnaby Creek (Hunner and Jones 1996). Bull trout are thought to have been extirpated in several rivers of the Northeast Washington Research Needs Area, including the Nespelem, Sanpoil, and Kettle Rivers (63 FR 31647, Mongillo 1993). Bull trout are occasionally observed near the mouths of tributaries in Lake Roosevelt and in the upper mainstem Columbia River. Bull trout have not recently been observed in Lake Rufus Woods. Observation data is sporadic and often anecdotal. Since 2011, reports of bull trout observations in Lake Roosevelt have increased, often in association with high water years. In 2012, observations of 19 bull trout were reported throughout Lake Roosevelt by tribal and educational survey crews, local citizens, and fishing charters. Most of these were assumed to be entrained fish from spawning areas in Canada and the Pend Oreille River. Six bull trout were observed in Sheep Creek that year (Honeycutt *in litt.* 2014). Another two bull trout were documented in Lake Roosevelt subbasin in 2017 (Baker *in litt.* 2017). Although suitable spawning habitat is located in several tributaries to Lake Roosevelt, no known spawning occurs in tributaries to Lake Roosevelt.

Given the historical use of the area and current infrequent observations of bull trout in the Northeast Washington Research Needs Area, local area biologists determined more information is necessary to determine how these areas contribute to recovery needs or to further identify actions to address potential threats. With some areas of habitat capable of supporting bull trout in this Research Needs Area, further evaluation is needed to determine extent of habitat and populations and the how the results will further recovery efforts.

Current Condition of the bull trout in the Lake Pend Oreille Core Area

The Lake Pend Oreille Core Area under the new delineation includes Lake Pend Oreille and the Lower Clark Fork River Drainage upstream of Lake Pend Oreille, and the Pend Oreille River downstream of Lake Pend Oreille within the action area. In the 2015 recovery plan (USFWS 2015a), the Pend Oreille River portion of the Core Area is identified as LPO C, with its own population threats and recovery actions separate from the entirety of the Lake Pend Oreille Core Area.

The 2002 Bull Trout Draft Recovery Plan identified one extant local population in LeClerc Creek that drains into Box Canyon Reservoir. However, the 2008 5-year Status Review, Northeast Washington Core Area Status Assessment Template states that the LeClerc Creek local population no longer exists. This determination is based on a lack of recent documentation since 2001 of juvenile fish or redds in LeClerc Creek when a bull trout was observed on a redd. In 2014, a single adult bull trout was observed in LeClerc Creek during redd surveys. When this population was active, individuals represented a unique life history strategy of moving from spawning areas in tributary streams downstream to the Pend Oreille River and then upstream to forage and overwinter in Lake Pend Oreille. For the LeClerc Creek population, the option to move up to Lake Pend Oreille was blocked by Albeni Falls Dam. Other than LeClerc Creek, spawning or bull trout specific surveys have not occurred in any other watershed within the CNF in the last 15 years. The Pend Oreille River has been designated as foraging, migration, and overwintering habitat for bull trout, and likely provided those same functions under pre-dam conditions.

Specific factors known to be significant in the decline of bull trout populations in the lower Pend Oreille River within Washington State are: construction and operation of three hydroelectric facilities on the mainstem Pend Oreille River (Boundary Dam, Box Canyon Dam and Albeni Falls Dam), habitat degradation on the mainstem and within the tributaries; human-made fish passage barriers into tributaries to the Pend Oreille River; and nonnative fish species introduction and management. Recovery in the Lower Pend Oreille River is dependent on the reestablishment of the historic connection to Lake Pend Oreille.

The Lake Pend Oreille Core Area is one of the largest, most complex, and best-documented bull trout core areas in the upper Columbia River watershed. The Core Area includes the Pend Oreille River in northeastern Washington, a nearly 95,000-acre lake in Idaho (Lake Pend Oreille), and the Lower Clark Fork River in western Montana. Bull trout face a variety of threats across their range; however, the biggest threats to bull trout status and distribution within the Lake Pend Oreille core area are believed to be from the following:

1. Introduced species/fisheries management;
2. Forest management practices and forest roads;

3. Fish passage issues (artificial barriers to migration), connectivity, and entrainment; and
4. Residential development and urbanization.

In 1925, the U.S. Fish Commission stocked 100,000 lake trout (*S. namaycush*) into Lake Pend Oreille and its tributaries. Additionally, lake trout may also have migrated downstream of Flathead Lake, where they were introduced 20 years earlier. Lake trout compete with native bull trout for food resources and are listed as one of the biggest threats to bull trout populations in the Lake Pend Oreille core area and in Lake Pend Oreille and studies suggest that bull trout will not persist in the presence of lake trout (USFWS 2015). For example, Priest Lake experienced dramatic declines in bull trout numbers as corresponding lake trout numbers increased. However, efforts to reduce competition for food resources, which benefit lake conditions for bull trout in Lake Pend Oreille, are ongoing through predator removal programs. Considerable effort has been put into controlling the lake trout population in Lake Pend Oreille through angler incentive programs, and trap and gill netting projects. In 2011 netting operations successfully removed 5,841 lake trout from Lake Pend Oreille. However, a total of 113 direct mortalities of bull trout occurred. Despite the mortalities of bull trout, long term benefits to non-native species removal are positive. This program continues and is believed to be highly effective at reducing lake trout numbers. Since the program began, annual bull trout mortalities have ranged between 120 in 2006 to 525 in 2013, while lake trout population estimates have declined by more than 50 percent.

The following is again from USFWS (2015c). To monitor bull trout population trends, an extensive redd count monitoring program in Lake Pend Oreille core area has been devised by Idaho Department of Fish and Game and has been in place since 1983. Based on 2010 surveys of the Lake Pend Oreille drainage, the adult bull trout spawning population consisted of at least an estimated 2,093 fish (compared to 2,771 in 2009). Survey results from 2009 also identified more than six local populations with greater than 100 individuals in each, estimated adult escapement (number of adults returning to spawn based on the number of redds observed during annual surveys) of 2,500 or more individuals, and increasing relative abundance measured as the trend in adult escapement. Recovery objectives were met for five years between 2002 and 2006, but estimated adult escapement was less than 2,500 in 2007, 2008 and 2010 and represented below average counts in several highly influential tributary spawning populations including Trestle Creek, Granite Creek, and Gold Creek. Despite this, regression analysis depicting trends in bull trout redds over time, demonstrates that trends in redd abundance are increasing annually throughout the core area. For example, in six consistently surveyed index streams in the Lake Pend Oreille core area, 333 redds were counted in 1992, compared to 456 in 2010. Similarly, for all streams combined in the Lake Pend Oreille core area, 447 redds were observed in 1992, compared to 654 in 2010.

Bull trout in the interconnected Lake Pend Oreille Core Area appear to be entirely adfluvial. Adult bull trout make spawning migrations into the larger tributaries beginning in April, with juvenile outmigration occurring as early as March and lasting until June for tributaries feeding directly into Lake Pend Oreille. Fall migrations (September-October) follow a similar pattern of movement with adults moving further upstream to spawn (then returning to Lake Pend Oreille to overwinter) and juveniles moving downstream into Lake Pend Oreille. Some of these migrations have been shown to be very extensive. Migratory bull trout spawning in the Middle Fork East

River and Uleda Creeks, tributaries to the East River downstream of Priest Lake, or in the action area, may exhibit an unusual life history strategy. These fish have been documented to migrate downstream out of Lake Pend Oreille into the Pend Oreille River, before ascending the East River drainage for spawning. It was previously believed that bull trout in this drainage were part of the Priest Lake core area. This life history was believed to also occur in tributaries downstream of Albeni Falls prior to construction of the dam. Juveniles requiring this upstream migration to the lake, often leave later in the fall.

Fish passage barriers also influence bull trout distribution throughout the core area. Log crossings, beaver dams, large alluvial deposits and culverts are recognized as fish passage barriers across the area. To improve fish passage, many of these barriers (i.e., culverts, log crossings, etc.) have been removed or replaced. While the aforementioned barriers influence fish passage on a local scale, large hydroelectric dams have had the greatest influence on bull trout distribution throughout the core area. Dams have permanently interrupted established bull trout migration routes, eliminating access from portions of the tributary system to the productive waters of Lake Pend Oreille and Flathead Lake. Three dams on the lower Clark Fork River have significantly reduced the amount of spawning and rearing habitat available to Lake Pend Oreille bull trout. Other effects of these dams to bull trout habitat include changes in water quality (temperature, sediment, and nutrients) and quantity, lake drawdowns, a reduction in shoreline food sources, and direct losses of fish into water conveyance systems (turbines, spillways, or water delivery systems).

Bull Trout in CNF

Bull trout population numbers on the CNF are very small and local populations may not currently exist, although occasional individuals are observed in streams on the Forest within the Pend Oreille River subbasin. All designated bull trout critical habitat on the CNF is within the Pend Oreille River subbasin.

There have been few recent observations of bull trout on the CNF. In 2015, the Colville National Forest took Environmental DNA (eDNA) samples from all streams with bull trout critical habitat with positive and negative results noted below (Carim et al. 2016). Environmental DNA (eDNA) is DNA extracted from an environmental sample, such as soil, water, or air, without directly sampling the target organism. Many factors may lead to a negative detection including sample timing, location, and other. Therefore, the lack of detection does not rule out presence. The most recent observations include:

- Cedar Creek (Stevens County) - the watershed is primarily in the U.S. but the lower reaches are in British Columbia (B.C.). Two juvenile bull trout were found in the lower portion of Cedar Creek in Canada by British Columbia biologists in 1996. There are numerous road crossings with the potential to block fish passage in the lower part of the drainage. Day snorkeling the East Fork Cedar Creek on National Forest System lands in 1996 did not find bull trout presence. Environmental DNA samples were taken in 2015. There were no detections of bull trout in Cedar Creek and East Fork Cedar Creek.
- South Fork Salmo River - over 90% of the larger Salmo River watershed is in B.C. The Salmo River has a relatively healthy population of bull trout. Juvenile bull trout were observed while snorkeling in the Canadian portion of the South Fork in 1998. Juvenile

and adult bull trout were captured as early as 1975 and as late as 1995 in the portion of the watershed within the U.S. This portion is within the Salmo-Priest Wilderness. Most of the Salmo River bull trout habitat is in Canada.

- Slate Creek - Five individual bull trout were caught in the mouth of this creek between 1994 and 1997. One individual was caught twice. All were adult except for one juvenile.
- Sullivan Creek - one adult bull trout was found poached in lower Sullivan Creek in 1994 below Mill Pond Dam, an impassable blockage to fish approximately 3.25 miles from the mouth. Environmental DNA samples were taken in 2015. There were no detections of bull trout in Sullivan Creek. Individual bull trout are observed annually in the lower reaches of Sullivan Creek during surveys.
- Cedar Creek (Ione Creek) (Pend Oreille County) - one adult bull trout was observed while snorkeling in 1995 above the old municipal dam for Ione. The dam was removed in 2005. There were no detections of bull trout in Cedar Creek by eDNA samples taken in 2015.
- LeClerc Creek - three juvenile bull trout were found while electrofishing in the East and West Branches in 1993. Two juvenile bull trout were observed during snorkeling in the East Branch in 1995. One juvenile bull trout was observed while snorkeling in the East Branch in 1998. According to USFWS (2012) there has been no recent documentation of bull trout juveniles or spawning since 2001 when a bull trout was observed on a redd and the population likely no longer exists. Environmental DNA samples were taken in 2015. There was a detection of bull trout in the West Branch of LeClerc Creek. In 2014 a single adult bull trout was observed in West Branch LeClerc Creek (USFWS 2016).
- Mill Creek (Pend Oreille County) - One adult bull trout was observed during snorkeling within the lowest mile of the creek in 1995. Environmental DNA samples were taken in 2015. There were no detections of bull trout in Mill Creek.
- Indian Creek - one bull trout was observed while snorkeling on the lowest mile of this creek on private lands in 1997.

Bull trout are threatened by historical and current land use activities. The construction and operation of Albeni Falls, Box Canyon, and Boundary Dams on the Pend Oreille River have fragmented habitat and impeded bull trout migration. The construction of other dams and diversions without fish passage in Pend Oreille River tributaries have further fragmented habitat and reduced connectivity. Habitat has been also degraded by past timber harvest and livestock grazing. The introduction of non-native species continues to impact bull trout populations through competition, predation, and hybridization (USFWS 2015a). Figure 3 displays the major man-made barriers in the Pend Oreille Subbasin.

The Service has previously consulted on new hydroelectric license agreements for Box Canyon Dam (April 29, 2005; FWS Reference 1-9-02-F-0620 and 01EWFW00-2014-F-0798); and Boundary Dam with the surrender of the license for the Sullivan Creek Project (June 19, 2012; FWS Reference 13410-2011-F-0199). The two license agreements will result in many habitat restoration projects in the Pend Oreille River and tributaries. The Sullivan Creek surrender will result in removal of the Mill Pond Dam, resulting in improved connectivity of the Pend Oreille River to upper Sullivan Creek and its tributaries. Bull trout in the mainstem river may recolonize Sullivan Creek upon dam removal. In addition, the Service is currently evaluating the feasibility of bull trout reintroduction to tributaries of the Pend Oreille River.

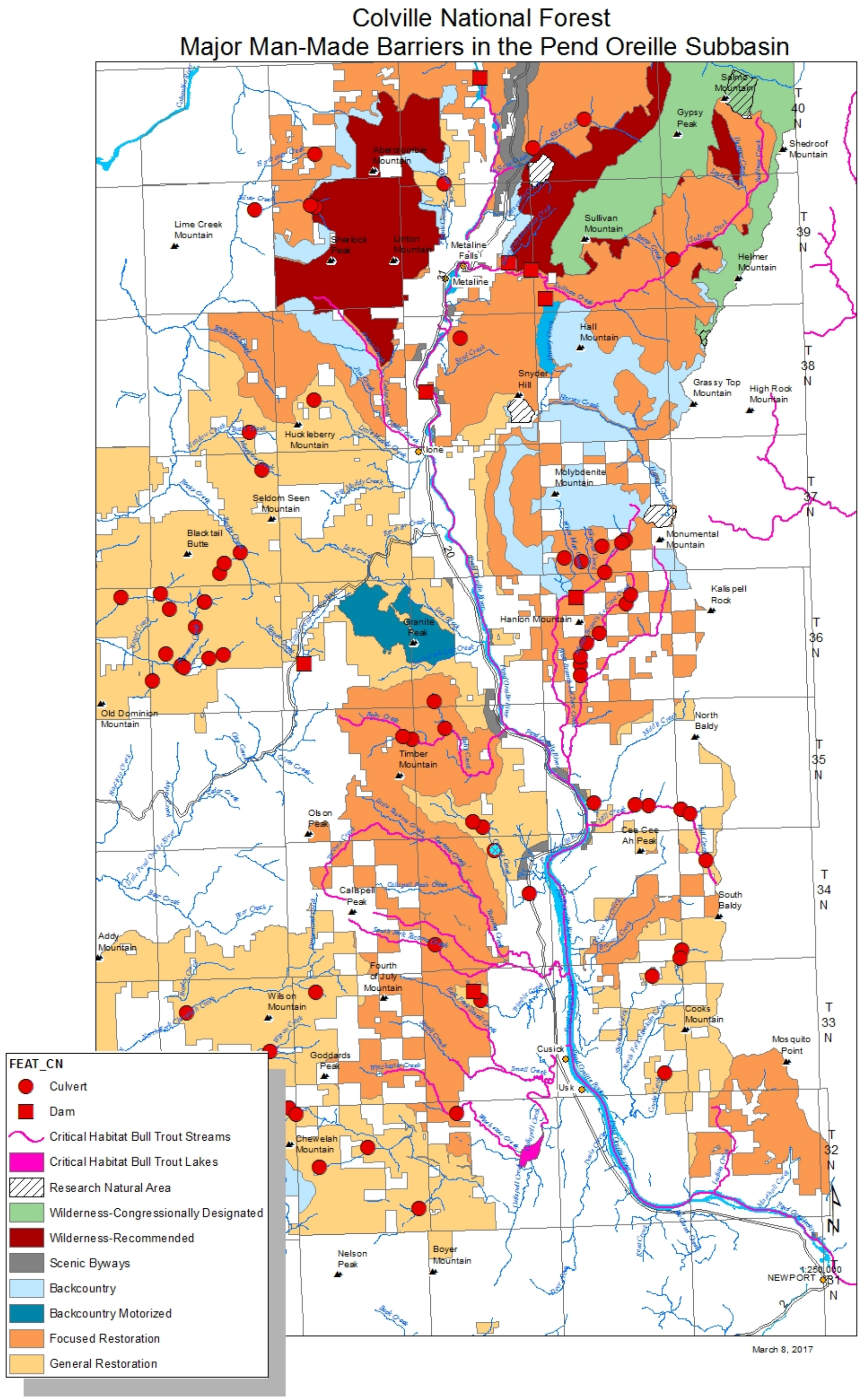


Figure 3. Man-made barriers in the Pend Oreille sub-basin.

The presence of brook trout, which are widespread on the CNF, pose a particular threat to bull trout. Bull trout and brook trout will hybridize resulting in hybrid offspring that are often, but not always sterile. Where hybridization occurs declines in the bull trout populations or even local extirpations have occurred (see USFWS 2015a). Brook trout may have a competitive advantage over bull trout and displace bull trout into higher elevation streams, especially at warmer water temperatures (Rieman et al. 2006, McMahon et al. 2007, Rodtka and Volpe 2007).

The re-licensing terms for the Boundary Hydroelectric Project include programs to improve conditions for bull trout and aid recovery of the population. The programs identified include improving passage for fish both upstream and downstream of the dam; riparian and stream channel habitat improvement; improving road conditions; and non-native trout suppression and eradication programs (USFWS 2012). However, the USFWS (2012, page 160) acknowledges that it may take 14 years before benefits of the programs result in slow but steady increases in bull trout numbers.

The Box Canyon Hydroelectric Project license requirements also include passage facilities at the dam and restoration of 164 miles of tributary habitat for native salmonids. Most of these restoration actions will occur on the CNF.

Conservation Role of the Action Area Bull Trout

Bull trout were once widely distributed in watersheds of the CNF. However, current distribution is limited to occasional individuals within the Lake Roosevelt subbasin, and small populations in the Pend Oreille Subbasin and the South Salmo River. In the United States, the Pend Oreille River subbasin (17010216) encompasses 698,895 acres of which 407,899 acres are managed by the CNF.

Within the action area, watersheds, including tributaries to Lake Roosevelt and the Pend Oreille River, have been significantly altered by residential, urban and recreational development along the shoreline. Bank armoring and recreational docks have limited complexity and large wood recruitment, modified natural hydraulic processes, and removed vegetation that provide shade and forage. These actions have furthered limited the potential for bull trout use of the river, and the persistence of the species in the action area. On the CNF, tributaries have been altered by roads, recreation, forest management actions, and grazing as well as other development. The CNF managed aquatic lands under INFISH and the associated PACFISH/INFISH Biological Opinion (PIBO, August 14, 1998). Implementation of INFISH on the CNF improved conditions for aquatic species over the years.

The CNF falls within two recovery units identified in the final recovery plan: the Mid-Columbia and the Columbia Headwaters. The Lake Pend Oreille Core Area, encompassing much of the eastern portion of the CNF, is included in a recovery unit identified as the Columbia Headwaters. The South Salmo Core Area (northeast corner of Washington) and the Northeast Washington Research Needs Area (most of western portion of CNF) are delineated under the Mid-Columbia Recovery Unit.

The Bull Trout Recovery Plan (USFWS 2015a) identified four elements to consider when assessing long-term viability (extinction risk) of bull trout populations: 1) number of local populations; 2) adult abundance (defined as the number of spawning fish present in a core area in a given year); 3) productivity, or the reproductive rate of the population; and 4) connectivity (as represented by the migratory life history form).

In the final recovery plan (USFWS 2015a), the goal for recovering bull trout is managing threats to ensure sufficient distribution and abundance throughout their range so that protection under the Act is no longer necessary. When this is achieved, it is expected that:

- Bull trout will be geographically widespread across representative habitats and demographically stable;
- The genetic diversity and diverse life history forms of bull trout will be generally conserved; and
- Cold water habitats essential to bull trout will be conserved and connected.

Specific actions to achieve the recovery goals are identified for the Lake Pend Oreille Core Area in the Columbia Headwaters Recovery Unit Implementation Plan contained within USFWS (2015d)., and the Mid-Columbia Recovery Unit Implementation Plan (USFWS 2015x). These actions to address threats are displayed in Appendix B.

Current Condition of Critical Habitat in the Action Area

There are thirty subwatersheds identified on the CNF, seventeen of which have streams segments with designated critical habitat (Table 4). Of the 228 miles of critical habitat in the subwatersheds approximately 98 stream miles (43%) are within the CNF boundary (BA p. 90, see BA Table 15 for details). The remaining miles (57%) are located on private or other land ownership. Within CNF boundaries, streams designated as critical habitat include Calispell, Tacoma, Ruby, Cedar, LeClerc, Slate, and Sullivan Creeks.

The current environmental baseline for physical aquatic habitat was assessed by the CNF in two ways. The first was to determine the Aquatic Ecological Condition (AEC) of subwatersheds on the Forest and the second was using monitoring results from the PACFISH/INFISH Biological Opinion (PIBO) effectiveness monitoring program (described in the BA p. 120-228). The viability of bull trout on the Forest (and other Management Indicator Species (MIS)/Focal species) was assessed as described in Reiss et al. (2008) and documented in MacDonald et al. (2016). The CNF developed a viability assessment that utilizes a decision support model, similar to what was used in AEC model, to determine the current status of the Management Indicator Species (MIS)/focal species. The viability model however evaluates the conclusion that the MIS/focal species populations at the subbasin scale are sustainable or viable based on their current status. The HUC 12 AEC results are aggregated to the subbasin (HUC 8) scale to provide a broader assessment of population and habitat status, better capture the distribution and ability of the local populations to interact across a broader landscape, and allows a broader assessment of natural and human-made disturbance that may be missed if only the AEC results are considered alone (Reiss et al. 2008).

The AEC Pend Oreille Bull Trout Watershed Condition Results show watershed condition scores are generally "not properly functioning" for CNF subwatersheds draining into the Pend Oreille subbasin (See Figure 4). Watershed condition is rated as "properly functioning" only in the Headwaters South Salmo River, Outlet South Salmo, Slate Creek, and North Fork Sullivan Creek – Sullivan Creek subwatersheds. The "functioning at risk" and "not properly functioning" ratings are due to "at risk" or "not properly functioning" ratings for large woody debris (16 subwatersheds), channel shape and function (17 subwatersheds), riparian vegetation condition (18 subwatersheds), insects and disease (four subwatersheds), road densities (19 subwatersheds) riparian road densities (19 subwatersheds) and roads on sensitive soils (eight subwatersheds). Additionally all subwatersheds were rated "functioning at risk" for the fire regime attribute.

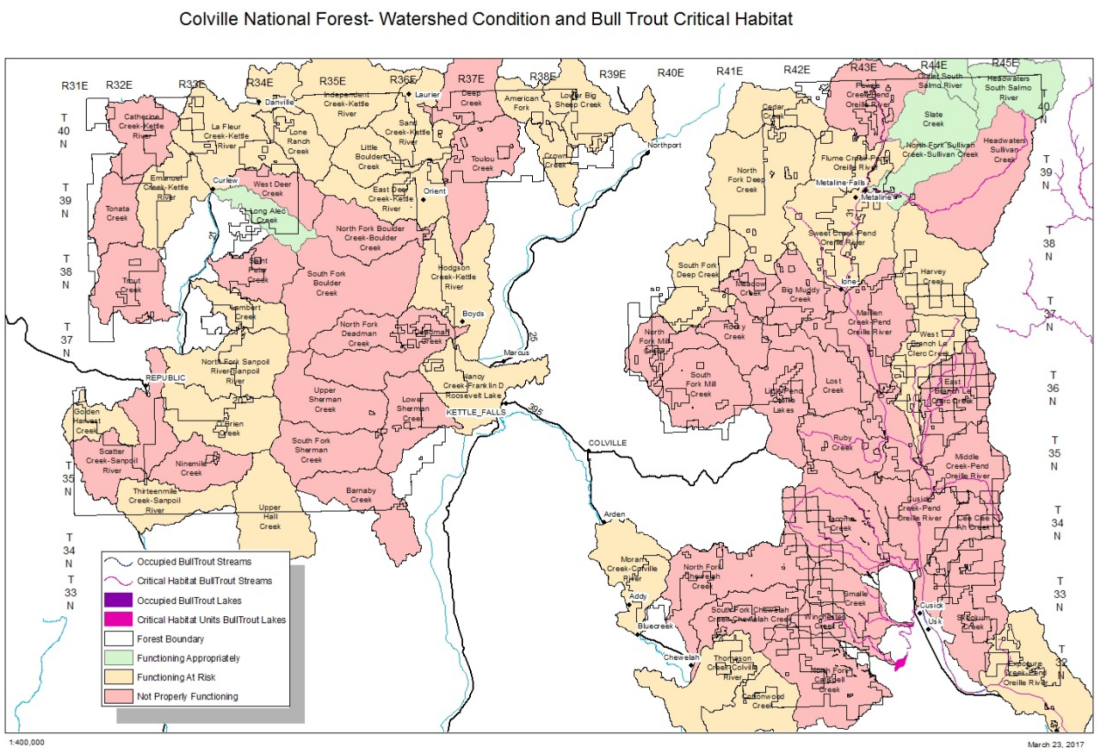


Figure 4. Functioning Condition by Watershed and Including Critical Habitat (from Figure 7 in BA, p.126).

That assessment of current aquatic habitat condition on the CNF is further informed through habitat trend information provided by the PIBO Effectiveness Monitoring Program. PIBO began implementation in 2001 (while the CNF only comes under the INFISH strategy the PIBO program includes areas managed under both the PACFISH and INFISH strategies).[16] The monitoring program was designed to answer the question: "Are key biological and physical components of aquatic and riparian communities being improved, degraded, or restored within the range of steelhead (*O. mykiss)* and bull trout?" As the program has progressed, PIBO is using

[16] PIBO PACFISH/INFISH Biological Opinion Monitoring http://www.fs.fed.us/biology/fishecology/emp/index.html)

an "index" approach to answer the question.[17] The index approach to assessing status of habitat conditions outlined in Al-Chokhachy *et al*. (2010) was developed to account for some of the natural variability among sites due to geoclimatic and disturbance regimes. The PIBO approach (Archer et al. 2016), based upon Al-Chokhachy et al. (2010), compares the status of stream habitat conditions at sites in 'managed' subwatersheds (subwatersheds disturbed by various management activities) to habitat conditions at sites within 'reference' or relatively pristine subwatersheds. Since all streams are affected by natural disturbance, status is determined by assessing how the range of habitat conditions at managed sites compares to what would be expected if the stream had only experienced natural disturbance. The PIBO approach compares five in-channel habitat attributes (BA p.127); residual pool depth, percent pools, stream substrate particle size, fines in pool tails, and large wood frequency. The individual attribute index scores are combined into a total index and there is an additional index for the aquatic macroinvertebrate community (observed/expected (O/E)). The index scores for the individual attributes and the final index are then compared to scores from reference stream reaches, in reference subwatersheds within the same ecoregion, and across the PIBO monitoring area.

PIBO also evaluated the data to determine if habitat trends on reaches where they had repeat surveys (often three) were improving (moving in a direction considered to be favorable habitat for salmonids). For the trend analysis, the attributes bank stability (% bank covered with plants or rock) and percent undercut bank were added to the five used to assess status. The index approach is felt to be good for determining status but may not be as useful for determining trends in habitat conditions over time as it averages conditions of several attributes that may be more responsive individually. Trends are therefore estimated by measuring the changes in the individual stream attributes over time (Archer et al. 2016). In addition to the sites sampled to determine whether the "key biological and physical components of aquatic and riparian communities are being improved, degraded, or restored" (deemed PIBO effectiveness monitoring), PIBO samples sites in Designated Monitoring Areas (DMAs). The DMAs are located at sites within grazed subwatersheds that are representative of typical grazing impacts for the pasture (Archer et al. 2016). Where available or appropriate, the PIBO trends are described for each critical habitat PBF below.

A formal consultation was conducted for the LeClerc Creek Allotment (USFWS 2016; 01EWFW00-2015-F-0285), addressing adverse effects on bull trout critical habitat. The consultation for critical habitat on the grazing allotment concluded that there would be continued degradation of certain PBFs as a result of cattle access to the stream, compaction and floodplain confinement, loss of riparian vegetation, and water quality impacts from sedimentation.

The following summarizes the preceding information in terms of the PBFs of bull trout critical habitat (BA p.128-132). Where the Forest Service (FS) or USFWS had specific knowledge or information on the PBFs for individual critical habitat streams, we present that information. Otherwise, the PBFs are generally described for all critical habitat streams.

17 As referenced in BA: Personal communication, telephone conversation between Ken MacDonald and Eric Archer, PIBO (March 20, 2014) and email Eric Archer to Ken MacDonald (Preliminary Colville Results) (March 21, 2014)

1. Springs, seeps, groundwater sources, and subsurface water connectivity (hyporheic flows) to contribute to water quality and quantity and provide thermal refugia.

Sullivan Creek

Within the upper portions of Sullivan Creek, this PCE is properly functioning. In the lower portion of Sullivan Creek, downstream from Outlet Creek, hydrological and temperature regimes are strongly influenced by the release of water out of Sullivan Lake Dam. Mill Pond Dam also impounds water that increases water temperatures. Springs, seeps, groundwater sources, and subsurface water connectivity all contribute to water quality and quantity within Sullivan Creek and provide thermal refugia.

Considering the scale of the entire subunit, we believe the baseline condition of this PBF within the action area and the entire CHU is "functioning at risk."

Slate Creek

Within Slate Creek, this PBF is properly functioning.

LeClerc Creek

Springs, seeps and other groundwater sources exist throughout the action area. There are numerous small seeps, springs, and areas of groundwater influence scattered throughout the LeClerc Creek drainage and its tributaries. Within several of the pastures in the allotment boundary, wetlands associated with pastures are hyporheically connected to LeClerc Creek. These areas provide upwelling and cold water refugia necessary for bull trout spawning and rearing.

Degradation of riparian vegetation exists along the banks of the East and Middle Branches of LeClerc Creek. While road relocations and habitat improvements have improved floodplain connectivity in the watershed, and action area, conditions that benefit cool water refugia and water connectivity are slow to improve. Off channel areas are limited in the watershed, as is consistent overland flows which create off-channel areas and filter contaminants and sediment.

Considering the scale of the entire subunit, we believe the baseline condition of this PBF within the action area and the entire CHU is "functioning at risk."

While the CNF did not specifically address this PBF through the AEC, they did assess 16 subwatersheds in bull trout critical habitat for the riparian road attribute, indicating there may be some areas where subsurface water may be disconnected due to the presence of near stream roads (Table 5). The 2012 Water Quality Assessment (WQA) 305(b) list and 303(d) list contains 42 stream reaches on the CNF that do not meet water quality standards and includes all impaired stream segments added to the 303(d) list since 2004 that are not under an approved Total Maximum Daily Load (TMDL) (WADoE 2014(a,b, and f)). There may be some impairment as approximately 5.5 miles of stream have a 303(d) water temperature impairment, 11.0 miles are impaired for pH and 20.1 miles are impaired for dissolved oxygen.

Table 5. AEC Riparian Road Density (From BA Table 2, p.129).

Subwatershed Number	Subwatershed Name	Percent FS	Riparian Road Density	Critical Habitat
170102160403	North Fork Sullivan Creek-Sullivan Creek	100	Functioning Appropriately	yes
170102160201	Exposure Creek-Pend Oreille River	57	Functioning At Risk	yes
170102160302	West Branch Le Clerc Creek	100	Functioning At Risk	yes
170102160903	Slate Creek	99	Functioning At Risk	yes
170102160904	Flume Creek-Pend Oreille River	86	Functioning At Risk	yes
170102160102	Winchester Creek	83	Not Properly Functioning	yes
170102160103	Smalle Creek	81	Not Properly Functioning	yes
170102160206	Tacoma Creek	92	Not Properly Functioning	yes
170102160207	Cusick Creek-Pend Oreille River	57	Not Properly Functioning	yes
170102160301	Middle Creek-Pend Oreille River	94	Not Properly Functioning	yes
170102160303	East Branch Le Clerc Creek	100	Not Properly Functioning	yes
170102160304	Ruby Creek	100	Not Properly Functioning	yes
170102160305	Yokum Lake-Pend Oreille River	73	Not Properly Functioning	yes
170102160307	Maitlen Creek-Pend Oreille River	77	Not Properly Functioning	yes
170102160402	Headwaters Sullivan Creek	100	Not Properly Functioning	yes
170102160902	Sweet Creek-Pend Oreille River	80	Not Properly Functioning	yes
170102160905	Pewee Creek-Pend Oreille River	71	Not Properly Functioning	yes

2. Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

Of these, there is a TMDL being actively implemented on 2.2 miles of the temperature-impaired streams (BA p.130). Impairment pollutants include fecal coliform bacteria, dissolved oxygen, pH and temperature. Portions of East, West, Middle, and main stem LeClerc Creek; Pend Oreille River; Ruby Creek; Slate Creek; North Fork and main stem Sullivan Creek; and Tacoma Creek are impaired.

The Forest currently administers four dams, including the West Branch LeClerc Creek Dam, Little Twin Lakes Dam, Big Meadow Lake Dam, and Bayley Lake Dam. There are an additional five dams within the administrative boundary of the Forest that are owned by public utilities or local governments. Table 6 and Figure 3 display man-made barriers on the Forest. Management of these dams does not vary by forest plan alternative, and management and mitigation of effects of these dams is expected to continue under all alternatives.

Table 6. Dams in the Pend Oreille Subbasin on the Colville National Forest (Table 3 in BA p.130).

Dam Name	Owner	Stream/River Name	Impairs Migration in Bull Trout Critical Habitat	Notes
West Branch LeClerc Creek Dam	Colville NF	West Branch LeClerc Creek	Yes	Log crib dam that does not create impoundment; filled with fine sediment. Removal is an essential project in the WB LeClerc Watershed Action Plan
Metaline Falls Municipal Water Dam	Metaline Falls	Tributary to Sullivan Creek	Yes	Diversion dam supplying water to the Community of Metaline Falls
Boundary Dam	Seattle City Light	Pend Oreille	Yes	
Mill Pond Dam	Pend Oreille Public Utility District (PUD)	Sullivan Creek	Yes	Scheduled for removal in 2017
Sullivan Lake Dam	Pend Oreille PUD	Harvey Creek/ Outlet Creek	Yes	Dam enhances the natural lake. Managed by Pend Oreille PUD for recreation, and water supply for interbasin transfers.
Conger Pond Dam	Colville NF	Trimble Creek	No	
Box Canyon Dam	Pend Oreille PUD	Pend Oreille	Yes	Partial barrier. Upstream passage expected in 2019. Downstream passage occurs through turbines and spillway.

Sullivan Creek

Mill Pond Dam, located approximately 3.9 miles upstream of Boundary Reservoir, is a complete barrier to fish passage. This dam is in the process of being removed in 2017/2018. Two potential natural fish barriers occur at RM 0.60 and RM 0.65 on lower Sullivan Creek. These barriers may be partial barriers at low flows and are likely complete barriers at very high flows. While Sullivan Lake Dam also represents a fish passage barrier within the watershed, it is not considered within the critical habitat designation. Considering the scale of the entire subunit, we believe the baseline condition of this PBF within the action area and the entire CHU is "functioning at risk."

Slate Creek

Within Slate Creek, this PBF is "properly functioning".

LeClerc Creek

Barriers to movement are considered high in the entire CHU due to mainstem Pend Oreille River dams as well as localized manmade and natural barriers in the CHU. Within the LeClerc Creek drainage and action area, barriers to movement are primarily associated with antiquated log crib dams from historical logging practices and road crossings containing undersized bridges or culverts. In West Branch LeClerc Creek, upper portions of the watershed have areas that naturally go subsurface creating seasonal barriers to movement. Natural falls are found in several of the tributaries to Middle Branch LeClerc Creek. The combination of natural dewatered segments and waterfall barriers and anthropogenic barriers in the LeClerc drainage contribute to the overall condition of this PBF within the entire CHU. We believe the baseline condition for migration habitats is "not properly functioning."

3. An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

The PIBO information suggests the food base, at least the aquatic macroinvertebrate food base is sufficient to support this PBF as the macroinvertebrate community within sampled streams in the Pend Oreille subbasin are similar to what is expected based upon reference streams. The action area likely provides sufficient food base for juvenile, subadult and adult bull trout. Numerous non-native and native species in the action area including macroinvertebrates, sculpin, brook trout and cutthroat trout provide a forage base for bull trout. However, the degraded condition of some of the watersheds and the reduced abundance of native forage fish (sculpins, minnows) and cutthroat trout is probably the most serious and persistent effect on bull trout food availability in the CHU. This factor leads us to consider this PBF as "functioning at risk."

4. Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks and unembedded substrates, to provide a variety of depths, gradients, velocities, and structure.

Sullivan Creek

Within Sullivan Creek, aquatic habitat has been influenced by historic timber harvest. Riparian vegetation has since become well established. Road density is between 1.7 and 2.0 miles per

mi^2. Shallow water habitat and some side-channel habitat are present resulting from accumulated (LWD). Substrate is trapped in Mill Pond and unable to be transported below Mill Pond Dam. Currently, this PBF in Sullivan Creek is “functioning at risk”. However, with the removal of Mill Pond Dam in late 2017, the function is expected to improve.

Slate Creek

The majority of Slate Creek watershed falls within the Colville National Forest. Riparian vegetation is intact and provides adequate shade, detritus, and LWD. Off-channel habitats are available due to braiding of the stream from LWD. This PBF is properly functioning.

LeClerc Creek

The riparian corridors within the action area are highly impacted by activities occurring in the watershed and the entire CHU, including but not limited to roads, forest practices, grazing, recreation, and rural development. Historic logging, historic crib dams, historic and ongoing grazing, and road construction, have reduced channel complexity, increased sediment and destabilized banks, and constricted the floodplain. Restoration actions such as cattle fencing, riparian harvest buffers, barrier removal projects, road relocations, and woody debris projects have improved conditions in the LeClerc Creek watershed. However, much of the watershed is still below benchmarks identified for forest management and maintaining complexity in the watershed. This PCE is “not properly functioning” within the action area.

High variability among watersheds regarding the condition of this PBF makes it especially challenging to specify a synthetic rating for the entire CHU. Because bull trout require complexity in both FMO (lower watershed) and spawning/rearing (upper watershed) habitats, we consider this PBF to be “functioning at risk,” overall.

The overall stream habitat indices and the percent pool indices within sampled streams in the Pend Oreille subbasin were found by PIBO to be not significantly different than reference streams within the eco-region but are significantly lower when compared to all reference streams, indicating this PBF may be “at risk” (BA p.131). The AEC assessment found 17 subwatersheds to be “functioning at risk” or “not properly functioning”. Residual pool depths, the amount of large wood and bank angle attributes were not found to be significantly different than reference streams. There have also been statistically significant improving trends in bank stability, large wood and residual pool depths. The AEC assessment indicates that complex habitats may be at risk due to watershed conditions that may not be resilient to disturbance as the watershed condition is only considered to be “properly functioning” in the North Fork Sullivan Creek-Sullivan Creek and Slate creek subwatersheds. Interestingly, in the AEC assessment, large woody debris was determined to be “functioning at risk: or “not properly functioning” in 16 subwatersheds. This seems to conflict with the PIBO information, possibly due to differences in methodology (BA p.132).

5. Water temperatures ranging from 2°C to 15°C (36°F to 59°F), with adequate thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

There are 5.5 miles of stream have a 303(d) water temperature impairment (Figure 5) with an actively implemented TMDL on 2.2 miles (BA p.132) . Additionally water temperatures may be “at risk” as riparian vegetation condition was judged to be “functioning at risk” or “not properly functioning” in 18 subwatersheds in the AEC assessment. The fire regime attribute was judged to be “functioning at risk” in all subwatersheds which may therefore have an increased risk of uncharacteristic wildfires that could remove shade.

Sullivan Creek

Upper Sullivan Creek has the coldest water temperatures of all tributaries entering Boundary Reservoir. Water releases from Sullivan Lake Dam increase water temperatures in lower Sullivan Creek. Maximum water temperatures in lower Sullivan Creek were around 15.5 ˚C. Currently, this PBF in Sullivan Creek is “functioning at risk”. However, with the removal of Mill Pond Dam in late 2017, the function is expected to improve and temperatures in lower Sullivan Creek reduced.

Slate Creek

The majority of Slate Creek watershed falls within the Colville National Forest. Riparian vegetation is intact and provides adequate shade, detritus, and LWD. Water temperatures within Slate Creek are within the preferred temperature range for bull trout. This PBF is “properly functioning”.

LeClerc Creek

Water temperatures in the CHU and LeClerc Creek are influenced by several natural and manmade factors. In the greater CHU, hydropower operations, loss of riparian condition, reduced floodplain connectivity, development, forest practices, and other factors influence overall water temperatures. In LeClerc Creek loss of riparian cover and wetland and floodplain connectivity likely have the greatest influence on temperatures in the basin. Temperatures in late July through September are often well above 15ºC. The Kalispel Tribe has collected temperature data consistently in up to 5 locations in the LeClerc Creek watershed (WDOE 2015a). In all sites, temperatures have exceeded standards for salmon bearing waters during late summer months. Based on these reasons, this PBF is “not properly functioning” within the action area and the entire CHU.

6. In spawning and rearing areas, substrate of sufficient amount, size, and composition to ensure success of egg and embryo overwinter survival, fry emergence, and young-of-the year and juvenile survival. A minimal amount of fine sediment, generally ranging in size from silt to coarse sand, embedded in larger substrates, is characteristic of these conditions. The size and amounts of fine sediment suitable to bull trout will likely vary from system to system

This PBF is considered to be at least “at risk” (BA p.132). The PIBO results show that median substrate sizes were lower compared to reference streams and there are more percent fines in pools compared to reference streams. The AEC assessment found that watershed conditions that may cause increased sediment delivery to streams; road densities, riparian road densities and roads on sensitive soils, were “functioning at risk” or “not properly functioning” on 19, 19, and 8 subwatersheds, respectively.

Sullivan Creek

Currently no bull trout spawning occurs within Sullivan Creek. In lower Sullivan Creek, spawning habitat is poor because appropriate sized gravel is lacking. Mill Pond Dam located 3.9 miles upstream of Boundary Reservoir blocks gravel movement in the creek. After removal of Mill Pond Dam in late 2017, access to suitable spawning areas will be possible. This PBF is “functioning at risk” currently, but will be “properly functioning” in the near future.

Slate Creek

Currently no known spawning occurs in Slate Creek. The PBF is considered properly functioning, as there are no barriers to use of the area and suitable gravels are present.

LeClerc Creek

Although no documented spawning currently occurs within the LeClerc Creek watershed or the any tributary to the Lower Pend Oreille River portion of the CHU, spawning occurred in the watershed as recently as the early 2000’s. Suitable spawning gravels and rearing areas occur throughout the LeClerc Creek drainage. Sedimentation from historical forest practices, road development, recreation, and grazing have increased embeddedness and fine materials and reduced areas of suitable substrates. Recent restoration actions, including wood placement and road relocation have begun to improve conditions in the watershed. Given these factors, this PBF is considered “functioning at risk” overall in the CHU.

7. A natural hydrograph, including peak, high, low, and base flows within historic and seasonal ranges or, if flows are controlled, minimal flow departure from a natural hydrograph.

This PBF was not directly assessed by the CNF but with 23 out of 25 subwatersheds in the Pend Oreille subbasin “functioning at risk” or “not properly functioning” for road densities (2016 Watershed Condition Framework Reassessment) the PBF may be considered at risk (BA p.132; BA Table 4).

Sullivan Creek

In upper Sullivan Creek, no water storage facilities are found upstream of Outlet Creek; and therefore, a natural hydrograph exists with peak flows in the spring and low base flows in fall and winter. The operation of Sullivan Lake Dam results in a modified hydrograph in Outlet Creek and lower Sullivan Creek. With water releases from Sullivan Lake Dam, two high-flow peaks occur in lower Sullivan Creek (SCL 2008). A natural spring peak resulting from melting snow and a lower artificial peak in late fall that results from releases from Sullivan Lake Reservoir. The average spring peak flows in lower Sullivan Creek is approximately 600 cfs. Maximum peak flows are approximately 1,600 cubic feet per second (cfs). Base flows are approximately 50 cfs. Fall releases from Sullivan Lake Dam results in flows of approximately 300 cfs in October and November. Currently, this PBF in Sullivan Creek is “functioning at risk”. However, with the removal of Mill Pond Dam in late 2017, the function is expected to improve.

Slate Creek

A natural hydrology occurs in Slate Creek. Slate Creek flows through the Colville National Forest and no flow control structures are located on the creek. The hydrology is snow-melt dominated. This PBF is "properly functioning".

LeClerc Creek

Base flows throughout most tributaries of the CHU are regulated by snowmelt and natural conditions. However, the mainstem Pend Oreille River is highly regulated by hydropower dams. Within the action area, small log crib dams may modify or slow natural high flow periods or reduce downstream flows during low flow periods. Based on these reasons, this PBF is "functioning at risk" within the action area and the entire CHU.

8. Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

The 2012 WQA 305(b) list and 303(d) list contains 42 stream reaches on the CNF that do not meet water quality standards and includes all impaired stream segments added to the 303(d) list since 2004 that are not under an approved TMDL (WADoE 2014(a,b, and f)). There may be some impairment as approximately 5.5 miles of stream have a 303(d) water temperature impairment, 11.0 miles are impaired for pH and 20.1 miles are impaired for dissolved oxygen. Of these, there is a TMDL being actively implemented on 2.2 miles of the temperature-impaired streams (BA p.130). Impairment pollutants include fecal coliform bacteria, dissolved oxygen, pH and temperature. Portions of East, West, Middle, and main stem LeClerc Creek; Pend Oreille River; Ruby Creek; Slate Creek; North Fork and main stem Sullivan Creek; and Tacoma Creek are impaired. Of these there is a TMDL being actively implemented on 2.2 miles of the temperature impaired streams (BA p.132). Figure 5 displays the water quality impairment areas and Bull Trout Critical Habitat.

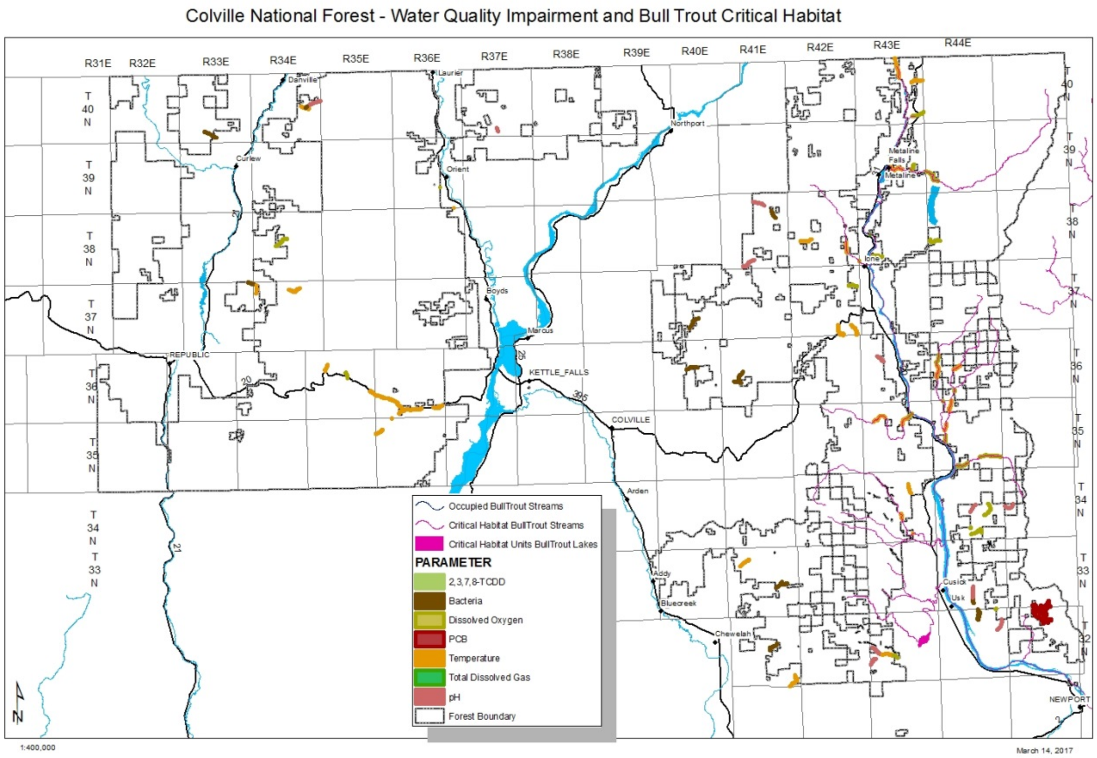


Figure 5. Water Quality Impairment and Bull Trout Critical Habitat.

Sullivan Creek

In Sullivan Creek, upstream of Outlet Creek, water quality and quantity are "properly functioning". Water quality and quantity in the lower portion of Sullivan Creek are influenced by water releases from Sullivan Lake Dam (see temperature and hydrology descriptions in PCEs #5 and #7 above) and holding of water in Mill Pond. Currently, this PBF in Sullivan Creek is "functioning at risk". However, with the removal of Mill Pond Dam in late 2017, the function is expected to improve and temperatures in lower Sullivan Creek reduced.

Slate Creek

The majority of Slate Creek watershed falls within the Colville National Forest. Water quality and quantity are" properly functioning" in Slate Creek

LeClerc Creek

The condition of this PBF is variable across the CHU. In spawning areas, water quality and quantity is generally good. In rearing areas, conditions are variable, with some degradation in both water quality (primarily due to increased sedimentation and temperature) and quantity. In FMO habitat in the lower portions of the CHU, numerous reaches are 303d listed for impairments due to sediment, temperature, dissolved oxygen, total dissolved gas, and other parameters. Overall, PBF 8 is "functioning at risk" across the entire CHU. Within LeClerc Creek, temperature and sediment are problematic. The watershed is listed on the 303(d) list for temperature, pH, and dissolved oxygen (WDOE 2015). A Total Maximum Daily Load was developed for temperature in the Pend Oreille River basin, including LeClerc Creek (Pickett, 2004).

9. Sufficiently low levels of occurrence of non-native predatory (e.g., lake trout, walleye, northern pike, smallmouth bass); interbreeding (e.g., brook trout); or competing (e.g., brown trout) species that, if present, are adequately temporally and spatially isolated from bull trout.

The presence of brook trout, which are widespread on the CNF, pose a particular threat to bull trout. Bull trout and brook trout will hybridize resulting in hybrid offspring that are often, but not always sterile. Where hybridization occurs declines in the bull trout populations or even local extirpations have occurred (see USFWS 2015a). Brook trout may have a competitive advantage over bull trout and displace bull trout into higher elevation streams, especially at warmer water temperatures (Rieman et al. 2006, McMahon et al. 2007, Rodtka and Volpe 2007). Nonnative salmonids, primarily triploid rainbow trout, were most prevalent in the inundated tributary deltas. Both native and nonnative fish were common in the tributary channels upstream of the inundation zone of Boundary Dam (SCL 2009). Nonnative salmonids comprised approximately 61 percent of all salmonids in tributary streams and the tributary deltas.

The re-licensing terms for the Boundary Hydroelectric and Box Canyon Hydroelectric Projects include programs to improve conditions for bull trout, remove non-native species, and aid recovery of the population. In addition to non-native salmonids, predatory and competitive species are documented in many lower stream reaches of tributaries to the Pend Oreille River, including bass, pike, and walleye. This PBF is "functioning at risk" within the action area and the entire CHU.

Integrating across PBFs, the overall condition of the Clark Fork River CHU is "functioning at risk," as are most streams within the action area. Spawning and rearing areas throughout the entire CHU are generally in more functional condition than FMO habitat. However, in many critical habitat streams located on the CNF, spawning and rearing as well as FMO are significantly degraded for PBFs associated with water temperature, sedimentation, and complexity. The only exceptions are within Sullivan and Slate Creeks.

Conservation Role of the Critical Habitat in the Action Area

The conservation needs of bull trout are often generally expressed as the four "Cs": cold, clean, complex, and connected habitat. Cold stream temperatures, clean water quality that is relatively free of sediment and contaminants, complex channel characteristics (including abundant large wood and undercut banks), and large patches of such habitat that are well connected by unobstructed migratory pathways are all needed to promote conservation of bull trout at multiple scales ranging from the coterminous to local populations (a local population is a group of bull trout that spawn within a particular stream or portion of a stream system). The recovery planning process for bull trout has also identified the following conservation needs: 1) maintenance and restoration of multiple, interconnected populations in diverse habitats across the range of each interim recovery unit, 2) preservation of the diversity of life-history strategies, 3) maintenance of genetic and phenotypic diversity across the range of each interim recovery unit, and 4) establishment of a positive population trend. Recently, it has also been recognized that bull trout populations need to be protected from catastrophic fires across the range of each recovery unit.

The conservation role of bull trout critical habitat is to support viable core area populations (75 FR 63898). The core areas reflect the metapopulation structure of bull trout and are the closest approximation of a biologically functioning unit for the purposes of recovery planning and risk analyses. CHUs generally encompass one or more core areas and may include FMO areas, outside of core areas, that are important to the survival and recovery of bull trout.

The primary function of individual CHUs is to maintain and support core areas, which 1) contain bull trout populations with the demographic characteristics needed to ensure their persistence and contain the habitat needed to sustain those characteristics; 2) provide for persistence of strong local populations, in part, by providing habitat conditions that encourage movement of migratory fish; 3) are large enough to incorporate genetic and phenotypic diversity, but small enough to ensure connectivity between populations; and 4) are distributed throughout the historic range of the species to preserve both genetic and phenotypic adaptations.

The designated critical habitat on the CNF is part of CHU 31, the Columbia Rivers Headwaters Unit. The Columbia Headwaters RU is essential to the conservation of bull trout because populations are significantly different at the mitochondrial DNA level from the two RUs west of the Cascade Range and at the microsatellite DNA level from the three other RUs east of the Cascade Range; they are mostly isolated from other RUs in the headwaters of the Columbia River basin by ancient waterfalls downstream; most populations occur in the adfluvial migratory form; they evolved in the absence of anadromous salmonids; they occur inland in a cooler and drier climate and different vegetative conditions than the two RUs west of the Cascade Range and the Mid-Columbia RU; loss of this RU would result in a significant gap in the range of bull trout; and populations within each of three different, isolated watersheds have or could have a shared evolutionary future by migrating among populations over long periods of time.

EFFECTS OF THE ACTION: Bull Trout

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

Bull trout are more likely to occur within the Pend Oreille River sub-basin portion of the CNF Plan. The bull trout recovery plan (USFWS 2015a) and designated critical habitat for the bull trout clearly expect conservation efforts for the bull trout within the Pend Oreille River sub-basin. Future actions implemented under the CNF Plan in the Pend Oreille River sub-basin will be more likely to affect individual bull trout as recovery actions increase the distribution and population numbers. Currently, bull trout in the Northeastern Washington Research Needs Area occur in low densities, and have been documented at the mouths of tributaries to Lake Roosevelt, and occur mostly outside of the CNF. However, the duration of the CNF Plan is 15 years. Bull Trout distribution may change over that time, changing the likelihood of bull trout exposure in other areas. Much of the following effects discussion focuses on the Pend Oreille River portion of the CNF, but management direction across the CNF is also relevant to future bull trout conservation efforts.

Effects of the ARCS and MAs

<u>Management Areas</u>

Focused and General Restoration

The 191,965 acre Focused Restoration MA comprises the most acreage (47%) of the CNF within the Pend Oreille River subbasin. The second largest MA is the General Restoration MA, 93,433 acres (23%). These two MAs are where all forest management programs, including all forms of recreation and vegetation management are expected to occur, and where roads have the biggest impact on the landscape. There are two major differences however. While both MAs allow active vegetation management, including timber sales, to achieve desired vegetation conditions and improve the resiliency of the Forest to disturbances such as wildfire, the Focused Restoration MA also emphasizes management for important wildlife and fish habitat. Of the two ‘restoration’ MAs, only the Focused Restoration MA is within key watersheds. The desired conditions for road densities are also different. The desired road densities are no more than one mile of NFS road per square mile within the focused restoration management area within each subwatershed. In the General Restoration MA the desired road densities are no more than two miles of NFS road per square mile within the general restoration management area within each subwatershed. Within both MAs, this road density calculation does not include roads under another jurisdiction, or roads that have been hydrologically stabilized and effectively closed to vehicular traffic, or decommissioned

Back Country and Back Country Motorized

The CNF Plan identifies 34,805 acres (almost 9%) and 5,255 (about 1%) to the BC and BCM management areas respectively. The only difference between the two areas is the suitability for non-motorized and motorized recreation. Backcountry emphasizes non-motorized recreation opportunities and can include foot, horse, and mechanized (e.g., mountain bikes) modes of travel. Backcountry motorized emphasizes summer and winter motorized recreation opportunities and can include off- highway vehicles, motorcycles, jeeps, and over-snow vehicles.

Recommended Wilderness (RW)

Approximately 36,792 ac (9% of CNF within the Pend Oreille) is recommended for wilderness. Chainsaw and mountain bike use on existing trails is allowed pending a Congressional decision on wilderness designation.

<u>*Combined Effects of MAs*</u>

Timber harvest is allowed on about 70 percent of the Forest in the Pend Oreille subbasin within the Focused and General Restoration MAs. These areas are to be managed to provide the vegetation structure and composition, including late forest structure, for forest communities that are resilient to disturbances such as wildfire, drought and insect infestations. Many of the subwatersheds on the Forest are “functioning at risk” for the fire regime indicator in the AEC assessment, and a few are “not properly functioning”. Vegetation management to restore vegetation to conditions as may be expected under historic and anticipated disturbance regimes, may improve watershed condition, especially in the Focused Restoration Mas, if the desired road densities are attained. The risks to watershed processes and aquatic habitat associated with vegetation management are probably greater in the General Restoration MA, as the Focused Restoration MA includes more management emphasis for wildlife habitat and key watersheds. Most subwatersheds on the Forest are “not properly functioning” or “functioning at risk” for the road and riparian road density attributes of the AEC. The desired road density of 1.0 mile/square mile in the Focused Restoration MA approaches the road density in subwatersheds generally conducive to supporting strong bull trout populations, while the 2.0 miles/square mile in the General Restoration MA is still within the “functioning at risk” level for road density. New roads cannot be constructed in RW, or Backcountry Motorized or Backcountry non-motorized MAs. The extent to which watershed conditions may improve will depend upon the amount of vegetation treatments that occur within a subwatershed and the ability of the Forest to achieve the road desired conditions within fiscal and social constraints.

Motorized recreation is allowed in the Restoration MAs and Backcountry Motorized MA, plus the current levels of motorized recreation are allowed in RW, bringing the total amount of land open to motorized recreation to 327,445 acres or about 81 percent of the CNF within the Pend Oreille River subbasin. No active vegetation management or roads are allowed in the BC, BCM or RW. These three MAs, combined with the 31,416 acres of designated wilderness and the 3,617 acres of RNA, means that about 28 percent of the CNF land within the Pend Oreille River subbasin is within MAs that will not be affected by vegetation management activities or roads. Sediment may continue to be delivered to streams and aquatic habitat due to the use of the existing motorized trail system. The level of effect on aquatic habitat will likely depend upon the ability of the Forest to maintain roads and trails.

ARCS (Appendix H in CNF Plan)

The ARCS plan components, including desired conditions, standards and guidelines, objectives, the designation of riparian management areas and key watersheds, the identification of suitable uses within RMAs and monitoring provide a comprehensive approach for conserving aquatic species and habitats (BA p.164). The CNF Plan ARCS has been developed to maintain and restore healthy watersheds, riparian areas and stream channels that are resilient to natural disturbance. Natural disturbances such as wildfire, large storms and subsequent floods, hillslope failures, landslides, debris flows, and channel migration create a mosaic of habitat conditions over time and space that native fish populations have adapted to. The ARCS also was developed recognizing that streams and aquatic ecosystems are linked to the dynamics of both the riparian and upland communities, and the watershed and physical processes that shape them.
The ARCS, with a more comprehensive set of desired conditions, standards and guidelines and objectives than were included in INFISH is expected to be more effective at restoring ecologically healthy watersheds, riparian and aquatic habitats. The differences between the ARCS and INFISH are described in Appendix A.

The ARCS includes Water Resources, Key Watersheds, and RMA management direction. The Water Resources section of the CNF Plan includes desired conditions and standards and guidelines that are to be applied Forest-wide in all MAs (BA p.164-165). The Forest-wide Water Resources plan components are in addition to CNF Plan components that are specific to RMAs and key watersheds. The Forest-wide desired conditions and standards and guidelines are to work in concert with the CNF Plan components for key watersheds and RMAs to establish the general direction and sideboards for managing for healthy watersheds and contribute to the viability of native aquatic and riparian species during CNF Plan implementation.

The intent of the ARCS is to provide for the ecological integrity of watersheds, riparian, and aquatic habitats. As discussed in section 2.1 of the BA, to be consistent with the desired conditions of the CNF Plan, a project or activity, when assessed at the appropriate spatial scale described in the CNF Plan, must be designed to meet one or more of the following conditions:

- Maintain or make progress toward one or more of the desired conditions of a plan without adversely affecting progress toward, or maintenance of, other desired conditions; or
- Be neutral with regard to progress toward CNF Plan desired conditions; or
- Maintain or make progress toward one or more of the desired conditions over the long term, even if the project or activity would adversely affect progress toward or maintenance of one or more desired conditions in the short-term; or
- Maintain or make progress toward one or more of the desired conditions over the long term, even if the project or activity would adversely affect progress toward other desired conditions in a negligible way over the long-term.

Therefore all management activities implemented during the life of the CNF Plan must be designed to meet the desired conditions.

The goal of the standards and guidelines is to minimize long-term impacts to aquatic resources from management actions by the CNF. The CNF Plan defines and lists several forest-wide aquatic and/or watershed DCs, STDs, and GDLs that will support aquatic and riparian habitats relevant to bull trout, and these are also listed in the proposed action section of this Opinion. The desired conditions are summarized below (for exact language, refer to the proposed action and the CNF Plan).

> *FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* states that CNF lands will provide aquatic habitats in which the distribution of stream channel conditions in watersheds across the Forest is similar to the distribution of conditions in similar, reference watersheds.
>
> *FW-DC-WR-05. Water Quality* states water quality is not only provided to a degree that provides for stable and productive riparian and aquatic, but also to specifically benefit the survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
>
> *FW-DC-WR-09. Groundwater-Dependent Systems*: Seeps, Springs, and Groundwater-fed Wetlands recognizes the important role of groundwater to healthy watershed conditions.

FW-DC-WR-10. Water Production for Downstream Uses recognizes the importance of water flowing off the CNF downstream ecological communities, including human communities.

FW-DC-WR-12. Aquatic Invasive and Non-Native Species – this desired condition brings management attention to the threat aquatic invasive species pose to native aquatic species.

FW-DC-WR-13. Aquatic Threatened, Endangered, and Sensitive Species specifically identifies the Forest's intent to contribute to the recovery of bull trout and the other MIS/focal species (westslope cutthroat trout and interior redband trout).

FW-DC-WR-14. Resiliency to Climate Change – recognizes the need to be cognizant of the effects of climate change to aquatic and riparian resources.

The CNF Plan includes five watershed standards that apply forest-wide. These five standards constrain management activities and will benefit the bull trout conservation.

The first standard; *FW-STD-WR-01. Properly Functioning Watersheds* – states that "when watershed function desired conditions are being achieved and watersheds are "functioning properly" projects shall maintain those conditions. When watershed function desired conditions are not yet achieved or watersheds have impaired function or are "functioning-at-risk" 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 be acceptable when they support long-term recovery of watershed function desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities".

The assessment of Aquatic Ecological Condition (see section 5.1.2 of the BA) found the condition of subwatersheds, on the CNF within the Pend Oreille subbasin are generally "not properly functioning" or "functioning at risk". Only the Headwaters South Salmo River subwatershed, North Fork Sullivan Creek-Sullivan Creek, and Slate Creek subwatersheds are judged to be "properly functioning". The "functioning at risk" and "not properly functioning" ratings are due to "at risk" or "not properly functioning" ratings for large woody debris (16 subwatersheds), channel shape and function (17 subwatersheds), riparian vegetation condition (18 subwatersheds), insects and disease (four subwatersheds), road densities (19 subwatersheds) riparian road densities (19 subwatersheds) and roads on sensitive soils (eight subwatersheds). Additionally all subwatersheds were rated "functioning at risk" for the fire regime attribute. The following standards address aquatic conditions.

Standard *FW-STD-WR-01* will require all management actions maintain "properly functioning" conditions where they exist, but importantly in most subwatersheds, projects will contribute to improved conditions by not retarding recovery towards the desired conditions or improving conditions to the extent possible given the project scope.

Standard *FW-STD-WR-02* will benefit bull trout conservation by requiring all projects to include National and Regional Best Management Practices which will reduce the risk of projects resulting in long-term adverse effects to bull trout.

Standard *FW-STD-WR-03. Water Quality* – requires all projects to be implemented in a manner consistent with the Clean Water Act and Total Maximum Daily Loads established for the Forest and is expected to benefit bull trout by reducing the stream miles with impaired water quality.

Forest-wide standards *FW-STD-WR-04 Aquatic Invasive Species In-Water Work* and *FW-STD-WR-05 Construction of New Roads, Trails and Developed Recreation Sites* that are included in the CNF Plan are also consistent with bull trout conservation. *FW-STD-WR-03 Aquatic Invasive Species In-Water Work* directs prevention measures be implemented for in-water projects to decrease the potential for aquatic invasive species transference into non-infested water bodies. *FW-STD-WR-05 Construction of New Roads, Trails and Developed Recreation Sites* requires new road, trail, and recreation sites be designed to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over land drainage features. The standard should help reduce the risk of these specific management activities disrupting the processes controlling the flow of water and sediment into aquatic habitat.

There are two Forest-wide guidelines that are designed to reduce the risk of spreading AIS, a benefit to bull trout conservation.

FW-GDL-WR-01 Aquatic Invasive Species Wildfire Suppression Equipment – addresses the risk of cross contamination between streams and lakes from pumps, suction, and dipping devices during wildfire suppression by avoiding dumping water directly from one stream or lake into another and water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident.

FW-GDL-WR-02. Aquatic Invasive Species Early Detection and Rapid Response – encourages using the principles and processes of early detection and rapid response (EDRR) to find, identify and quantify new aquatic invasive species occurrences; and coupling EDRR with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species.

Three additional guidelines address watershed restoration, hydrologic processes, and fire suppression chemicals in areas occupied by threatened, endangered, proposed, candidate or sensitive species or their habitats.

FW-GDL-WR-03. Watershed Restoration
Use the restoration methods that maximize the use of natural ecological processes for long-term sustainability and minimize the need for long-term maintenance.

FW-GDL-WR-04. Hydrologic Function of Roads, Trails, and Developed Recreation Sites
Roads and trails should be maintained to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over-land drainage features. Roads and trails should integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

FW-GDL-WR-05. Chemical Fire Suppression
Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by threatened, endangered, proposed, candidate, or sensitive species, or their habitats.

The forest-wide management direction described above will conserve bull trout habitat and minimize adverse effects to the bull trout.

<u>RMAs</u>

RMAs are established to protect the ecological processes and conditions and the important functions of riparian zones provide to aquatic habitat including:

a) The input of fine organic matter and nutrients to aquatic habitat.
b) Providing for bank stability.
c) Filtering sediment due to surface erosion thus controlling the amount reaching the aquatic system.
d) A source of large woody debris.
e) Shading the aquatic habitat thus helping to control water temperature.
f) Controlling the microclimate within the riparian zone and adjacent to the aquatic habitat.
g) Recognition of small and intermittent streams and managing unstable lands to account for aquatic function and values.

The proposed action section of this Opinion describes the RMA size for fish-bearing streams; permanently flowing non-fish-bearing stream; constructed ponds and reservoirs, and wetlands greater than one acre; lakes and natural ponds; and discusses the approach for intermittent streams. Appendix A also compares those buffers in the ARCS to INFISH buffers.

The CNF Plan includes RMAs (BA p.168-171) with DCs, STDs, and GDLs. The CNF Plan includes four desired conditions that are a benefit to bull trout conservation by accounting for maintaining natural processes and the functions of the RMAs:

MA-DC-RMA-01. Composition
Riparian management areas consist of native flora and fauna in a functional system and a distribution of physical, chemical, and biological conditions appropriate to natural disturbance regimes affecting the area.

MA-DC-RMA-02. Key Riparian Processes
Key riparian processes and conditions (including slope stability and associated vegetative root strength, capture and partitioning of water within the soil profile, wood delivery to streams and within the riparian management areas, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality) are operating consistently with local disturbance regimes.

MA-DC-RMA-03. Livestock Grazing
Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment.

MA-DC-RMA-04. Roads
Roads located in or draining to riparian management areas do not present a substantial risk to soil or hydrologic function. Roads do not disrupt riparian and aquatic function.

The first two desired conditions need to be considered in all land management activities that occur within an RMA, and focus on maintaining natural processes and providing healthy riparian and aquatic habitats. *MA-DC-RMA-03* helps protect riparian areas during livestock grazing by maintaining riparian vegetation with sufficient plant cover, rooting depth and vigor thus protecting against accelerated erosion and allowing for the deposition of overbank sediment necessary to maintain stream banks. *MA-DC-RMA-04* will help conserve bull trout by requiring road maintenance activities to account for reducing risk to soil, hydrologic function as well as riparian and aquatic function.

The following standard is important to the conservation of riparian and aquatic habitat and necessary to provide habitat conditions for bull trout recovery:

MA-STD-RMA-01, Aquatic and Riparian Conditions
Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When RMAs are "properly functioning" and aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. When RMAs have impaired function or are "functioning-at-risk" or if aquatic and riparian desired conditions are not yet being achieved and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions . Short-term adverse effects from project activities may be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of RMA desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

Reeves (*et al.*) 2016 provide a review of the current science surrounding riparian functions and processes (BA p.171). As they state, and described in USDA and USDI (1994), most of the key ecological processes needed to be maintained within RMAs occur within a distance equal to one site potential tree height from a stream or the floodplain (when present), including the beneficial effects of root strength for bank stability, litter fall, shading to moderate water temperature, and delivery of coarse wood to streams. Most of the moderating effects of sediment delivery to streams from overland erosion that may be produced by upland management activities generally occurs within a distance of one site potential tree. Similarly an extensive literature review by Sweeny and Newbold (2014) of stream side buffers and concluded, overall, buffers ≥30 m (98 feet) wide are needed to protect the physical, chemical, and biological integrity of small streams. Sweeny and Newbold (2014) also state their review found that sediment trapping was ~65 and ~85% for a 10- and 30-m buffer, respectively, concluding the increased sediment removal attained by wider buffers may be small fraction of the total sediments (by mass), but probably a large fraction of the finer silts and clays, which are typically released from narrow buffers in concentrations high enough to impair water quality.

As explained in Reeves et al. (2016) the extension of the riparian reserve boundary in the Northwest Forest Plan from one site-potential tree-height to two on fish-bearing streams was to protect and enhance the microclimate of the riparian ecosystem within the first tree-height. Reeves *et al* (2016) conclude, in some cases, one-site potential tree buffer may be enough to ameliorate increases in microclimate due to management activities, especially timber harvest. There are also concerns for decreasing the extent of the riparian reserves and the effects on stream temperatures (Reeves et al. 2016).

Given the above, plus the uncertainties, and that at a minimum an approximately 100 foot distance is needed to filter most but not all sediment delivered to streams via overland flow, the RMAs in the CNF Plan, with the associated desired conditions, standards and guidelines plus standards and guidelines for specific management activities and programs represent a precautionary approach for managing RMAs to protect fish habitat water quality. The RMAs will allow for careful management to achieve riparian, aquatic and landscape-scale desired conditions while protecting the important ecological processes. All the ecological functions for which the RMAs are established for fish-bearing streams also apply to intermittent streams (Reeves et al. 2016). The protections are expected to provide benefits directly to bull trout individuals through improved habitat, but also to forage species.

Key Watersheds

Key watersheds are a subset of the watersheds across the Colville National Forest and are designated at the subwatershed scale (CNF Plan p.46). They are a network of watersheds that serve as strongholds for important aquatic resources and are crucial to threatened and endangered aquatic species and provide high quality water important for maintenance of downstream populations. Management in key watersheds emphasizes minimizing risk and maximizing passive and active restoration or preservation of watershed function and aquatic and riparian habitat.

The key watersheds include all subwatersheds with bull trout critical habitat, and ≥ 25% of the subwatersheds within the CNF. There is critical habitat within the Calispell Creek, Cusick Creek-Pend Oreille, Maitlen Creek Pend-Oreille River, and Yokum Lake-Pend Oreille River subwatersheds, but the critical habitat is not within the Forest boundary. There is also possibly a very small amount (less than a mile) of critical habitat within the Forest in the Pewee Creek-Pend

Oreille River subwatershed with greater than 25% CNF managed land Although these above mentioned subwatersheds are not included in the key watershed network, Forest-wide and RMA plan components are expected to provide high quality water and protect the riparian and watershed ecological processes that can contribute to providing downstream habitat conditions for bull trout.

FW-DC-WR-16. Key Watershed Network and *FW-DC-WR-18 Key Watershed Integrity* provide a clear description of the purpose of the CNF Plan key watersheds and that in the case of the key watersheds in the Pend Oreille subbasin, the key watersheds are to contribute to short-term conservation and long-term recovery of bull trout. *FW-DC-WR-17 Roads in Key Watersheds,* addresses the threat roads, a key threat specific to bull trout pose to watershed processes and aquatic habitat.

Priority and Focused Watersheds

In addition to the key watersheds, there are Priority watersheds and Focused subwatersheds that are also expected to have restoration actions implemented. The Focus Watersheds are the LeClerc-Pend Oreille River (HUC 171021602), The Upper Sanpoil River (HUC 1702000401) and Chewelah Creek-Colville River (HUC 1702000301). The LeClerc Creek-Pend Oreille River watershed includes bull trout critical habitat. The Forest along with partners have developed a watershed action plan. The Forest has also identified Priority watersheds through the implementation of the Watershed Condition Framework (Potyondy and Geier 2010). The West Branch and East Branches LeClerc Creek are priority watersheds and also key watersheds. While key watersheds are the priority for restoration, focus and priority watersheds are used to target implementation of short-term, opportunistic restoration work. These actions will benefit all native species on the CNF, as well as bull trout through improved conditions for habitat, and forage.

Restoration objectives that apply to all watersheds including key watersheds that may directly contribute to bull trout conservation within the Pend Oreille River subbasin include; *FW-OBJ-WR-01 Aquatic Invasive Species*, *FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species*, FW-*OBJ-WR-03, General Watershed Function and Restoration* and *MA-OBJ-RMA-01. Improve Riparian Function at Dispersed and Developed Recreation Sites*.

Vegetation Management Effects, including restoration, climate change, fire

While implementation of the CNF Plan is intended to produce commercial timber (*FW-DC-RFP-01 Commercial Products* (CNF Plan p.89)), the intent of the Vegetation Management program is to create forest and non-forest vegetation structure that contributes to the species diversity, species composition, and structural diversity of native plant communities (*FW-DC-VEG-01)(*BA p.174-177). The desired vegetation structure classes, identified by plant community type are to be resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases (*FW-DC-VEG-03*).

Large fires can result in accelerated erosion due to surface erosion or debris slides, increasing the sediment supply to streams and changing channel structure (Wondzell and King 2003, Benda et al. 2003, all as referenced in BA p.175). However, disturbances such as fires and the resulting erosion processes also help create diverse fish habitat through the introduction of large woody debris and coarse substrates that maintain productive fish habitat (Reeves et al. 1995). Fires can cause direct mortality to fish resulting in local extirpations. However, fish populations, especially salmonids, have been observed to rapidly recover after an episodic disturbance such as a wildfire; as long as the population and habitat are connected to adjoining populations, (Sestrich *et al.* 2011, Rieman et al. 2003, Rieman et al. 1995). And if fish, such as bull trout, are isolated above barriers or in streams with little connectivity to adjacent populations, they are more susceptible to extirpation by a large disturbance. The concern, therefore, is not so much over the effects of "natural" fires but larger, more severe fires than occurred historically, especially if the fires occur in subwatersheds with isolated populations.

Vegetation management through timber sales for timber production or as a fuel treatment (e.g. thinning, prescribed fire) and managing wildfires to reduce the potential for uncharacteristically severe wildfires can adversely affect watershed processes, aquatic and riparian habitat (see Spence et al. 1996, Mehan 1991; and Day 2015). Removal of large trees through timber harvest or prescribed fire within the RMA reduces large wood input to stream channels that is necessary to create complex aquatic habitat. Removal of trees shading streams can result in increased summer stream temperatures. Accelerated erosion from ground disturbing activities associated with vegetation management such as skid roads and the transportation system, result in accelerated erosion and sediment delivery to stream channels. Pumps and other equipment used to deliver water to manage prescribed fire or wildfire can also transmit AIS from infected waters to unaffected waters. While adverse effects such as decreases in large wood, shade, and increased erosion may continue to occur, implementation of the ARCS components minimizes these effects.

The potential for adverse effects is greatest on lands specifically allocated for timber production due to the emphasis on commodity production; potentially resulting in intense vegetation manipulation and more ground disturbance due to logging and roads than is expected where vegetation management emphasizes the restoration of forest vegetation. The RMA standards and guidelines that specifically constrain vegetation management activities, including fire, to prevent or minimize adverse effects of vegetation management activities include:

> *MA-STD-RMA-02. Chemical Application.*
> Apply herbicides, insecticides, piscicides, and other toxicants, other chemicals, and biological agents only to maintain, protect, or enhance aquatic and riparian resources and/or native plant communities
>
> *MA-STD-RMA-03. Personal Fuelwood Cutting*
> Personal fuelwood cutting shall not be authorized within riparian management areas or source areas for large woody debris.
>
> *MA-STD-RMA-04 Timber harvest and Thinning*
> Timber harvest and other silvicultural practices can occur in riparian management areas only as necessary to attain desired conditions for aquatic and riparian resources. Vegetation in riparian management areas will not be subject to scheduled timber harvest.

MA-STD-RMA-05. Yarding Activities
Cable yarding activities, if crossing streams, shall achieve full suspension over the active channel.

MA-STD-RMA-12. Wildland Fire and Fuels Management -Minimum Impact Suppression Tactics
Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas.

MA-STD-RMA-13. Wildland Fire and Fuels Management - Portable Pumps
Portable pump set-ups shall include containment provisions for fuel spills, and fuel containers shall have appropriate containment provisions. Park vehicles in locations that do not allow entry of spilled fuel into streams.

MA-GDL-RMA-03. Landings, Skid Trails, Decking, and Temporary Roads states landings, designated skid trails, staging or decking should not occur in riparian management areas, unless there are no other reasonable alternatives and provides conditions to be considered if such facilities must be located within an RMA.
MA-GDL-RMA-15. Recreation Management – Existing Facilities
Consider removing, or relocating, or re-designing existing recreation facilities that are not meeting desired conditions in riparian management areas or are in active floodplains.
MA-GDL-RMA-17. Water Drafting Sites
Water drafting sites should be located and managed to minimize adverse effects on stream channel stability and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.
MA-GDL-RMA-18. Wildland Fire and Fuels Management – Fire Line Construction
Water bars on fire lines should be located and configured to minimize sediment delivery to streams and to minimize creation of new stream channels and unauthorized roads and trails.

MA-GDL-RMA-19. Wildland Fire and Fuels Management – Burning Masticated Fuels
To minimize soil damage when burning masticated fuels within riparian management areas, burning of masticated fuel beds greater than 3 inches in depth should be accomplished with moist soil conditions.

MA-GDL-RMA-20. Direct Ignition
Direct ignition in RMAs should not be used unless effects analysis demonstrates that it would not retard attainment of aquatic and riparian desired conditions.

FW-GDL-WR-01. Aquatic Invasive Species Wildfire Suppression Equipment –
During wildfire suppression, cross contamination between streams and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident.

Vegetation management activities can cause adverse effects to bull trout; however, the Water Resource and RMA desired conditions, standards and guidelines will greatly reduce the potential for long-term adverse effects. The AEC results show that a number of subwatersheds are "functioning at risk" or "not properly functioning" for the Fire Regime and Insects and Disease attributes. Vegetation management to create a vegetation composition and structure that is more characteristic of the natural fire regime and to promote late forest structure appropriate to the biophysical environment is a component of managing for natural watershed function and may result in terrestrial and aquatic ecosystems that are more resilient to disturbance from fires or insects and disease.

Response to Climate Change

The Washington Department of Fish and Wildlife (WDFW) analyzed the effects of climate change on bull trout in the Mid-Columbia Recovery Unit in Washington, and determined they were moderately to highly vulnerable (WDFW 2015, Appx C p.C-60). They determined bull trout would be exposed to increased water temperatures, altered runoff timing, increased winter/spring flood events, and lower summer flows. The WDFW (2015, Appx C p.C-60) noted the following: "Sensitivity of Bull Trout is primarily driven by water temperature. Bull Trout are the southernmost species of Western North American char and have lower thermal tolerance than other salmonids they co-occur with. The upper incipient lethal temperature for Bull Trout was found to be 70˚F, whereas the optimal temperatures for growth were in the range of 50-59˚F. Thus Bull Trout have similar thermal optima to the salmonids they co-occur with, yet a lower thermal tolerance, indicating they have a narrower thermal niche and higher sensitivity to temperature. Indeed the geographic distribution of Bull Trout and the persistence of populations during contemporary warming has been most strongly related to maximum water temperature. The ability of Bull Trout to persist in sub-optimally warm temperatures likely depends on food abundance. As temperature increases metabolic costs, the extent to which Bull Trout can maintain positive energy balance depends on its ability to find food. Bull Trout historically relied heavily on salmon as a food resource and may be less resilient to temperatures in areas where foraging opportunities of salmon eggs and juveniles have declined. Invasive chars (Brook and Lake trout) now reside in many headwater streams and lakes, and may exclude Bull Trout from these potential coldwater refuges, increasing their sensitivity to warming. Bull Trout sensitivity to flows is likely to occur during two critical periods: 1) direct effects of altered runoff timing and magnitude on emerging fry in late winter/spring, and 2) indirect effects of low summer flows on all life phases of Bull Trout by mediating the duration and magnitude of thermal stress events."

Desired conditions place emphasis on managing RMAs so they are resilient to climate change and other disturbances. The CNF Plan will respond to climate change through the following DCs, STDs, and GDLs.

> *FW-DC-WR-13. Aquatic Threatened, Endangered, and Sensitive Species*
> National Forest System lands contribute to the recovery of federally threatened and endangered aquatic species and conservation of Regional Forester's sensitive aquatic species. Aquatic habitat supports spawning, rearing, and/or other key life history

requirements. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-14. Resiliency to Climate Change
Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin is scale is used for Forest planning and 5th field watershed scale is used for project planning.

FW-STD-WR-01. Properly Functioning Watersheds
When aquatic and riparian desired conditions are being achieved and watersheds are "functioning properly", projects shall maintain those conditions. When aquatic and riparian desired conditions are not yet achieved or watersheds have impaired function or are "functioning-at-risk" 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 be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

MA-STD-RMA-07. Road Construction at Stream Crossings
At a minimum, all new or replaced permanent stream crossings shall accommodate at least the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change.

MA-STD-RMA-08. Road Construction-Fish Passage
Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic species and for riparian-dependent organisms where connectivity has been identified as an issue. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows.

Land management objectives for forests with mixed-severity fire regimes are increasingly designed to restore successionally diverse landscapes that are resistant and resilient to current and future stressors, such as climate change (Hessberg et al. 2016). Providing for resilient RMAs, Forest, and Road conditions is key for providing productive bull trout habitat over time.

As described above, there is management direction in the CNF Plan to implement these climate change adaptations through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats. These components, in combination with the other Forest-wide CNF Plan components, show clear intent to provide habitat necessary for the recovery of bull trout. Included in the intent is to minimize habitat degradation that may make conditions more suitable for non-native competitors.

National Forest Access System Effects

Roads can have numerous adverse effects on fish and fish habitat including the interruption or alteration of geomorphic and hydrologic processes. Geomorphic impacts of roads include chronic and long-term sediment delivery to aquatic habitat, accelerated mass failures of cuts and fills depositing large quantities of sediment, and altered channel morphology if the roads confine streams and prevent access to the floodplain. Roads constructed in riparian areas damage or remove vegetation thus reducing stream shade and large woody debris input. Roads constructed in the floodplain may inhibit natural stream channel migration processes (Gucinski *et al* 2001). Meredith et al. (2014) found that in the interior Columbia Basin, the presence of near-stream roads resulted in reduced amounts of large woody debris in streams.

The effects of roads on hydrologic processes include the interception of rainfall directly on the road surface and road cutbanks affecting subsurface water moving down the hillslope; concentrating flow on the surface or in an adjacent ditch or channel; and diverting or rerouting water from normal flow paths were the roads not present. Trombulak and Frissell (2000) in their review of the ecological effects of roads cite research on how roads directly change the hydrology of slopes and stream channels. Roads intercept shallow groundwater flow paths, diverting the water along the roadway and routing it efficiently to surface-water systems at stream crossings. This can cause or contribute to changes in the timing and routing of runoff, the effects of which may be more evident in smaller streams than in larger rivers. Hydrologic effects are likely to persist for as long as the road remains a physical feature altering flow routing. Roads can deliver pollutants to aquatic habitat as the chemicals applied to roads or from vehicles runs off a road into a stream (Gucinski et al. 2001).

Roads can influence fish populations by creating passage barriers at culverts at road/stream crossings. Blocking passage is a serious issue as maintaining connectivity between populations of a species and providing access to blocked habitat are important factors in a species' long-term persistence, such connectivity to adjacent populations and habitat may be an important strategy for species to persist in a changing climate (ISAB 2007).

In addition to the effects of the roads on the physical environment and passage, roads are an indicator of the level of potential human uses or management intensity that may affect fish populations. Lee et al. (1997) found strong fish populations in the interior Columbia Basin were more frequently found in areas of low road density than high road density. Similarly, Al-Chokhachy et al. (2010) found reference watersheds generally provided higher quality physical stream habitat than managed watersheds with higher road densities. Following Lee et al. (1997), the USFWS (64 FR 17110) considers watersheds with road densities <1 mile/square mile and no valley bottom roads as one measure of properly functioning watersheds for bull trout recovery. The USFWS considers road densities of 1-2.4 miles/square mile to be "functioning at risk", and road densities greater the 2.4 miles/square mile to be "not properly functioning".

Off-highway Vehicle (OHV) trails that are not designed or maintained properly, including the drainage system, can be sources of chronic and long-term sediment delivery to streams. Negative impacts of soil and watershed functions from OHV activities include soil compaction, reduced

water infiltration capacity, increased erosion, and damage to vegetation. Extensive networks of OHV routes across a landscape, especially on steep slopes, can direct or alter the direction of surface flows forming gullies that channel sediment and contaminants into aquatic systems (Ouren et al. 2007).
The access system can also be a vector for AIS. Boats coming from water bodies with AIS can introduce AIS, infecting a previously unaffected system. Road construction and maintenance often requires water that is obtained by pumping out of nearby streams. A pump that has been previously used in waters with AIS can transmit the AIS into new uninfected waters. Pumping water from streams can also entrain juvenile fish, such as bull trout resulting in direct mortality. During road construction reconstruction and maintenance both pumps and vehicles need to be refueled near the work site creating the potential for a fuel spill.

The effects of roads and trails on watershed function can be reduced by considering the location, design, and employing design or maintenance methods to disperse runoff (Furniss et al. 1991). Road removal or decommissioning creates a short-term disturbance which may temporally increase sediment but over the long-term, decommissioning can reduce chronic erosion and the threat of landslides.

Minimizing the threat of roads in key watersheds is further emphasized with standard *FW-STD-WR-06 Road Construction and Hydrologic Risk Reduction in Key Watersheds*. In key watersheds with ESA listed fish critical habitat that are "functioning properly" with respect to roads, there will be no net increase is system roads that affect hydrologic function. In key watersheds with ESA critical habitat for aquatic species that are "functioning-at-risk" or have impaired function with respect to roads, there will be a net decrease (for every mile of road construction there would be greater than one mile of road-related risk reduction) in system roads that affect hydrologic function to move toward proper function. Treatment priority shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. As with other site-specific actions, road-related treatment at the project-level may require individual consultation. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction.

One desired condition and eight standards and guidelines are designed to minimize effects from roads. The desired condition *MA-DC-RMA-04 Roads* reflects the Forest's intent that roads will not be a substantial risk to soil or hydrologic function; and do not disrupt riparian and aquatic function. The standards and guidelines designed to specifically reduce the potential for adverse effects due to the access system include:

> *FW-STD-WR-05 Construction of New Roads, Trails and Developed Recreation Sites*
> New roads and trails will be designed to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over land drainage features. New roads, trails and developed recreation sites will integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

MA-STD-RMA-06. Road and Trail Construction and Maintenance
No sidecasting or placement of fill in riparian management areas, except where needed to construct or replace stream crossings. Snowplowing activities shall not allow runoff from roads and trails in locations where it could deliver sediment to streams.

MA-STD-RMA-07. Road Construction at Stream Crossings
At a minimum, all new or replaced permanent stream crossings shall accommodate at least the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change.

MA-STD-RMA-08. Road Construction-Fish Passage
Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic species and for riparian-dependent organisms where connectivity has been identified as an issue. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows.

FW-GDL-WR-04. Hydrologic Function of Roads, Trails, and Developed Recreation Sites
Roads and trails should be maintained to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over-land drainage features. Roads and trails should integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

MA-GDL-RMA-01. Fuel Storage
Refueling shall occur with appropriate containment equipment and a spill response plan in place. Wherever possible, storage of petroleum products and refueling will occur outside of RMAs. If refueling or storage of petroleum products is necessary within RMAs, these operations will be conducted no closer than 100 feet from waterways**.**

MA-GDL-RMA-04. Road Construction –
Construction of permanent or temporary roads in riparian management areas should be avoided, except where Forest authorities are limited by laws and regulation, and except where necessary (examples are provided in CNF Plan p.127).

MA-GDL-RMA-05. Temporary Road Reconstruction
Temporary roads in RMAs should be avoided. When avoidance is not possible, temporary roads in RMAs should be managed to protect and restore aquatic and riparian desired conditions.

MA-GDL-RMA-06. Road Construction – Wetlands and Unstable Areas –
Wetlands and unstable areas should be avoided when reconstructing existing roads or constructing new roads and landings. Impacts should be mitigated where avoidance is not possible.

MA-GDL-RMA-07. Road and Trail Management – Drainage
Road and trail drainage should be routed away from potentially unstable channels, fills, and hillslopes.

MA-GDL-RMA-08. Road and Trail Construction – Passage for Riparian-dependent Species
Construction or reconstruction of stream crossings should allow passage for other riparian-dependent species where connectivity has been identified as an issue.

MA-GDL-RMA-09. Road and Trail Construction—Minimization of Diversion Potential
Where feasible, new or reconstructed stream crossings should be designed to prevent the diversion of streamflow out of the channel and down the road or trail in the event of crossing failure. If avoidance is not possible, minimize the potential effects of crossing failure.

The AEC assessment found in the Pend Oreille subbasin that the attributes associated with roads were "functioning at risk" or "not properly functioning" for road densities (19 subwatersheds), riparian road densities (19 subwatersheds), and roads on sensitive soils (eight subwatersheds). While it is not possible to eliminate all the adverse effects of roads and to a lesser extent trails, the Water Resource and RMA standards and guidelines and objectives will help reduce the current effects of the access system. The RMA Standards and Guidelines reduce the potential for future adverse effects due to new road construction and reconstruction, as well as minimize the potential for fuel spills, introducing AIS into waterbodies, and entraining juvenile bull trout during construction, reconstruction and maintenance activities. Standards for constructing new and reconstructing existing road stream crossings will prevent creating future fish passage barriers. The Key Watershed and Water Resource objectives for improving passage will help connect currently disconnected habitat.

Livestock Grazing

The potential effects of livestock grazing on fish habitat have been well documented (*e.g*. Platts 1991, Spence et al. 1996, BA p.181-182). The potential adverse effects of grazing include soil erosion and sediment delivery to streams; soil compaction; alteration or removal of riparian vegetation that provides shade, cover, a terrestrial food source and stabilizes stream banks; altered channel morphology including channel widening, increased bank instability and loss of undercut banks. Al-Chokhachy et al. (2010) found the presence of cattle in watersheds sampled across the interior Columbia Basin and the Missouri River Basin often resulted in degraded physical aquatic habitat conditions, especially where grazing occurred in watersheds with high road densities. Grazing can result in direct mortality to bull trout if livestock trample redds (Gregory and Gamett 2009).

The CNF Plan does not include any changes to grazing allotments, but does include new desired conditions and standards and guidelines for managing the grazing program. There are 8 grazing allotments in the Pend Oreille subbasin, in both the current Forest Plan and the CNF Plan (Figure 6).

Colville National Forest
Bull Trout Critical Habitat and Range Management Units

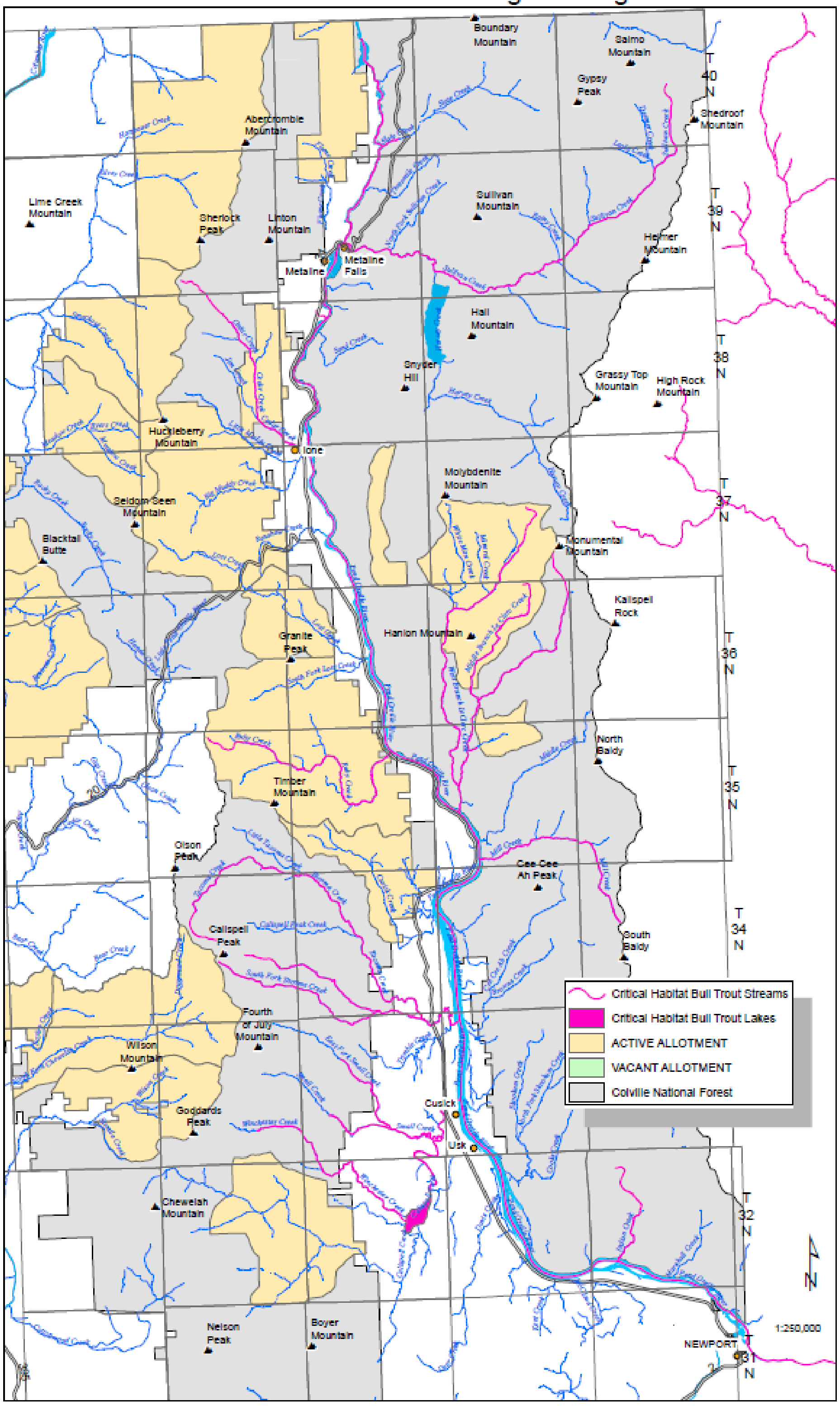


Figure 6. Bull Trout Critical Habitat, and Range Management Units in Pend Oreille River Watershed.

The Livestock Grazing program desired conditions include managing grazing for native plant communities with few to no invasive plant species, having stable or improving ecological conditions, and conditions are resilient to disturbance events. The CNF Plan includes DCs, STDs, and GDLs specifically developed to prevent or minimize the potential adverse effects grazing can have on riparian and aquatic habitat:

> *FW-DC-LG-01. Plant Community Structure and Diversity.*
> Riparian and upland areas within allotments reflect ecological conditions supporting the desired conditions, including those described in the Wildlife, Aquatic and Riparian, Soil, and Vegetation Desired Conditions.
>
> *FW-DC-LG-02. Economic and Social Contributions*
> Rangelands and forestlands provide forage for use by both livestock and wildlife. Grazing continues to be a viable use of vegetation on the Forest. Availability of lands identified as suited for this use contributes to providing animal products, economic diversity, open space, and promotes cultural values and a traditional local life style. Allotments are generally grazed on an annual basis.
>
> Consistent with sustaining other resource desired conditions, a viable level of forage is available for use under a grazing permit system where use generally occurs on an annual basis generally between June and October. Riparian and upland areas within allotments reflect ecological conditions supporting the desired conditions, including those described in the Wildlife, Aquatic and Riparian, Soil, and Vegetation Desired Conditions.
>
> *FW-DC-LG-03. Deer and Elk Forage on Grazing Allotments*
> Adequate browse and forage occurs on deer and elk summer and winter ranges within commercial grazing allotments during the critical winter period of December 15 to April 1.
>
> *FW-GDL-LG-01. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments*
> If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey.

Additional DCs, STDs, and GDLs apply to grazing within RMAs:

> *MA-DC-RMA-03. Livestock Grazing* - Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment.
>
> *MA-STD-RMA-09. Management of Livestock Grazing to Attain Desired Conditions* directs that grazing be managed to move toward aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing management, including removal of livestock if adjusting grazing practices is not successful.

MA-STD-RMA-10. Recreational and Permitted Grazing Management-Livestock Handling, Management, and Water Facilities
New and replaced livestock handling and/or management facilities and livestock trailing, salting, and bedding are prohibited in riparian management areas unless they do not prevent or retard attainment of aquatic and riparian desired conditions, inherently must be located in an RMA, or are needed for resource protection.

MA-STD-RMA-11. Permitted Grazing Management-Allotment Management Planning
During allotment management planning, negative impacts to water quality and aquatic and riparian function from existing livestock handling or management facilities located within riparian management areas shall be minimized to allow conditions to move toward the desired condition.

MA-GDL-RMA-11 - Annual Grazing Use Indicators establishes livestock use indicators for stubble height, utilization of deep-rooted herbaceous vegetation, streambank alteration, and utilization of woody browse as starting points for managing grazing depending upon the ecological condition of riparian and aquatic habitat. These are described in detail in the Riparian Management Areas section of the proposed action on p.24.

MA-GDL-RMA-12. Recreational and Permitted Grazing Management – Livestock Handling Activities
Livestock trailing, bedding, loading, and other handling activities should be avoided in riparian management areas, except for those that inherently must occur in a riparian management area.

MA-GDL-RMA-13. Recreational and Permitted Grazing Management - Fish Redds
Avoid livestock trampling of Federally-listed Threatened or Endangered fish redds.

Components in the CNF Plan are expected to improve the rate of habitat improvement. MA-GDL-RMA-11 adds indicators (based on best available science) that will maintain conditions in "functioning properly" subwatersheds and improve conditions in "functioning at risk subwatersheds". The potential effects of livestock grazing on bull trout habitat include soil erosion and sediment delivery to streams; soil compaction; alteration or removal of riparian vegetation that provides shade, cover, a terrestrial food source and stabilizes stream banks; altered channel morphology including channel widening, increased bank instability and loss of undercut banks. There are eight grazing allotments in the Pend Oreille River subbasin. Future adverse effects from grazing may still occur; however, the CNF Plan includes one desired condition, four standards and one guideline specifically developed to prevent or minimize the potential adverse effects grazing can have on riparian and aquatic habitat.

Mining Effects

Spence et al. (1996) reviewed the effects of mining on fish habitat. In general, mining activities can increase sediment delivery, cause changes in the substrate and increase streambed and streambank stability. Mining activities may fundamentally alter the way water and sediment are transported through a river system, altering the erosional and depositional processes changing channel configuration. Increased turbidity can not only affect salmonids but also the macroinvertebrate community. Mining operations can damage streamside vegetation that shades streams and stabilizes streambanks. Toxic effects of materials used in mining or metals released into the stream environment can affect growth, reproduction behavior and migration of salmonids and degrade macroinvertebrate habitat (BA p. 183-184).

There is currently one large mining operation near Metaline Falls, a slate rock mining operation on private lands in the Indian Creek drainage, and suction dredging is common in Sullivan Creek. The recovery plan (USFWS 2015a) includes an action specific to mining:

- 1.2.1 Washington Department of Fish and Wildlife (WDFW) and partners will address mining impacts in Sullivan Creek. Minimize or eliminate impacts of dredging and sluicing within Sullivan Creek.

The CNF Plan does not authorize any new mining operations on the Forest. The CNF Plan does however address new mining operations with specific standards for mining and through the identification of suitable uses within RMAs in order to avoid or minimize the effects of mining operations on bull trout. There is one mining desired condition, *FW-DC-MIN-02. Reclamation and Extraction*, for operations to include interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats. There are eight standards developed to minimize the potential impacts of mining operations:

> *MA-STD-RMA-18. Mineral Operations in RMAs*
> For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian-dependent resources affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service has limited discretionary authorities. In those cases, project effects shall be minimized and shall not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities.
>
> *MA-STD-RMA-19. Operating Plans for Existing Activities*
> Work with operators to adjust their mineral operations to minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects.
>
> *MA-STD-RMA-20. Structures and Support Facilities*
> Work with operators to locate structures, support facilities, and roads outside RMAs. Where no alternative exists, work with operators to locate and manage them to minimize effects upon aquatic and riparian desired conditions. When structures, support facilities, and roads are no longer required for mineral activities, reclaim sites to achieve aquatic and riparian desired conditions. Require operations to provide financial assurance adequate for the forest to reclaim disturbed areas in the absence of a financially solvent operator. Bonding will be posted prior to approval of any Plan of Operations.

MA-STD-RMA-21. Mine Waste

Do not locate mine waste with the potential to generate hazardous substances (as defined by CERCLA) within RMAs and/or areas where groundwater contamination is possible. The exception is short-term staging of waste during abandoned mine cleanup.

MA-STD-RMA-22. Leasable Exploration and Development

Consent decisions to allow mineral leasing will provide BLM stipulations for lease management. Once leased, the Forest will actively coordinate and consult with BLM regarding lease exploration and development activities. In consultation with the BLM, the Forest will recommend BMPs and mitigation as Conditions of Approval to support attainment and maintenance of aquatic and riparian desired conditions.

MA-STD-RMA-23. Saleable Minerals

Prohibit saleable mineral activities such as sand and gravel mining and extraction within RMAs unless no alternatives exist and if the action(s) will not retard or prevent attainment of aquatic and riparian desired conditions.

MA-STD-RMA-24. Inspection and monitoring of mineral plans, leases, and permits

Conduct inspections, monitor, and annually review required monitoring for mineral plans, leases, and permits. Evaluate inspection and monitoring results and require mitigations for mineral plans, leases, and permits as needed to eliminate impacts that retard or prevent attainment of aquatic and riparian desired conditions.

MA-STD-RMA-25. Suction Dredge and Placer Mining

Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations and their designated critical habitat. All suction dredge mining activities in occupied habitat for aquatic threatened or endangered species/populations and in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or "will likely cause significant disturbance of surface resources."[18] A likelihood that a threatened or endangered species "take" (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics.

If the district ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the district ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance.

The mining standards when combined with Forest-wide Water resource plan components and are an improvement over current direction. Not all impacts of mining can be avoided but the standards will help minimize potential impacts. *MA-STD-RMA-25* directly applies to suction dredging. The plan provides additional protection to bull trout habitat in that saleable mineral development and surface occupancy for leasable mineral operations may not be authorized as identified in the suitable uses for RMAs.

Recreation Effects

Recreation is a large program with the potential to affect bull trout and habitat. The desired conditions for the recreation program include providing a variety of high quality, nature-based outdoor recreational settings and opportunities varying from primitive to urban in both developed (e.g., campsites, vistas, parking areas) and dispersed (e.g., camping, backcountry skiing, boating, mushroom and berry picking, hunting, and fishing) recreation settings (BA p. 182-183). The potential effects to bull trout and habitat due to recreation include effects due to the access system maintained to support the recreation activities (discussed previously) and the human disturbance to the environment and/or individual bull trout at dispersed and developed sites. The potential effects of developed and dispersed camping are similar, the major difference being developed sites have been dedicated to recreation. The concentrated human use of developed and dispersed sites can lead to soil compaction and trampled vegetation, exposing soils to erosion accelerating sediment delivery to streams. Riparian and streamside vegetation may be damaged or destroyed by removing shade, resulting in increased solar radiation reaching a stream and increasing water temperatures. Large wood that is important for providing complex aquatic habitat and instream cover for fish may be lost as hazard trees are felled in developed sites and by unauthorized firewood cutting in dispersed sites. Loss of streamside vegetation can result in destabilizing streambanks as the roots holding the banks together are damaged causing accelerated bank erosion contributing excess sediment to the stream system and channel widening. Wider streams with shallow flow are subject to greater amounts of warming plus loss of deep pools necessary for adult bull trout holding during spawning migrations and loss of overhead hiding cover for both juvenile and adult bull trout. Litter fall from streamside vegetation is an important food source for aquatic macroinvertebrates that provide food for juvenile bull trout and the vegetation provides habitat for terrestrial insects that are also an important food source.

Camping and other recreation uses may also encourage harassment of spawning fish, especially bull trout that spawn in the late summer and fall. Redds may be damaged, resulting in egg and alevin mortality if disturbed by campers. Finally, recreation activities, especially boating, can introduce AIS into previously uninfected waters. In general the effects of recreation activities, other than the transportation are confined to the site; however, larger scale effects may result from additive impacts of multiple recreation sites. As in all activities, project-level consultation may be required for site-specific recreation actions.

To minimize recreation effects, *FW-GDL-REC-02. Dispersed Recreation* states that the priority for facilities or minor developments in dispersed sites includes protection of the environment and dispersed campsites should not be designated in areas with sensitive soils or within 50 feet of streams, wetlands, or riparian areas. However, RMA components provide more complete direction to minimize the potential effects of recreation.

RMA guidelines specific to recreation activities, other than those previously mentioned for the Access System and Livestock grazing programs, that will help minimize the potential adverse effects of recreation to bull trout habitat include:

> *MA-GDL-RMA-02. Felling Trees*
> When trees are felled for safety, they should be retained onsite (channels and adjacent floodplains) to maintain, protect, or enhance aquatic and riparian resources unless otherwise determined that such trees pose a new risk to administrative or developed recreation sites.
>
> *MA-GDL-RMA-14. Recreation Management – New Facilities and Infrastructure*
> New Facilities and Infrastructure is designed to keep new facilities or infrastructure outside expected long-term channel migration zones. Those facilities that inherently occur in riparian management areas (e.g., road stream crossings, boat ramps, docks, interpretive trails) should be located to minimize impacts on riparian-dependent resource conditions (e.g., within geologically stable areas, avoiding major spawning sites).
>
> *MA-GDL-RMA-15. Recreation Management – Existing Facilities*
> Consider removing, or relocating, or re-designing existing recreation facilities that are not meeting desired conditions in riparian management areas or are in active floodplains.

Key watershed objectives include restoring riparian vegetation on 75-450 acres in key watersheds, some of which will be sites associated with dispersed recreation. RMA objective *MA-OBJ-RMA-01 Improve Riparian Function at Dispersed and Developed Recreation Sites* is to restore riparian processes at 75 sites through education, enforcement, and engineering where recreational use results in bank damage, reduction in water quality, and/ or a reduction in stream shade.

The treatment of invasion by AIS species is addressed in *FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species*, specifying that within the next 15 years, implement aquatic invasive species control and eradication at 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and ecological systems are determined to be unacceptable.

The recreation-specific guidelines combined with the overarching standards and guidelines for RMAs provide management direction to implement actions necessary to minimize the potential effects of the Recreation Program on riparian processes and bull trout.

Lands and Special Uses Effects

The Forest "Lands" program includes real estate type activities (including land exchanges and acquisitions, granting or accepting of easements). The Lands program can be beneficial to bull trout in that one of the reasons for land acquisition is to maintain, restore, and enhance plant, wildlife, and riparian aquatic and riparian-dependent resources and habitat including aspects of connectivity, foraging and reproduction for threatened and endangered and species of conservation concern. The Lands program activities will continue as they do in the current Forest Plan.

Special uses include permitting activities other than those uses included in the regulations governing the disposal of timber, minerals, and the grazing of livestock. The Forest administers a variety of uses under special use permits, leases, or easements. A permit for a special use is governed by the management direction for the area the special use permit, lease, or easement is authorized. The effects of a special use will be determined at the time a request for a permit is received and there is no way to know what uses may be requested in the future. Current special use permits may need to be modified in order to meet the new direction provided by the CNF Plan.

The potential effects of special uses within RMAs will be minimized as all special uses will not only need to meet the RMA standards and guides but will also be constrained by *MA-STD-RMA-16 Lands and Special Use Authorizations*. The standard states all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation, or improvement of those conditions and processes. These authorizations include, but are not limited to, water diversion or transmission facilities (e.g, pipelines, ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals. Hydropower special uses are further constrained by *MA-STD-RMA-17 Hydroelectric New Support Facilities* that requires new support facilities to be located outside of RMAs.

Additional Hydroelectric constraints are included in the standards for key watersheds (BA p.173). In addition to the standard regarding roads in key watersheds, the Forest-wide and RMA standards and guidelines, there are two additional standards specific to key watersheds: *FW-STD-WR-07 Hydroelectric and Other Water Development Authorizations in Key Watersheds* and *FW-STD-WR-08 New Hydroelectric Facilities and Water Developments*, that provide extra protection to key watersheds from potential adverse effects of hydropower and other water developments.

Monitoring

In addition to the CNF Plan components described above, there are aquatic habitat monitoring questions that will be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

> *MON-WTS-01:* Are management actions contributing to improved watershed condition class within focus, key, and priority watersheds, and other watersheds identified for restoration?

MON-WTS-02: Are management actions reducing road impacts to watershed and aquatic habitat function and water quality within all watersheds across the Forest? Within Key, Focus, and Priority Watersheds?

MON-WTS-03: Are management actions improving key riparian processes within Riparian Management Areas?

MON-WTS-04: Are water resources and RMA standards, guidelines, and best management practices (BMPs) being implemented at project sites? Are standards, guidelines, and BMPs effective at achieving desired conditions?

MON-WTS-05-01: What is the status and trend of water quality?

MON-AQH-01: Are management activities across the Forest contributing to the viability of riparian and wetland-dependent TES and surrogate species?

MON-AQH-02: Are management actions improving conditions within Riparian Management Areas where livestock grazing is permitted?

MON-AQH-03: Are management actions preventing the spread of aquatic invasive species?

The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments.. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects

Forest management programs, especially vegetation management, the access system, livestock grazing, minerals, and lands and special uses all can adversely affect bull trout. The Water Resource and RMA desired conditions, standards and guidelines are expected to limit adverse effects of management activities to short-term effects that do not degrade watershed and riparian desired conditions or slow progress towards achieving the desired conditions. The CNF Plan includes an integrated watershed and aquatic resource monitoring program designed to assess if management actions during CNF Plan implementation are meeting or moving towards the desired conditions. The CNF Plan includes specific objectives for improving watershed and aquatic habitat conditions, and population and habitat connectivity, particularly within the key watersheds. Aquatic habitat within the Pend Oreille subbasin (and the Forest as a whole) appears to be improving and is expected to continue with implementation of the CNF Plan. Effects from implementation of the CNF Plan are summarized as follows:

- Bull trout are more likely to occur within the Pend Oreille River sub-basin and Salmo River portions of the CNF. Future actions implemented under the CNF Plan are more likely to increase documentation of bull trout within those subbasins. Currently, bull trout in the Northeastern Washington Research Needs Area occur in low densities, have been documented at the mouths of tributaries to Lake Roosevelt, and occur mostly outside of the CNF. However, since the duration of the CNF Plan is 15 years bull trout distribution may change over time, changing the likelihood of bull trout exposure across the forest. Therefore, while effects today are more likely in Pend Oreille and Salmo subbasins, future effects could occur over a broader area.

- The goal of the ARCS is to minimize long-term impacts to aquatic resources from management actions by the CNF. The MAs and ARCS include several forest-wide aquatic and/or watershed DCs, STDs, and GDLs that will conserve bull trout habitat and minimize adverse effects to the bull trout. The RMAs will allow for careful management to achieve riparian, aquatic and landscape scale desired conditions while protecting the important ecological processes in fish bearing streams, intermittent streams, and other aquatic systems. The RMA widths should be protective of aquatic ecological functions. The protections are expected to provide benefits to bull trout not just through improved habitat, but also to forage species.

- The Key Watersheds include all subwatersheds with bull trout critical habitat, and > 25% of the subwatersheds within the CNF. While key watersheds are the priority for restoration, focus and priority watersheds are used to target implementation of short-term, opportunistic restoration work. These actions will benefit all native species on the CNF, as well as bull trout through improved conditions for habitat, and forage.

- Vegetation management including timber harvest or prescribed fire can reduce large wood input to stream channels, remove shade resulting in increased summer stream temperatures, result in accelerated erosion and sediment delivery to stream channels. Pumps and other equipment used to deliver water to manage prescribed fire or wildfire can also transmit AIS from infected waters to unaffected waters. While adverse effects may continue to occur, implementation of the ARCS components minimizes these effects.

- Vegetation management to create a vegetation composition and structure that is more characteristic of the natural fire regime and to promote late forest structure appropriate to the biophysical environment is a component of managing for natural watershed function and may result in terrestrial and aquatic ecosystems that are more resilient to disturbance from fires or insects and disease.

- There is management direction in the CNF Plan to respond to climate change, including an emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats. These components in combination with the other Forest-wide CNF Plan components should minimize the effects of climate change on bull trout.

- While it is not possible to eliminate all the adverse effects of the Access System, including roads and to a lesser extent trails, the Water Resource and RMA standards and guidelines and objectives will help reduce the current effects of the access system. The RMA Standards and Guidelines reduce the potential for future adverse effects due to new road construction and reconstruction, as well as minimize the potential for fuel spills, introducing AIS, into waterbodies, and entraining juvenile bull trout during construction, reconstruction and maintenance activities. Standards for constructing new and reconstructing existing road stream crossings will prevent creating future fish passage barriers. The Key Watershed and Water Resource objectives for improving passage will help connect currently disconnected habitat.

- The potential effects of livestock grazing on bull trout habitat include soil erosion and sediment delivery to streams; soil compaction; alteration or removal of riparian vegetation that provides shade, cover, a terrestrial food source and stabilizes stream banks; altered channel morphology including channel widening, increased bank instability and loss of undercut banks. There are 8 grazing allotments in the Pend Oreille River subbasin. Future adverse effects from grazing may still occur, however the CNF Plan includes one desired condition, four standards and one guideline specifically developed to prevent or minimize the potential adverse effects grazing can have on riparian and aquatic habitat.

- Mining activities may alter the way water and sediment are transported through a river system, impair water quality, effect the macroinvertebrate community, and damage streamside vegetation that shades streams and stabilizes streambanks. Not all impacts of mining can be avoided but the standards will help minimize potential impacts. The plan provides additional protection to bull trout habitat in that saleable mineral development and surface occupancy for leasable mineral operations may not be authorized as identified in the suitable uses for riparian management areas.

- The potential effects of recreation, including developed and dispersed camping , include soil compaction and trampled vegetation causing sediment delivery to streams, removal of shade, decreasing large woody debris as hazard trees are felled in developed sites and by unauthorized firewood cutting in dispersed sites, loss of streamside vegetation causing accelerated bank erosion and resulting in channel widening. The recreation-specific guidelines combined with the overarching standards and guidelines for RMAs provide management direction to implement actions necessary to minimize the potential effects of the Recreation Program on riparian processes and bull trout.

- The potential effects of special uses within RMAs will be minimized as all special uses will not only need to meet the RMA standards and guides but will also be constrained by *MA-STD-RMA-16 Lands and Special Use Authorizations*. The standard states all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation, or improvement of those conditions and processes.

- Appendix B provides a matrix comparing the CNF Plan to the Bull Trout Recovery Plan expectations. The CNF Plan provides direction consistent with the recovery plan.

The CNF Plan in general, and particularly the Water Resource, RMA, and key watershed plan components, are intended to restore ecological resiliency and protect watershed and stream channel processes. Restoring resiliency, protecting ecological processes and improving habitat and population connectivity are likely the best strategy for helping bull trout survive in changing climate conditions.

EFFECTS OF THE ACTION: Critical Habitat

All bull trout critical habitat on the CNF is located on tributaries to the Pend Oreille River and includes Calispell, Tacoma, Ruby, Cedar, LeClerc, Slate and Sullivan Creeks. These tributaries lie within the Clark Fork River Basin CHU (31). The effects to bull trout critical habitat PBFs are discussed by major topics below. Much of the discussion summarizes what was already addressed under bull trout.

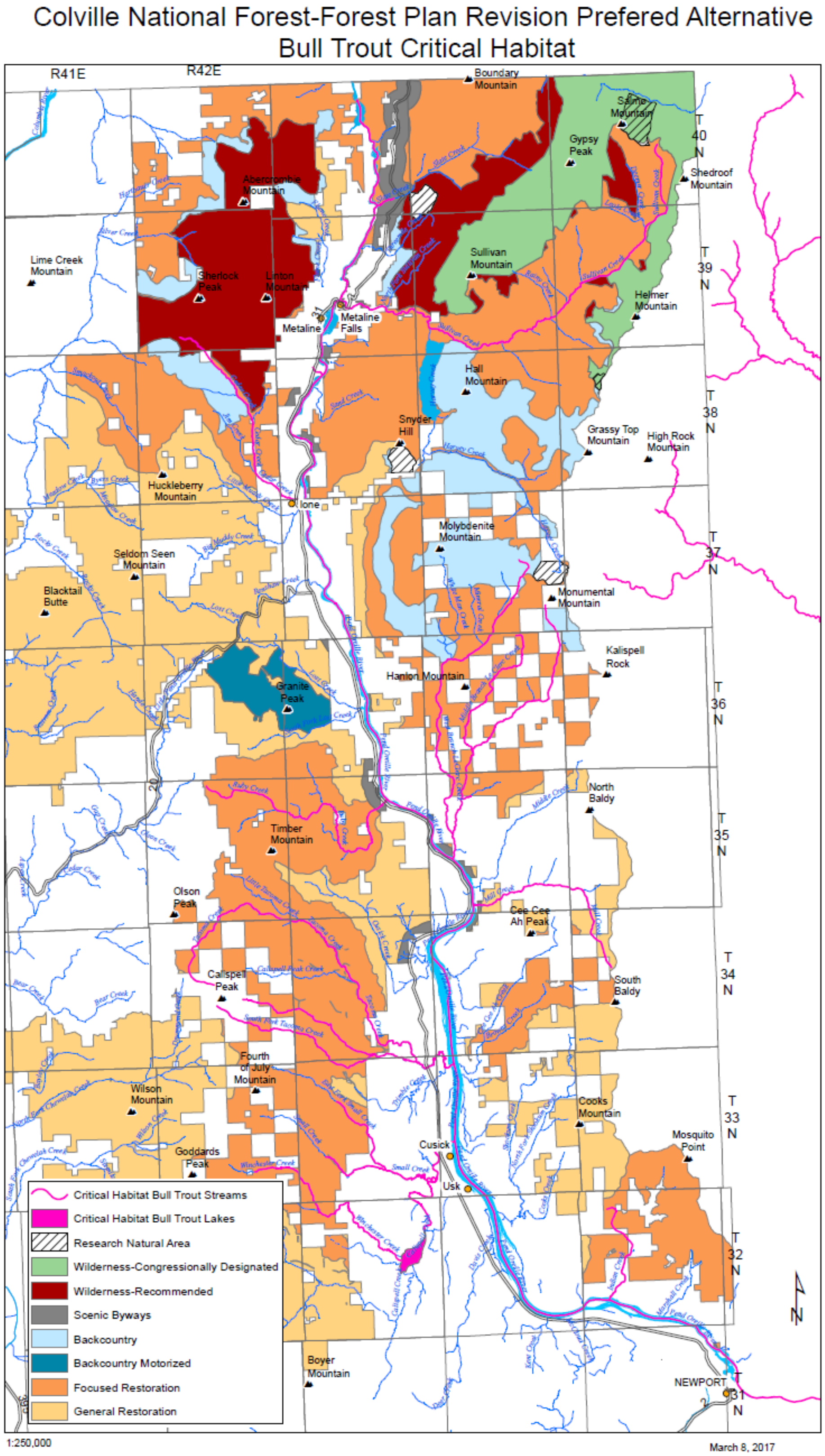


Figure 7. Critical Habitat and MAs in the Pend Oreille River Watershed.

ARCS and MAs

The CNF Plan key watersheds are shown in Figure 1 in the description of the proposed action. The key watersheds include all of subwatersheds with bull trout critical habitat and > 25% of the subwatersheds within the CNF. There is critical habitat within the Calispell Creek, Cusick Creek-Pend Oreille, Maitlen Creek Pend-Oreille River, and Yokum Lake-Pend Oreille River subwatersheds, but the critical habitat is not within the Forest boundary. There is also possibly a very small amount (less than a mile) of critical habitat within the Forest in the Pewee Creek-Pend Oreille River subwatershed with greater than 25% CNF managed land. Although these above mentioned subwatersheds are not included in the key watershed network, Forest-wide and RMA plan components are expected to provide high quality water and protect the riparian and watershed ecological processes that can contribute to providing downstream habitat conditions for bull trout.

The key watershed objectives that have been identified for key watersheds with bull trout critical habitat include 57 miles of road improvements, improving fish and other aquatic organism passage at 22 road/stream crossings, 70 acres of range infrastructure improvement, improving riparian vegetation structure on between 75-450 acres, and restoring 52 miles of stream habitat (BA p.173; and BA Table 9).

Critical habitat and management areas are displayed in Figure 7. The bull trout effects discussion (above) described the effects of the ARCS and MAs; the effects will be similar for critical habitat. The potential threats to bull trout critical habitat will be avoided or greatly reduced by the Forest-wide Water Resource and RMA plan components (desired conditions, standards and guidelines) that have been previously discussed for bull trout. The proposed action section of this Opinion describes the RMA size for fish-bearing streams; permanently flowing non-fish-bearing stream; constructed ponds and reservoirs, and wetlands greater than one acre; lakes and natural ponds; and discusses the approach for intermittent streams. Appendix A compares existing aquatic management under INFISH, to that expected under the CNF Plan. The CNF Plan strategy is more protective for aquatic habitat than INFISH for the following components: implementation of key watersheds that are prioritized for restoration, aquatic invasive species measures, certain quantified goals for restoration and habitat improvement, addressing infrastructure, stream restoration, dispersed recreation, roads, and livestock grazing. The Water Resources and RMA standards and guidelines for specific management activities further help either avoid or minimize the potential effects to bull trout critical habitat due to the specific activity. The CNF management direction supports all nine PBFs, and ensures maintenance or improvement of the aquatic functions needed by bull trout.

Vegetation Management, Restoration, Fire, Climate Change

Effects to critical habitat from vegetation management are similar to those described above for bull trout. Vegetation management activities can cause adverse effects to PBFs and critical habitat, however the Water Resource and RMA desired conditions, standards and guidelines will greatly reduce the potential for long-term adverse effects. Vegetation management to create a vegetation composition and structure that is more characteristic of the natural fire regime and to promote late forest structure appropriate to the biophysical environment is a component of managing for natural watershed function and may result in terrestrial and aquatic ecosystems that are more resilient to disturbance from fires or insects and disease, thereby minimizing adverse effects on PBFs and critical habitat.

FW-DC-WR-14, Resiliency to Climate Change, expects management of aquatic and riparian ecosystems to be resilient to climate change. Land management objectives for forests with mixed-severity fire regimes are to restore successionally diverse landscapes that are resistant and resilient to current and future stressors, such as climate change (Hessberg et al. 2016). Providing for resilient RMA, Forest, and Road conditions is key for providing productive critical habitat over time. As described previously for bull trout, there is management direction in the CNF Plan to implement these climate change adaptations through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats. These components in combination with the other Forest-wide CNF Plan components, show clear intent to provide PBFs necessary for the recovery of bull trout, including avoiding degredation of habitats.

National Forest Access System Effects

Minimizing the threat of roads in key watersheds is emphasized with standard FW-STD-07 Road Construction and Hydrologic Risk Reduction in Key Watersheds (BA p.172). In key watersheds with bull trout critical habitat that is "functioning properly" with respect to roads, there will be no net increase in system roads that affect hydrologic function. In key watersheds with bull trout critical habitat that is "functioning-at-risk" or has impaired function with respect to roads, there will be a net decrease (for every mile of road construction there would be greater than one mile of road-related risk reduction) in system roads that affect hydrologic function to move toward proper function. Treatment priority shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction.

Roads and other access can have direct or indirect effects on all PBFs. While it is not possible to eliminate all the adverse effects of roads and to a lesser extent trails as long as the access system is in place, the Water Resource and RMA standards and guidelines, as well as the key watershed and Water Resource objectives to improve roads that are hydrologically connected to streams will help reduce the current effects of the access system. The RMA Standards and Guidelines reduce the potential for future adverse effects due to new road construction and reconstruction, as well as minimize the potential for fuel spills, introducing AIS, into waterbodies, and entraining juvenile bull trout during construction, reconstruction and maintenance activities. Standards for constructing new and reconstructing existing road stream crossings will prevent creating future fish passage barriers. The key watershed and Water Resource objectives for improving passage will help connect currently disconnected habitat.

Livestock Grazing Effects

The main PBFs affected by livestock grazing are PBF 4 (complex aquatic environments) and PBF 8 (sufficient water quality and quantity). The CNF Plan components that have been developed to reduce the potential impacts of grazing to bull trout and bull trout habitat are more complete than the current direction in INFISH and therefore the improvements being noted within DMAs are expected to continue at least at the current pace if not faster, and are an improvement over current direction. *MA-GDL-RMA-10* adds indicators (based on best available science) that will maintain conditions in "functioning properly" subwatersheds and improve conditions in "functioning at risk" subwatersheds.

Mining Effects

The main PBFs affected by mining include PBF 4 (complex aquatic environments), PBF 6 (spawning substrates) and PBF 8 (sufficient waters quality and quantity). The mining standards are as stringent, if not more so, than the INFISH standards and guidelines, and when combined with Forest-wide Water resource plan components are an improvement over current direction. Not all impacts of mining can be avoided but the standards will help minimize potential impacts. *MA-STD-RMA-23* directly applies to suction dredging. The CNF Plan provides additional protection to bull trout habitat in that saleable mineral development and surface occupancy for leasable mineral operations may not be authorized as identified in the suitable uses for riparian management areas.

Recreation Effects

Recreation can have direct and indirect impacts on most or all of the PBFs. The recreation-specific guidelines combined with the overarching standards and guidelines for RMAs provide management direction to implement actions necessary to minimize the potential effects of the Recreation Program on riparian processes and bull trout. The direction is at least equal to the direction in INFISH. The objectives addressing recreation impacts provide specific direction to improve riparian and aquatic habitat where recreation impacts have occurred and prevent AIS invasion that is not included in INFISH.

Lands and Special Uses Effects

Depending on the site specific details, Lands and Special Uses could have indirect effects on all PBFs. The potential effects of special uses within RMAs will be minimized as all special uses will not only need to meet the RMA standards and guides but will also be constrained by *MA-STD-RMA-14 Lands and Special Use Authorizations*. The standard states all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation, or improvement of those conditions and processes. These authorizations include, but are not limited to, water diversion or transmission facilities (e.g, pipelines, ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals. Hydropower special uses are further constrained by *MA-STD-RMA-15. Hydroelectric New Support Facilities* that requires new support facilities to be located outside of RMAs.

Additional Hydroelectric constraints are included in the standards for key watersheds (BA p.173). In addition to the standard regarding roads in key watersheds, the Forest-wide and RMA standards and guidelines there are two additional standards specific to key watersheds, FW-STD-

WR-08 Hydroelectric and Other Water Development Authorizations in Key Watersheds and FW-STD-WR-09 New Hydroelectric Facilities and Water Developments, that provide extra protection to key watersheds from potential adverse effects of hydropower and other water developments.

Summary of Effects to Critical Habitat

Most actions that will be implemented under the direction of the CNF Plan have the potential to affect the PBFs of critical habitat either directly or indirectly, in a beneficial or negative manner. Land management activities that disturb the soil surface and alter vegetation have the greatest potential for and risk of adverse effects. The management programs that have the greatest potential to affect bull trout critical habitat are Vegetation Management, the National Forest Access System, Livestock Grazing, Mining, Recreation, and Lands and Special Uses. The CNF Plan designates MAs, where, depending upon the intent and CNF Plan components for the MA, management activities will be implemented to achieve desired conditions of the MA within the constraints provided by the CNF Plan components for the individual programs. Implementation of the ARCS will minimize the effects of future actions, and improve on aquatic and riparian habitat restoration over the baseline condition. This will ensure that PBFs are maintained and improved.

CUMULATIVE EFFECTS: Bull Trout and Critical Habitat

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Recreation is likely to increase on all land ownerships due to increasing demands from the public, many of those activities are focused near water and can result in disturbance of bull trout, channel morphology changes, sediment impacts, and other effects to bull trout and its critical habitat.

There are several entities in and near the action area that are working on improvement of aquatic habitat and water quality to benefit native salmonids, especially bull trout and its critical habitat. Some of the major activities that are ongoing or have been recently completed are:

Tributary Habitat Restoration, Enhancement, and Passage

- Kalispel resident fish project (Kalispel Natural Resources Department)
- Road abandonment and bank stabilization (Kalispel Natural Resources Department)
- Riparian fencing and planting (WDFW)
- Tributary passage and screening (Kalispel Natural Resources Department, City of Ione)

Bull Trout Research and Monitoring

- Genetic inventory of bull trout in the Pend Oreille sub-basin (Kalispel Natural Resources Department)

- Kalispel resident fish project (Kalispel Natural Resources Department)
- Resident fish stock status above Chief Joseph and Grand Coulee Dams (WDFW and Kalispel Natural Resources Department in Boundary Project area)
- Granite Creek watershed assessment (Kalispel Natural Resources Department /Pend Oreille Conservation District)

Mainstem Pend Oreille River Water Quality

- Temperature TMDL implementation for the Pend Oreille River (Washington State Department of Ecology (WDOE) and stakeholders)
- Water quality monitoring (Kalispel Natural Resources Department)
- Total Dissolved Gas TMDL

The WDFW manages fisheries in the action area and regulates private and public hatchery releases. The WDFW modifies and publishes recreational fishing regulations on an annual basis. Currently, recreational anglers may not target bull trout, but may incidentally catch and release bull trout. Changes in the regulations such as seasons, closed areas, and harvestable sizes and numbers of other trout species could also change the likelihood of the incidental catch of bull trout by altering angler effort. Changes in other regulations, such as changes to increase fishing pressure on northern pike in the Pend Oreille, by allowing anglers to use two poles, will increase the likelihood of incidental catch of bull trout.

INTEGRATION AND SYNTHESIS OF EFFECTS:

The USFWS concludes that the implementation of the CNF Plan will not jeopardize the continued existence of bull trout. Impacts to reproduction, numbers, and distribution are not expected to appreciably reduce the likelihood of survival and recovery of the bull trout in the action area, recovery units, and rangewide for the following reasons:

- Bull trout populations are thought to be in only two watersheds on the CNF, Salmo and LeClerc. While the populations are low, this will be offset by restoration efforts that will better support the small populations and allow for future reintroductions/colonizations by bull trout into critical habitat and other Forest streams.
- Under the ARCS and other plan direction in the CNF Plan, riparian and aquatic ecosystems managed by CNF are expected to improve. The aquatic environment improved under INFISH, and the ARCS is more protective than INFISH for many components (Appendix A).
- Although there will be adverse effects from actions under the CNF Plan in the future, the management direction in the CNF Plan will result in better habitat in the long term.
- The CNF Plan is consistent with the recovery plan as standards and guidelines should limit the potential for exacerbating the threats to bull trout recovery due to forest management practices, forest roads and fish passage issues on the Forest. The key watershed objectives are also consistent with and will complement recovery actions identified in the recovery plan and restoration plans of other entities. Forest management activities may affect bull trout. Appendix B compares the expectations of the bull trout recovery plan, and the Recovery Unit Implementation Plan with components of the revised CNF Plan and ARCS.

Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the PBFs essential to the conservation of a species or that preclude or significantly delay development of such features. Based on the analysis of effects from implementation of the programs described within the CNF Plan to bull trout critical habitat and limiting factors to bull trout recovery, the Service believes that this action will not result in the destruction or adverse modification of bull trout critical habitat. Overall, implementation of future actions may have adverse effects to bull trout critical habitat, depending on the site-specific effects, but result in beneficial effects in the long term. The Service concludes that the implementation of the CNF Plan will not result in adverse modification of bull trout critical habitat because:

- Most of the bull trout critical habitat on the CNF is included within the key watershed network. Key watersheds are a network of watersheds that serve as strongholds for important aquatic resources and are crucial to threatened and endangered aquatic species and provide high quality water important for maintenance of downstream populations. Management in key watersheds emphasizes minimizing risk and maximizing passive and active restoration or preservation of watershed function and aquatic and riparian habitat.
- Although there will be adverse effects to PBFs and critical habitat from actions under the CNF Plan in the future, most of the adverse effects are anticipated to be short-term and the management direction in the CNF Plan will result in better habitat in the long term.
- Under the ARCS and CNF Plan, riparian and aquatic ecosystems managed by CNF are expected to improve. The aquatic environment improved under INFISH, and the ARCS is more protective than INFISH for many components (Appendix A).

CONCLUSION

After reviewing the current status of the bull trout, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the bull trout and is not likely to destroy or adversely modify designated critical habitat.

CARIBOU CHAPTER
STATUS OF SPECIES: WOODLAND CARIBOU

Taxonomy and Species description

Caribou (*Rangifer tarandus*) are medium-sized members of the deer family (Cervidae) with a circumpolar distribution that extends from landmasses above the Arctic circle southward to the southern extent of the boreal forest biome and adjacent forested ecosystems (Banfield 1961). There are several recognized subspecies of caribou in North America, some of which have extensive zones of overlap with adjacent subspecies. Of the continental subspecies, woodland caribou (*R.t. caribou*) occupy the southern-most extent of the species' range and have undergone the largest contraction in their historical distribution and decline in abundance, especially along the southern periphery of their range.

Caribou are distinguished from other members of the deer family by their large hooves, broad muzzles, and the distinctive antlers that both sexes develop annually. Males drop their antlers from November-April and females from May-June. The pelage of woodland caribou ranges from a deep chocolate brown in mid-summer to a grayish-tan during spring. Adult males develop a distinctive white mane during the rut.

The southern Selkirk Mountains population of woodland caribou is included within the southern mountain caribou ecotype (mountain caribou) that currently occupies southeastern B.C., northern Idaho, and northeastern Washington near the international border to northeast of Prince George, B.C. (COSEWIC 2011; Wittmer et al. 2005, p. 408). The southern mountain caribou ecotype is distinguished from other woodland caribou ecotypes by behavioral and ecological characteristics, rather than strictly genetic characteristics. The southern mountain caribou ecotype is closely associated with high-elevation, late-successional, coniferous forests where their primary winter food, arboreal lichen, occurs (77 FR 71043; 79 FR 26504). Mountain caribou are not migratory but instead use different elevations throughout the year.

Listing Status

The southern Selkirk subpopulation of Woodland Caribou was emergency listed in January 1983 (48 FR 1722), and then federally listed as endangered in the United States in 1984 (USFWS 1994).

The southern mountain caribou population in B.C. has been divided into 18 subpopulations, with the South Selkirk subpopulation being the only one that extends into the United States (Wittmer et al. 2005). Since 2000, all southern mountain caribou subpopulations have been formally recognized as threatened under the Species at Risk Act in Canada (COSEWIC 2014). There are currently about 1,540 southern mountain caribou (Environment Canada 2014), with many subpopulations experiencing declines of 50 percent or more in the past 10 years (B.C. Ministry of Environment Mountain Caribou Science Team 2005).

On May 8, 2014, the USFWS announced a 12-month finding on a petition to delist the southern Selkirk Mountains population of woodland caribou (*Rangifer tarandus caribou*) (79 FR 26504).

After review, the USFWS determined that a revision to the originally listed entity to define a DPS was appropriate. The USFWS proposed to amend the listing of the southern Selkirk Mountains population of woodland caribou by defining the Southern Mountain Caribou DPS and to recognize it as threatened under the ESA. The proposed DPS includes the transboundary South Selkirk subpopulation that moves between southern British Columbia, Canada, and northern Idaho and northeastern Washington, United States. On April 19, 2016, the USFWS reopened the comment period on the proposed rule to list the DPS as threatened and to reaffirm the previously designated critical habitat (81 FR 22961; see status of critical habitat).

In the following status of the species discussions, we will use "southern Selkirk subpopulation", the currently listed entity, when discussing information specific to the original listing, or the existing recovery plan (USFWS 1994). However, we recognize that this subpopulation is also currently proposed as the Southern Mountain Caribou DPS. In the status of the species, we will generally refer to the broader entity, the southern mountain caribou (COSEWIC 2011), unless the information is specific to a certain location or type. The biological information, status, and threats are generally applicable to both the currently listed and proposed entities. "Woodland caribou" may be referenced for information relevant to both the mountain and woodland ecotype, and is usually a more general discussion of woodland and mountain caribou characteristics.

Life History

Woodland caribou are adapted to exist in cold winter climates and have thick fur with semi-hollow hair for insulation, dark pelage that absorbs thermal energy, large fat stores, and a respiratory system that minimizes heat loss. These same adaptations, however, make woodland caribou susceptible to hyperthermia in summer months (COSEWIC 2011).

Woodland caribou are polygynous, with dominant bulls breeding with multiple cows during fall rut (Cichowski et al. 2004). Pregnant females disperse to isolated, often rugged, high elevation areas where other prey animals are scarce, thereby limiting their exposure to common predators. Calves are born in late spring into early summer (Cichowski et al. 2004, COSEWIC 2002). The productivity of caribou is low compared to other cervids (e.g., deer and moose). Unlike deer and elk, which can birth multiple young and reproduce as yearlings, caribou typically have only one calf per year and most females reproduce for the first time around three years of age (Cichowski et al. 2004, Shackleton 2010). Predation is the most common cause of calf mortality (Shackleton 2010). Caribou calf mortality averages 50-70% within their first year and is influenced by the abundance of predators and/or the availability of winter forage and therefore the nutritional status of the mothers during pregnancy. Limited forage due to temporal variation in the accessibility of lichens and other spring forage is likely to produce smaller calves that are likely more susceptible to predation and diseases, resulting in lower survival and ultimately depressed recruitment to the population (COSEWIC 2002).

Southern mountain caribou occur in the inland temperate rain forest ecosystem along the western slopes of the continental divide. This mountainous region extends from east-central B.C. to the inland northwestern United States. Within the temperate rain forest ecosystem, southern mountain caribou are closely associated with high elevation alpine, Engelmann spruce (*Picea engelmannii*) / subalpine fir (*Abies lasiocarpa*), and western redcedar (*Thuja plicata*) / western hemlock (*Tsuga heterophylla*) vegetation communities (Warren 1990). At these higher elevations, which are typically greater than 1,219 meters [m] (4,000 feet [ft]), annual precipitation often exceeds 2.5 m (8 ft) of moisture, with annual snowfalls typically exceeding 10 m (33 ft) and late winter snowpacks often over 3 m (10 ft) deep. This unique ecological setting for the species has given rise to unique characteristics in southern mountain caribou (COSEWIC 2011, 79 FR:26504).

One feature that makes southern mountain caribou distinct is their dependence on arboreal, or tree, lichen (primarily *Bryoria* spp.) as food during winter (Stevenson and Hatler 1985, Antifeau 1987, Rominger and Oldemeyer 1989, Mountain Caribou Technical Advisory Committee (Mountain Caribou Technical Advisory Committee (MCTAC) 2002). These lichen are primarily found in the mid-canopy of late-successional forest habitats. Southern mountain caribou move to higher elevations and deeper snowpack conditions during late winter to gain access to these arboreal lichen.

During spring, as snowpack conditions deteriorate, some southern mountain caribou forage at mid- to lower elevations in areas of early vegetation green-up, although the southernmost sub populations tend to remain at high elevations during this period During late spring and early summer, pregnant females re-ascend to calve at secluded, high elevation ridgeline habitats as a means to avoid predators. During summer and early fall, southern mountain caribou move among high-elevation, wet glacial basins where they forage on vascular vegetation. Finally, during late fall and early winter, southern mountain caribou descend to the spruce / fir – cedar / hemlock transition zone to forage on late-curing vegetation and windfall or windblown arboreal lichen until snowpack conditions firm up. As a result, southern mountain caribou undertake as many as four altitudinal migrations annually (COSEWIC 2011), whereas other woodland caribou populations typically make fewer, directional migrations between seasonal use areas or remain relatively sedentary.

Habitat

In general, seasonal habitats of southern mountain caribou consist of early winter, late winter, spring, calving, summer, and fall habitats primarily within two vegetation zones: western hemlock/western red cedar and subalpine fir/Engelmann spruce forests (76 FR 74025-74026; USFS 2004, p. 18; USFWS 2008a, p. 20). Southern mountain caribou typically make the longest landscape movements during the early winter period, which may range from several miles (mi) to about 30 mi (48 kilometers [km]) (USFS 2004, p. 22). Early winter is a period of rapid snow accumulation and generally extends from November to mid/late January. During this time, southern mountain caribou generally inhabit the transition zone between mature to old-growth western hemlock/western red cedar and subalpine fir/Engelmann spruce forest types (USFWS 2008a, p. 20). These habitats generally occur between 4,000 and 6,200 ft (1,220–1,900 m) in elevation and have a more closed overstory canopy (70 percent or more) that intercepts snow (USFS 2004, p. 18, USFWS 2008a, p. 20).

Southern mountain caribou seek out these more closed timber stands where they feed on a combination of lichen on wind-thrown trees and lichen that has fallen from standing trees (litterfall) (MCTAC 2002, p. 10). If available, shrubs and other forbs that remain accessible in snow wells under large trees are also consumed. A conifer canopy that intercepts snow and allows access to feeding sites is important (MCTAC 2002, p. 10) until the snow pack consolidates and the caribou can move to higher elevations (USFS 2004, p. 18). However, these elevational shifts can be quite variable within and between years, depending on snow levels (Apps et al. 2001, p. 67; Kinley et al. 2007; p. 94). Southern mountain caribou experience the poorest mobility and food availability of any season during early winter because of the typically deep, soft snow (MCTAC 2002, p. 10).

Late winter generally starts around mid-January and extends to approximately mid-May. During this time, the snowpack is deep (up to 16 ft (5 m) on ridge tops) and firm enough to support the animal's weight, which allows easier movement. The upper slopes and ridge tops used by southern mountain caribou are generally higher than 6,000 ft (1,830 m) in elevation, support mature to old stands of subalpine fir/Engelmann spruce forest with relatively open canopies (approximately 10 to 50 percent cover), and have high levels of arboreal lichen (USFWS 1994, p. 6; MCTAC 2002, p. 10; USFS 2004, p. 18; Kinley and Apps, 2007, p. 15; USFWS 2008a, p. 20).

In spring (May to July), southern mountain caribou move to areas with green vegetation, which becomes their primary food source. During the spring and summer, southern mountain caribou forage primarily on grasses, flowering plants, horsetails, willow and dwarf birch, and sedges in subalpine meadows (Paquet 1997, p. 13, 16), and on huckleberry leaves (USFS 2004, p. 18). These areas may overlap with early and late winter ranges at mid to lower elevations (Servheen and Lyon 1989, p. 235; MCTAC 2002, p. 11), and vegetation in these areas allow southern mountain caribou to recover from the effects of winter (USFWS 1994, p. 7). Pregnant females will move to these spring habitats for forage, but during the calving season in early June to July, the need to avoid predators influences habitat selection. Areas selected for calving are typically at high elevation, old-growth forest ridgetops that can be food limited, but are more likely to be predator free (USFWS 1994, p. 8; MCTAC 2002, p. 11). Arboreal lichen becomes the primary food source for pregnant females and females with calves, since green forage is unavailable in these secluded, high-elevation habitats.

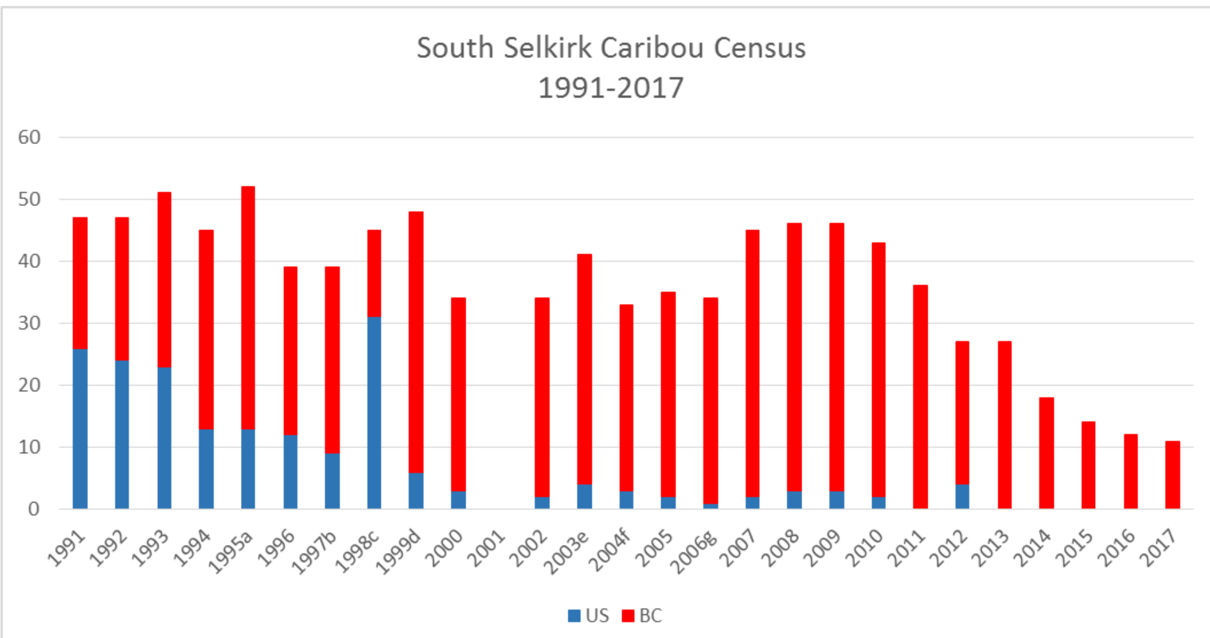
Southern mountain caribou spend the summer (July to mid-October) in higher elevational alpine and subalpine areas with high forage availability (USFWS 1994, p. 8). In early summer, open-canopied stands provide forbs and huckleberry (*Vaccinium* spp.) leaves. In the Selkirk Mountains, the shallow slopes used in late summer are characteristically high-elevation benches with secondary stream bottoms, riparian areas, and seeps where forage is lush and abundant (Servheen and Lyon 1989, p. 236, Stevenson *et al.* 2001, p. 1; Kinley and Apps 2007, p. 15).

Fall habitat (generally October into November) use by southern mountain caribou is driven primarily by the availability of late-curing forage vegetation and wind-thrown lichen. The fall and early winter diet consists largely of dried grasses, sedges, willow and dwarf birch, and arboreal lichen. Southern mountain caribou may gradually move to western hemlock dominated forests. It is during this time of year when southern mountain caribou are making the transition from green forage to arboreal lichen (Servheen and Lyon, 1989, p. 236). As winter nears, the annual cycle of habitat use repeats itself.

Populations, Distribution, Trend

Records from the 1800s indicate that caribou were once abundant in the area now known as the south Selkirk subpopulation (Seton 1927, Flinn 1956, Layser 1974). However, their numbers apparently declined rapidly in Washington after a major forest fire in 1915 (Taylor and Shaw 1929, Booth 1947, Dalquest 1948). Two estimates of the size of the subpopulations suggest only about 100 animals in the 1950s (Flinn 1956) and probably fewer than 50 animals from 1925 to 1971 (Freddy 1974, Wiles 2017). More reliable census methods were implemented in the early 1970s resulting in about 25 caribou in 1973-1974 (Freddy 1974) and 26-28 caribou annually from 1983-1985, with nearly all animals detected in British Columbia (Scott and Servheen 1985).

Results of the caribou census in the Selkirk Mountains from 1991-2017 are shown in Figure 8. Augmentations took place in Idaho (1987, 1988 and 1990), Washington (1996, 1997), and B.C. (1998). All augmentations took place after the annual census so census results were not affected during that year but they did affect results in the following years.



[a] Known incomplete count. Tracks of small group (2-4) detected, but not observed in helicopter survey.
[b] Includes 19 animals released in 1996.
[c] Includes 13 animals released in 1997.
[d] Includes 11 animals released in 1998.
[e] Likely included some amount of double counting, minimum population is 31.
[f] Following the census, 4 calves were observed adjacent to Highway 3.
[g] Fixed wing - 34 observed, 2-4 more suspected. Helicopter census incomplete.

Figure 8. Southern Selkirk Subpopulation Numbers from 1991through 2017.

Currently, there are 15 subpopulations of southern mountain caribou remaining in B.C., one of which (south Selkirk caribou) is a transboundary subpopulation with the United States. These existing subpopulations encompass roughly 38,800 km^2 (15,000 mi^2) in B.C., which accounts for approximately 25% of the historical, provincial distribution of southern mountain caribou defined above. The most recent abundance estimate for southern mountain caribou in B.C. is approximately 1,350 mature individuals (COSEWIC 2014), which would equate to approximately 22% of the historical, provincial abundance of southern mountain caribou defined above. Nine of the existing subpopulations are estimated to consist of fewer than 50 individuals, four consist of between 50 and 250 individuals, and two consist of between 250 and 500 individuals (COSEWIC 2014).

Threats

Threats to southern mountain caribou include forest harvest, forest fires, human development, recreation, and climate change. In addition to causing direct impacts, these threats often catalyze indirect impacts to southern mountain caribou, for example increasing predators (79 FR 26515). Both direct and indirect impacts to southern mountain caribou from habitat destruction, modification, and curtailment are described below.

<u>Avalanches</u>

Avalanches and landslides pose a direct threat to southern mountain caribou survival (Seip and Cichowski 1996), with avalanches accounting for about 6% of Jasper subpopulation mortality. The last remaining caribou in the Banff subpopulation died in an avalanche in 2009 (Environment Canada 2014). The risk to southern mountain caribou from this natural phenomenon can be increased due to displacement to more avalanche prone habitats due to snowmobile and other winter recreation activities (Simpson 1987, Seip and Cichowski 1996) along with anthropogenic avalanche control activities. Avalanches are common in the southern Selkirk Mountains. In addition to natural avalanches, B.C. Highways and Whitewater Ski Resort routinely initiate avalanches throughout the winter months to protect Highway 3 in B.C. and skiers at the resort.

<u>Climate Change</u>

In general, climate change will likely alter the distribution and abundance of suitable southern mountain caribou habitat, and will change snow depths and persistence, affecting seasonal movements of southern mountain caribou (WDFW 2012). The potential effects of climate change depend on the interaction, not only of seasonal temperatures and snowfall patterns, but also occurrence of wildfires, and outbreaks of forest insects and diseases (Mountain Caribou Science Team 2005).

The Service discussed climate change relevant to southern mountain caribou in the proposed rule to amend the caribou listing (79 FR 26518); much of that discussion follows in this and the following paragraph. Climate change modeling presented in Utzig (2005, p.5) demonstrated projected shifts in habitats within the southern mountain caribou range in Canada. Projections for 2055 indicate a significant decrease in alpine habitats, which is loosely correlated with the distribution of the arboreal lichen on which these southern mountain caribou depend. The projections indicate a significant increase in the distribution of western red cedar in the mid-term with a shift upward in elevation and northward over the longer term. Projected subalpine fir distribution is similar, with a predicted shift upward in elevation and long-term decreasing presence in the south and on the drier plateau portions of the present range of the southern mountain caribou. Recent analysis by Rogers et al. (2011, pp. 5–6) of three climate projection models indicate that subalpine forests (which contain subalpine fir) may be almost completely lost in the Pacific Northwest (Washington and Oregon) by the end of the 21st century. This loss would be detrimental to the southern mountain caribou given their reliance on this habitat type for forage of arboreal lichen during the late winter and for summer habitat (Utzig 2005, p. 2). However, both western red cedar and subalpine fir are projected to increase densities to the north. This indicates the potential for range expansion of southern mountain caribou in those northern areas (Utzig 2005, p. 5). Unfortunately, habitat in the southern extent of the range may become unsuitable (Rogers et al.2011, pp. 5–6).

The movements of local southern mountain caribou populations are closely tied to changes in snow depth and consolidation of the snow pack, allowing access to arboreal lichen in winter (Kinley et al. 2007, entire). In general, climate change projections suggest reduced snowpacks and shorter winters, particularly at lower elevations (Utzig 2005, p. 7; Littell et al. 2009, p. 1). Snowpack depth is significant in determining the height at which arboreal lichen occur on trees, and the height at which southern mountain caribou are able to access lichen in the winter. These arboreal lichen are also dependent upon factors influenced by climate, including humidity and stand density (Utzig 2005, p. 7). Kinley et al. (2007, entire) found that during low snow years, southern mountain caribou in deep snowfall regions made more extensive use of low-elevation sites (sometimes associated with the use of stands of lodgepole pine (*Pinus contorta*) and western hemlock) during late winter. When snowpack differences were slight between years in these regions, southern mountain caribou did not shift downslope as they did during low snow years (Kinley et al. 2007, p. 93). This may indicate that southern mountain caribou escape reduced snowpacks (similar to what is projected with climate change) by moving to lower elevations during low snow years. However, other factors associated with climate change may negatively impact those lower elevation forests, such as increased episodes of wildfire and insect outbreaks, or largescale changes in forest composition (Littell et al. 2010, entire). In addition, moving to lower elevations during late winter may also make southern mountain caribou more susceptible to predation due to increased presence of other ungulate species such as moose and deer at these elevations, which in turn attracts greater numbers of predators.

<u>Fire and Fire Suppression</u>

Forest fires cause direct loss of important old-growth habitat and increase openings that allow for the growth of early seral habitat, which is conducive to use by other ungulates, such as deer and moose, but not by southern mountain caribou, which require old growth and mature forests (79 FR 26516). Historically, natural fires occurred at very low frequency and extent throughout the range of the southern mountain caribou. This was due to the very wet conditions of the interior wet-belt (Stevenson et al. 2001, p. 3). When fires did occur, most were relatively small in size (Seip 1998, p. 204). Fires can remove suitable habitat for 25 to 100 years or longer depending on fire intensity, geography, and type of forage normally consumed by southern mountain caribou (COSEWIC 2002, p. 45).

Fires can directly alter southern mountain caribou habitat through loss of mature conifer stands, lichen and other forage plants, and by creating barriers to movement due to increased downfall and elevated snowfall. Indirectly, fire converts mature and old forests into early seral habitat favored by moose, elk, and deer, which may result in an increase in predators and ultimately southern mountain caribou predation. Historically, when disturbance from a wildfire occurred, southern mountain caribou would shift their use of habitat from affected areas to areas that were more suitable. Fires coupled with industrial activities can reduce suitable areas available for caribou to occupy. When combined with human-caused habitat alteration, fire can threaten southern mountain caribou habitat even though it is a natural component of the forest ecosystem (Environment Canada 2014).

Fire suppression activities over the past 70 to 90 years has the potential to alter natural succession of forested ecosystems by reducing the number, overall size and distribution of wildfire events. This may lead to conditions where forested stands are more susceptible to uncharacteristic, stand-replacing fire events where there has been significant fuel buildup (Hall 2010, Keane et al. 2002), and such events may result in the loss of important southern mountain caribou habitat. Additionally, fire suppression can lead to contiguous fuels at lower elevation that can carry fire from dry, frequent fire systems into southern mountain caribou habitat, as well as facilitate encroachment of subalpine fir into the whitebark pine zone situated along rugged ridgetops (Keane et al. 2002). In general, the exclusion of fire through active suppression is not considered to be a significant factor in altering fuel loads in the subalpine fir/Engleman spruce, alpine tundra and wetter part of the interior cedar hemlock zones due to the long fire return intervals associated with these habitats (Agee 1993, Keane et al. 2002, Hall 2010). However, suppression activities at lower elevations and a warming climate have the potential to significantly influence these conditions over time (Marlona et al. 2012).

Forest Insects and Disease

Forest insects and disease can affect southern mountain caribou habitat. Engelmann spruce beetles (*Dendroctonus engelmannii*) have been known to kill large amounts of old-growth forest and southern mountain caribou habitat in western Canada and the northwestern United States (79 FR 26517). Spruce bark beetle (*Dendroctonus rufipennis*) outbreaks and resulting tree mortality have occurred frequently in this zone. Some of these outbreaks followed wind-throw events of trees or forest fires in the United States (Evans 1960, p. 124; USFWS 1985, p. 21). More recently, mountain pine beetle outbreaks and mass tree mortality in western Canada have occurred in the 1990s and 2000s. Habitat affected by mountain pine beetle outbreaks may remain viable for southern mountain caribou, or may even provide better forage for a period of time, perhaps as long as a decade. This is because dead and dying trees may remain standing and continue to provide arboreal lichen to foraging southern mountain caribou. However, eventually these trees fall and arboreal lichen become scarcer, forcing southern mountain caribou to seek alternate habitat (Hummel and Ray 2008, p. 252). These beetle outbreaks have impacted southern mountain caribou by directly removing habitat and associated arboreal lichen from the landscape (Evans 1960, p. 132). In addition, these beetle outbreaks have brought increased logging operations to high-elevation forests. This logging was done in an attempt to salvage the valuable wood resource in these forest stands, and also brought human presence and an increase in the potential for poaching and disturbance (Evans 1960, p. 131; USFWS 1985, p. 21).

Hunting

General hunting of most southern mountain caribou populations is not permitted. However, with general big game hunting, misidentification can be a concern. In addition to misidentification risks, poaching of southern mountain caribou has occurred in some herds. Misidentification and poaching both are a risk to caribou. Within the southern Selkirk subpopulation, several mortalities have occurred due to hunting and/or poaching. Between the 1960s and 1980s, poaching and/or misidentification of caribou was believed to be an important cause of mortality (USFWS 1985). Poaching remained a concern into the early 1990s, with two known cases in the U.S. In the late 1990s, a public education effort to reduce poaching and misidentification accompanied the southern Selkirk subpopulation augmentation efforts. No recent evidence of poaching has been documented in the U.S. or Canada.

Timber Harvest

Southern mountain caribou prefer older-aged interior forests with limited interspersion of open habitat types (Environment Canada 2014). Timber harvest can lower the quality of habitat for southern mountain caribou (Smith et al. 2000, Apps and McLellan 2006, Wittmer et al. 2007, Kranrod 1996, Sulyma 2001, Miège et al. 2001, Stevenson and Coxson 2007) and/or alter habitats to favor primary prey species. In addition, timber harvest may require infrastructure construction (e.g., roads) that permanently convert habitat and/or produce linear features that increase fragmentation and facilitate predator and human access (Apps et al. 2013). These changes decrease the suitability of the habitat for southern mountain caribou and increase the caribou's susceptibility to predation.

The harvesting of forests has both direct and indirect effects on southern mountain caribou habitat (79 FR 26516). A direct effect of forest harvest is the direct loss of large expanses of contiguous old-growth forest habitats. Southern mountain caribou rely upon these habitats as an important means of limiting the effect of predation. Their strategy is to spread over large areas at high elevation that other prey species avoid (Seip and Cichowski 1996, p. 79; MCTAC 2002, pp. 20–21). These old-growth forests have evolved with few and small-scale natural disturbances such as wildfires, insects, or diseases. When these disturbances did occur, they created only small and natural gaps in the forest canopy that allowed trees to regenerate and grow (Seip 1998, pp. 204–205). Forest harvesting through large-scale clear-cutting creates additional and larger openings in old-growth forest habitat. These openings allow for additional growth of early seral habitat.

Research has shown that southern mountain caribou alter their movement patterns to avoid areas of disturbance where forest harvest has occurred (79 FR 26516, Smith et al. 2000, p. 1435; Courtois et al. 2007, p. 496). With less contiguous old-growth habitat, southern mountain caribou are also limited to increasingly fewer places on the landscape. Further, southern mountain caribou that do remain in harvested areas have been documented to have decreased survival due to predation vulnerability (Courtois et al. 2007, p. 496). This is because the early seral habitat, which establishes itself in recently harvested or disturbed areas, also attracts other ungulate species such as deer, elk, and moose to areas that were previously unsuitable for these species (Mountain Caribou Science Team (MCST) 2005, pp. 4–5; Bowman et al. 2010, p. 464). With the increase in the distribution and abundance of prey species in or near habitats located where southern mountain caribou occur, comes an increase in predators and therefore an increase in predation on caribou. Predation has been reported as one of the most important direct causes of population decline for southern mountain caribou (MCST 2005, p. 4; Wittmer et al. 2005, p. 257; Wittmer et al. 2005, p. 417; Wittmer et al. 2007, p. 576).

The harvest of late-successional (old-growth) forests directly affects availability of arboreal lichen, the primary winter food item for southern mountain caribou (79 FR 26516). Southern mountain caribou rely on arboreal lichen for winter forage for 3 or more months of the year (Apps et al. 2001, p. 65; Stevenson et al. 2001, p. 1; MCST 2005, p. 2). In recent decades, however, local southern mountain caribou populations have declined faster than mature forests have been harvested. This suggests that arboreal lichen are not the limiting factor for southern mountain caribou in this area (MCST 2005, p. 4; Wittmer et al. 2005, p. 265; Wittmer et al. 2007, p. 576).

Roads created to support forest harvest activities have also fragmented habitat. Roads create linear features that also provide easy travel corridors for predators into and through difficult habitats where southern mountain caribou seek refuge from predators (MCST 2005, p. 5; Wittmer et al. 2007, p. 576). It has been estimated that forest roads throughout British Columbia expanded by 4,100 percent (from 528 to 21,748 mi (850 to 35,000 km)) between 1950 and 1990. Most of these roads were associated with forest harvesting (Stevenson et al. 2001, p. 10). In the United States, roads associated with logging and forest administration developed continuously from 1900 through 1960. These roads allowed logging in new areas and upper elevation drainages (Evans 1960, pp. 123–124). In both Canada and the United States, these roads have also generated more human activity and human disturbance in habitat that was previously less accessible to humans (MCST 2005, p. 5).

Currently, timber harvest in caribou habitat in the Selkirk Mountains is limited. In 2007, the Province of B.C. instituted Government Actions Regulations to prevent any further reduction of caribou habitat (Mountain Caribou Recovery Implementation Plan Progress Board 2012). The Nature Conservancy of Canada purchased the 55,000 hectares (136,000 acres) Darkwoods property in 2008, in part to protect southern mountain caribou habitat. Management of the Darkwoods property prohibits timber harvests in caribou habitat. Private lands in B.C. currently do not have any regulatory mechanisms in place to prevent modification or elimination of southern mountain caribou habitat due to forest management. In the U.S., the ESA governs protection of the Selkirk subpopulation. To meet federal obligations under the ESA, the Idaho Panhandle (IPNF) and CNF incorporated management direction in their Forest Plans to protect and restore southern Selkirk subpopulation caribou habitat. Additionally, a majority of the caribou habitat on the Colville National Forest occurs in designated Wilderness, where timber harvest is prohibited. The Idaho Department of Lands (IDL) consults with Idaho Department of Fish and Game (IDFG) during timber sale development to identify and mitigate potential impacts to wildlife species.

On USFS, Canadian Crown Lands, and Nature Conservancy of Canada lands, anthropogenic habitat conversion and/or infrastructure development are unlikely to occur due to the current regulatory mechanisms in place (approximately 91% of the Management Area). The IDL managed property provides a substantial amount of quality Selkirk subpopulation habitat (Kinley and Apps 2007) and is currently being managed to generate income to the Trust Beneficiaries (primarily public school systems). The IDL harvested approximately 1,800 acres within the Selkirk subpopulation Management Area since 2003, with an additional 600 acres sold but not yet harvested. Most of the harvest units fall just inside the Management Area boundary at marginal elevations for caribou (IDL Timber Sale Geodatabase, 2/17/2015). Private lands comprise only a small portion of Selkirk subpopulation habitat. Federal lands in both the U.S. and Canada and Provincial lands in B.C. have regulatory mechanisms in place to protect existing caribou habitat. However, private and IDL managed lands have less stringent requirements for protection of habitat and remain at some risk for habitat modification and infrastructure development. Since recovery of habitat due to past conversions may take 60 to 100 years or more (Environment Canada 2014), effects from past timber harvest will continue into the future.

Parasites and Diseases

Parasites and diseases can make individual caribou more susceptible to mortality. Some cases of parasite and disease related mortality in individuals has been documented (Spalding 2000, COSEWIC 2002); however, there is no evidence of widespread effects to caribou due to parasites or diseases. Biting insects, pulmonary irritants, and neurological nematodes can affect caribou. Several biting insects considered important include warble flies (*Oedemagena spp.*), nose bot flies (*Cephenemyia trompe*), mosquitoes (*Aedes spp.*), blackflies (*Simulium spp.*), horseflies (*Tabanus spp.*), and deer flies (*Chrysops spp.*) (COSEWIC 2002). Hydatid cysts (*Echinococcus granulosus*) and protostrongylid nematode (*Parelaphostrongylus andersoni*) can affect the lung capacity of caribou, thereby decreasing their overall health, while increasing their susceptibility to predation (COSEWIC 2002). Another major parasite is the meningeal nematode (*P. tenuis*), which is benignly carried by white-tailed deer but can cause neurologic disease in caribou, however this nematode has not been detected in any species within the southern Selkirk range (Samuel et al. 1992). Viral, parasitic, and bacterial diseases can affect individual caribou, but these effects are currently not considered a major threat.

In the southern Selkirk subpopulation, a translocated animal captured for the 2012 Purcell augmentation in B.C. died due to the effects of parasitism (Gordon 2013). The effects of parasites and diseases in the southern mountain caribou population of caribou is largely unknown, but is assumed to be negligible.

Predation

Predation is a natural process within ecosystems. However, when predation increases above the level a population can withstand, it becomes a threat. Gray wolves (*Canis lupus*), mountain lions (*Puma concolor*), bears (*Ursus spp.*), and wolverine (*Gulo gulo*) prey upon caribou to varying degrees (Kinley and Apps 2001, Cichowski and MacLean 2005, Wittmer et al. 2005, Stotyn 2008, McNay 2009). In the southern mountain caribou range, predator abundance has increased due to the recovery of the gray wolf along with anthropogenic (e.g. timber harvest, mining) and natural (fire) events that converted mature/old-aged forests to early seral stands that better support other prey species, such as deer (*Odocoileus spp.*), elk (*Cervis Canadensis*), and moose (*Alces americanus*). Increasing primary prey and predator abundance in southern mountain caribou habitat, along with declining caribou subpopulations, results in an unbalanced predator/prey system that threatens the persistence of caribou.

Currently, predation is identified as the primary cause of caribou mortality over the entire distribution of woodland caribou (Seip 1992, Stuart-Smith et al. 1997, Schaefer et al 1999), as well as within southern B.C. (Wittmer 2004, Wittmer et al. 2007). Predator populations are supported by primary prey species (Seip 1992b, Stotyn 2008, Williamson-Ehlers 2012). Southern mountain caribou populations cannot solely sustain a predator population and are considered a secondary prey species (Environment Canada 2014, Kinley and Woods 2006). As timber harvest and/or other events (i.e., fire, forest insect/disease) convert mature/old-aged forests to earlier seral stages, primary prey species take advantage of new habitats interspersed in southern mountain caribou range and predator species likewise respond (Seip 1991; Seip 1992; Wittmer et al. 2005). Research by Wittmer et al. (2007) supports that the survival of caribou in mid-aged forests was reduced compared to those that occupied areas with higher proportions of older-aged forests within their home ranges, although Wittmer's work did not include the southern Selkirk subpopulation.

Since the late 1980s, predation has been the leading known cause of caribou mortality in the South Selkirk Mountains; however, early studies of this subpopulation (Freddy 1974) did not conclude that predation was a major threat. During the augmentation of caribou to the South Selkirk Mountains in the late 1980s, Compton et al. (1995) concluded that adult mortality was limiting population growth of the subpopulation, and predation by both mountain lions and bears was a contributing factor. However, population levels of mountain lions were estimated to be declining at this time (Clarke 2003). The steady decline in caribou located in Idaho since the winter census of 1994[19] (Figure 8) was likely due to an unsustainable level of predation in the ecosystem (Wakkinen and Johnson 2000). Recently, wolves and grizzly bears have become more abundant in the South Selkirk Mountains, in both the U.S. and B.C. Additionally, mountain lion populations are believed to be increasing. With stable to increasing predator populations, the risk of predation to caribou likely remains high.

Since 2014, five radio-collared and two uncollared caribou mortalities have been documented. One uncollared dead caribou was found during the 2014 aerial census flights. The cause of death for this animal is unconfirmed, but due to the kill site pattern, presence of wolf hair and DNA on the carcass, and the proximity of wolves to the kill site, wolf predation is the likely cause in this case. The other documented mortality occurred in September 2014. British Columbia Ministry of Forest, Lands, and Natural Resource Operations (FLNRO) personnel confirmed wolf predation as the cause of death (DeGroot, L. FLNRO, pers. comm. 9/10/2014). In addition, four more adult animals were lost due to unknown causes between the 2014 and 2015 annual censuses. In May 2015, FLNRO personnel investigated a mortality of a radio-collared cow with a full term fetus. Black bears were feeding on the carcass, but mountain lion predation is implicated as the cause of death (DeGroot, L. FLNRO, pers. comm. 5/27/2015). In October 2015, the mortality of a radio-collared adult male caribou was investigated. The animal died approximately 300m (1,000') from Highway 3. Bruising identified on the carcass occurred on the lower front legs, with scoff marks on the rear quarter of the hide. Based on the bruising

19 Some translocated caribou emigrated from the recovery area within the U.S.

patterns and the location to the highway, it is believed that the animal succumbed to injuries from an automobile collision and was subsequently scavenged by black bears and wolves. An uncollared caribou carcass was reported by a hiker in the early summer of 2016. On investigation, it was determined to be a yearling bull that likely died of unknown causes in the Fall of 2015. Another collared bull died in June of 2017, but due to a collar malfunction causing a two week notification delay the cause of death was undetermined. Lastly, a radio on a collared caribou stopped reporting GIS locations in May of 2016. An investigation of the vhf signal is planned for this summer, but will likely be classified as an unknown mortality. In the Selkirk subpopulation, like other caribou subpopulations, unsustainable levels of predation are suspected to be the main cause of the most recent population decline.

Recreational Activities

Winter and non-winter recreational activities can affect caribou through displacement (Wilson and Hamilton 2003, Powell 2004, Seip et al. 2007) and increased stress (Freeman 2008). Animals can exhibit behavioral and/or physiological responses to stress factors. A behavioral response is apparent when the animal moves away or avoids areas of disturbance. A physiological response may not be apparent to an observer or be accompanied by a behavioral response. Increased heart rate and release of glucocorticoid, a stress related hormone, are examples of physiological responses to a stress factor. MacArthur et al. (1982) found that bighorn sheep maintained a cardiac response that required additional energy expenditures, while the sheep showed habituation behavior. Elevated stress hormone levels were detected in caribou up to 10 km (6.2 miles) away from snowmobile areas (Freeman 2008). Elevated stress responses can lead to poor health, low survival, and slow reproductive rates (Simpson and Terry 2000, Romero 2004).

Winter recreation can result in displacement, potentially resulting in caribou moving into areas of poor habitat quality potentially resulting in increased predation risk, reduced body condition, and lower survival and reproductive rates (Simpson and Terry 2000). Snowmobile activity poses a large threat to caribou due to potential for vast overlap in land use (Seip et al. 2007, Freeman 2008). Other motorized winter activities, such as heli- or snowcat-skiing likely result in similar effects as snowmobile recreation (Freeman 2008); however, these activities are not common in the southern Selkirk Mountains. In a literature review, Reimers (1991) concluded that ungulates tend to show little disturbance response to snowmobiles when traveling along defined routes. In the south Selkirk Mountains, caribou appear to move out of an area when snowmobilers arrive and use as a play area, but appear to tolerate travel along defined routes (DeGroot, L. BCMFLNRO, pers. comm. 4/24/2015). In Quebec, Duchesne et al. (2000) found that backcountry skiing and snowshoeing impacted caribou behavior, but through time these impacts were reduced suggesting caribou showed some habituation to them. The effects of these activities are relatively unstudied in the southern Selkirk Mountains. Reimers et al. (2003) found that wild reindeer were easily disturbed by snowmobiles, but traveled longer distances when disturbed by a skier. They suggest that the frequency of disturbance, which increases the amount of time spent moving and detracts from other biological activities (feeding, resting), could result in more serious consequences then the energetic cost of moving away from a single disturbance. Both snowmobiling and backcountry skiing create packed snow trails, which can facilitate predator access to caribou habitat in the winter (Simpson and Terry 2000, Cichowski et al. 2004, Powell 2004). Similar impacts of human presence experienced in the non-winter periods (hiking, motorized trails, etc.) may also produce displacement responses in caribou (Dumont 1993, Lesmerises et al. 2017).

In the South Selkirk Mountains, several snowmobile closures are in place to protect caribou. Both the IPNF and CNF LRMP incorporate management objectives and standards to reduce impacts to caribou. On the IPNF, a court ordered closure is in place that prohibits snowmobiling within 71% of the U.S. caribou recovery area until a winter travel plan is approved (79 FR:26504). The CNF manages snowmobile use in caribou habitat. Snowmobiling/motorized use is not allowed in the Salmo-Priest Wilderness. On IDL property, all snowmobile restrictions have been lifted until caribou are documented within 2.7 miles of the Restricted Winter Access Units. In B.C., stewardship agreements between British Columbia Ministry of the Environment and 13 snowmobile clubs are in place to limit disturbance to caribou. Winter motorized use on the Darkwoods property occurs under an agreement with the snowmobile clubs to allow travel along the roads only (i.e. no off-road use is allowed). Access is restricted when caribou are in the area. However, enforcement is limited.

<u>Human Development, Roads and Other Linear Features</u>

Human development fragments habitat within and between local southern mountain caribou populations and creates potential impediments to unrestricted caribou movements (79 FR 26517; MCST 2005, p. 5). Impediments in valley bottoms, such as human settlements, highways, railways, and reservoirs, have led to an isolation of local populations (MCST 2005, p. 5; Wittmer et al. 2005, p. 414) and reduced chance of rescue (the movement of individuals, often juveniles, to other local populations which can provide genetic flow and recruitment to populations with very low numbers) from natural immigration or emigration (van Oort et al. 2011, pp. 220–223; Serrouya et al. 2012, p. 2598). Similar to forest harvest and fires, human development and its associated infrastructure also impact southern mountain caribou in the following ways: it eliminates caribou habitat, alters the distribution and abundance of other ungulate species, provides travel corridors for predators (MCST 2005, p. 5), and increases human access to habitat that was previously difficult to access.

Southern mountain caribou have also been killed by vehicles on highways (79FR 26517, Johnson 1985, entire; Wittmer et al. 2005, p. 412.). Highway 3 in B.C. poses a direct threat of mortality to caribou. In 2009, three south Selkirk caribou were killed at Salmo Pass on Highway 3. Monitoring of radio-collared caribou from the Selkirk subpopulation caribou recently showed numerous crossings of Highway 3. In addition, caribou are drawn to the salt spread on the road surface to control icing. Standard fixed message signs are in place warning motorists of the potential presence of caribou on the roadway. These signs have shown some effectiveness at reducing collisions immediately after installation (Found and Boyce 2011), but overtime, these sign types become generally less effective (Pojar et al. 1975, Coulson 1982, Rogers 2004, Meyer 2006, Bullock et al. 2011). Motorized travel in the non-winter period on most forest roads in caribou habitat is restricted in the U.S.; however, there are few restrictions occurring on Crown Land in B.C. Road use on the Darkwoods property is allowed through a permit process and is generally low, but can receive heavier use when timber harvests activities on adjacent lands are occurring. Use of these roads can negatively affect caribou.

Transmission lines and clearing along the U.S./Canada border result in linear corridors that are maintained in early seral vegetation communities. Within these areas, shrubs are permitted to grow, but most trees are removed to protect the transmission lines and denote the international border. In turn, these corridors contribute to prey habitat and fragmentation, which reduces the quality of the habitat for caribou and increases the risk of caribou mortality due to predation.

Small Population Size

Small, isolated populations are at greater risk for extirpation due to stochastic events as well as inbreeding depression and genetic drift resulting from a reduction in genetic diversity (Serrouya 2012, Weckworth 2012). The southern Selkirk subpopulation is an isolated subpopulation with a recent population estimate in the low teens (Figure 8). However, due to previous augmentation efforts, this population exhibits high genetic diversity despite its small population size (Zittlau 2004, Serrouya 2012). However, due to the small population, this herd may experience founder effects if it were to recover without additional augmentations (Foley 1997). Therefore, conservation strategies of the southern Selkirk subpopulation of caribou need to consider landscape connectivity or management augmentation to maintain occasional exchanges between populations to preserve genetic diversity (Courtoies et al. 2003).

Recovery Needs/Conservation Strategies

The recovery plan for the southern Selkirk subpopulation of caribou (USFWS 1994) outlines a recovery area. The general outline of the southern Selkirk suppopulation recovery area (388,470 ha (959,923 ac)) was based on the historic occurrences of caribou and an assessment of available potential caribou habitat in the 1970s and 1980s (Freddy 1974, Johnson et al. 1977). Early ground and aerial-based research on this population indicated that 1,372 m (4,500 feet) was the appropriate elevation cutoff to capture early winter habitat use in the Selkirk Mountains (Freddy 1974, Scott and Servheen 1985). This is consistent with the designation of much of the Recovery Area boundary in the 1980s. However, it should be noted that the boundary extends down to 1,219 m (4,000 feet) in the western portion of the U.S. part of the recovery area per the 1985 recovery planning effort (USFWS 1985). This incongruity is not explained in that document, but was likely based on recommendations made by Freddy (1974) and the International Mountain Caribou Technical Committee (Johnson et al. 1977, Johnson et al. 1981). The knowledge that a historic travel corridor is located between 975 - 1,158 m (3,200 – 3,800 feet) elevation (Flinn 1956, Freddy 1979) and/or the need to create Caribou Management Units of a certain size (USFWS 1985) likely factored into this decision (Figure 9).

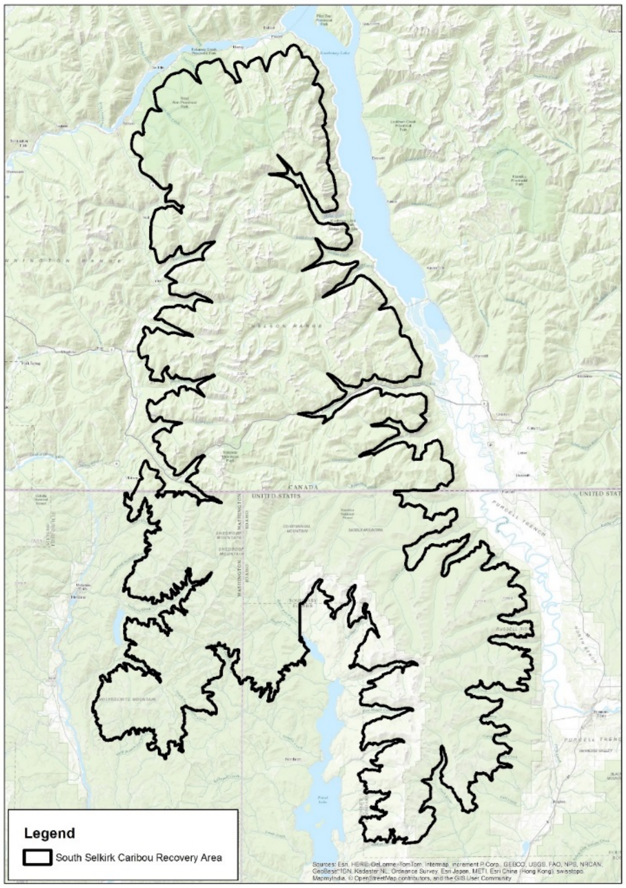


Figure 9. South Selkirk Caribou Recovery Area.

The caribou recovery area is divided into 17 Caribou Management Units (CMU), four of which occur on the Colville National Forest. Each CMU is approximately the size of the average home range of woodland caribou in the Selkirk Mountains (about 30 square miles or 19,200 acres) (USFWS 1985).

The recovery plan for the southern Selkirk subpopulation of caribou (USFWS 1994 p.6, p.28) has an ultimate goal of a self-sustaining population of caribou that is well-distributed throughout the Selkirk ecosystem. Because data were not available to establish specific, long-term recovery goals and objectives, the primary goal of the plan was to increase caribou populations and habitat suitability until specific population and habitat criteria could be established and full recovery goals enumerated. The objectives listed in the 1994 plan are listed below.

1. Maintain the two existing caribou herds in the Selkirk Ecosystem.
2. Establish a herd in the western portion of the Selkirk Mountains in Washington.
3. Maintain an increasing population as reflected by March aerial surveys (i.e., r>l).
4. Secure and enhance at least 179,000 ha (443,000 acres) of suitable and potential caribou habitat in the Selkirks to support a self-sustaining population.

The 1994 Recovery Plan includes a narrative listing the recovery process and steps. The main ones are listed here, with more detail provided in the 1994 plan (USFWS 1994, p. 28-43):

1. Maintain the population. Maintain the 2 existing caribou herds in the Selkirk. Ecosystem.

1.1 Reduce the impacts of poaching and accidental kills by hunters.
1.2 Reduce the impacts of caribou-vehicle collisions.
1.3 Reduce the impacts from other sources of mortality.
1.4 Reduce population impacts to genetic and demographic influences.

2. Secure and manage at least 179,000 ha (443,000 acres) of habitat in the Selkirks to support a self-sustaining caribou population.
   2.1 Protect, enhance, and restore Selkirk caribou habitat.
   2.2 Manage appropriate habitats.
   2.3 Secure the habitat. [subtasks would also apply to the CNF]
3. Gather information needed for recovery actions (verify recovery objectives)
   3.1 Habitat research needs.
      3.11 Determine caribou habitat relations.
      3.12 Evaluate timber management practices as related to caribou habitat.
      3.13 Effects of roads and motorized vehicles on caribou and their habitat.
      3.14 Develop, implement, and validate the cumulative effects model.
   3.2 Population research needs.
      3.21 Develop methodology to economically count and classify caribou.
      3.22 Determine caribou population trend, structure, and mortality factors.
      3.23 Monitor potential pathogens in caribou and associated species.
   3.3 Determine Recovery goals and objectives.
      3.31 Determine population size at recovery.
      3.32 Determine the amount of habitat needed for the recovered population.
      3.33 Establish caribou in the western portion of the Selkirks in Washington.
      3.34 Evaluate the need for and feasibility of establishing a population outside of the Selkirk Ecosystem to achieve recovery.
4. Keep the public and agency personnel informed and involved in caribou management.
   4.1 Develop a public involvement plan for activities involving caribou management.
   4.2 Implement the public involvement plan.
   4.3 Update the public involvement plan periodically.

Future Conservation Strategies

On January 14, 2015, the USFWS began a new caribou conservation planning process at a meeting in Spokane, Washington. At this meeting, the USFWS launched a two-pronged approach to caribou conservation, which included the following that would be implemented concurrently: 1) development of an updated draft management plan for the southern Selkirk subpopulation of caribou and possibly the full southern mountain caribou DPS if listed; and 2) identification and, where possible, implementation of near-term actions to conserve the southern Selkirk subpopulation. The USFWS contracted with the Kootenai Tribe of Idaho to lead the two-pronged approach. Once a draft management plan is developed, it will be subject to the USFWS' normal review processes, including opportunity for public review.

As an outcome of the January kick-off meeting, a volunteer technical workgroup, the Selkirk Caribou International Work Group (SCITWG), was formed to develop the draft management plan and to identify and coordinate implementation of near-term management actions. Current SCITWG participants include representatives from: the USFWS, U.S.

Forest Service - Idaho Panhandle National Forest, Kootenai Tribe of Idaho, Kalispel Tribe, Ktunaxa Nation Council, B.C. Ministry of Forests Lands and Natural Resource Operations, Idaho Department of Fish and Game, Washington Department of Fish and Wildlife, Idaho Governor's Office of Species Conservation, and a Boundary County Commissioner, and a Bonner County Commissioner.

The SCITWG continues to meet and make progress on an updated management plan and has continued to identify and where possible coordinate implementation of near-term management actions to protect the remaining Selkirk caribou subpopulation, including the following: censuses, predator monitoring and management, placing warning signs on British Columbia Highway 3, exploring maternal pens and/or predator fencing, locating funding, and exploring other monitoring or enforcement activities.

STATUS OF CARIBOU CRITICAL HABITAT

In 2012, the USFWS designated Critical Habitat for the southern Selkirk subpopulation of mountain caribou (77 FR 71042). This resulted in the designation of 30,010 acres of Federal land in Boundary County, Idaho, and Pend Oreille County, Washington as critical habitat. These lands are under Federal ownership, within the Colville and Idaho Panhandle National Forests. The Selkirk Mountains Critical Habitat Unit was occupied at the time of both the emergency listing on January 14, 1983 (48 FR 1722), and the final listing in 1984 (49 FR 7390; February 29, 1984), and is essential to the conservation of the species. The rule also identifies physical and biological features (PBFs) (1) which are essential to the conservation of the species, and (2) which may require special management considerations or protections. The PBFs identified for the southern Selkirk subpopulation in the critical habitat rule include the following, with more detail provided in the rule itself (77 FR 71068-71070):

- Space for individual and population growth and for normal behavior.
- Food, water, air, light, minerals, or other nutritional or physiological requirements.
- Sites for breeding, reproduction, or rearing (or development) of offspring.
- Habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of a species.

Concurrent with proposing the new Southern Mountain Caribou DPS, the USFWS confirmed that the physical or biological features essential to the Conservation remain the same, and determined that the critical habitat from 2012 met the definition for the new southern mountain caribou DPS (79 FR 26532).

Based on the current understanding of the PBFs and habitat characteristics required to sustain the southern Selkirk subpopulation's life-history processes, the USFWS described primary constituent elements (PCE)(77 FR 71070). Primary constituent elements are the elements of PBFs that provide for a species' specific life-history processes and are essential to the conservation of the species:

1. Mature to old-growth western hemlock (*Tsuga heterophylla*)/western red cedar (*Thuja plicata*) climate forest and subalpine fir (*Abies lasiocarpa*)/Engelmann spruce (*Picea engelmanni*) climax forest at least 5,000 feet in elevation; these habitats typically have

26-50% or greater canopy closure. Currently, the hemlock/cedar forest type is 21% early successional condition, 60% mid-successional condition, and 19% late-successional condition. Estimates of the range of variability show that 55-83% of these forest types were in a late-successional condition, indicating there is substantial potential to improve habitat conditions for woodland caribou.

2. Ridge tops and high-elevation basins that are generally 6,000 feet in elevation or higher, associated with mature to old stands of subalpine fir/Engelmann spruce climate forest with relatively open (approximately 50%) canopy.
3. Presence of arboreal hair lichens.
4. High-elevation benches and shallow slopes, secondary stream bottoms, riparian areas, and seeps, and subalpine meadows with succulent forbs and grasses, flowering plants, horsetails, willow, huckleberry, dwarf birch, sedges and lichens. These are used by woodland caribou, including pregnant females, for feeding during the summer seasons.
5. Corridors/transition zones that connect the habitats described above. If human activities occur, they are such that they do not impair the ability of caribou to use these areas.

The Selkirk Mountains Critical Habitat Unit consists of 30,010 ac (12,145 ha) in Boundary County, Idaho and Pend Oreille County, Washington. Lands within this unit are at 5,000 ft (1,520 m) and higher in elevation (77 FR 71074). These lands are under Federal ownership, within the Colville and Idaho Panhandle National Forests. This area also contains the PBFs essential to the conservation of the southern Selkirk Mountains population of woodland caribou and which may require special management considerations or protection. The primary land uses are forest management activities and recreational activities, which occur throughout the year. Recreational activities include, but are not limited to, snowmobiling, OHV use, backcountry skiing, and hunting. Special management considerations or protection needed within the unit are required to address habitat fragmentation of contiguous old growth forests due to forest practices and activities, wildfire, and disturbances such as roads and recreation.

The PBFs and PCEs described above are essential to the conservation of the southern Selkirk subpopulation of caribou, and may require special management considerations or protections to reduce habitat fragmentation of contiguous old-growth forests due to forest management practices and activities, wildfire, disturbances such as roads and recreation, and altered predator/prey dynamics (77 FR 71071). Special management considerations or protection are required within critical habitat areas to address these threats. Management activities that could ameliorate these threats include, but are not limited to, conservation measures and actions to minimize the effects of forest management practices on the PBFs, actions to minimize the potential for wildfire and the implementation of rapid-response measures, as appropriate, when wildfire occurs, road and recreational area closures as appropriate to avoid or minimize the potential for disturbance-related impacts, and reducing opportunities for predator-caribou interactions.

The United States-Canada border in the Selkirk Mountains is remote, rugged, and permeable to the southern Selkirk population (77 FR 71071). Illegal border-related activities and resultant law enforcement response (such as increased human presence, and vehicles including trucks, motorcycles, and all-terrain-vehicles), has the potential to cause adverse effects in these remote areas. While current levels of law enforcement activity do not pose a threat, a substantial increase in activity levels could be of concern. We note that some level of law enforcement activity can be beneficial, as it decreases illegal traffic. Significant increases in illegal cross-border activities in the designated critical habitat areas could pose a threat to the southern Selkirk Mountains population of woodland caribou, and therefore, to a degree, border security actions provide a beneficial decrease in cross-border violations and their impacts. There are no known plans to construct security fences in the designated critical habitat. We do not anticipate impermeable fencing being built in areas with rugged terrain. Technological solutions and other tactics for Homeland Security purposes would be more likely to be applied in these areas.

Previous LRMPs for the IPNF and CNF have been revised to incorporate management objectives and standards to address the above threats, as a result of section 7 consultation between the USFWS and USFS (USFWS 2001a, b). Standards for caribou habitat management have been incorporated into the IPNF's 1987 and CNF's 1988 LRMP, and contribute to caribou conservation through ensuring consideration of the biological needs of the species during forest management planning and implementation actions (USFS 1987, pp. II–6, II–27, Appendix N; USFS 1988, pp. 4–10–17, 4–38, 4–42, 4–73–76, Appendix I).

These efforts contribute to the protection of the essential PBFs by: (1) Retaining mature to old-growth cedar/ hemlock and subalpine spruce/fir stands; (2) analyzing timber management actions on a site-specific basis to consider potential impacts to caribou habitat; (3) avoiding road construction through mature old-growth forest stands unless no other reasonable access is available; (4) placing emphasis on road closures and habitat mitigation based on caribou seasonal habitat needs and requirements; (5) controlling wildfires within southern Selkirk Mountains population of woodland caribou management areas to prevent loss of coniferous species in all size classes; and (6) managing winter recreation in the CNF in Washington, with specific attention to snowmobile use within the Newport/Sullivan Lake Ranger District.

EVIRONMENTAL BASELINE FOR CARIBOU AND CARIBOU CRITICAL HABITAT

A general environmental baseline description, applicable to all listed, proposed, or candidate species was previously described and is incorporated here by reference. The following discussion provides a more specific environmental baseline for the caribou.

In the Federal Register notice proposing a new southern mountain caribou DPS (79 FR 26520), the USFWS described ongoing efforts to protect the proposed southern mountain caribou DPS and its habitat in the United States including the following (these also address the currently listed entity): (1) Retaining mature to old-growth cedar/hemlock and subalpine spruce/fir stands; (2) analyzing forest management actions on a site-specific basis to consider potential impacts to caribou habitat; (3) avoiding road construction through mature old-growth forest stands unless no other reasonable access is available; (4) placing emphasis on road closures and habitat mitigation based on caribou seasonal habitat needs and requirements; (5) controlling wildfires within southern Selkirk Mountains woodland caribou management areas to prevent loss of coniferous tree species in all size classes; and (6) managing winter recreation in the CNF in Washington, with specific attention to snowmobile use within the Newport/Sullivan Lake Ranger District.

Environmental Baseline for Caribou

The Southern Selkirk subpopulation was estimated to be 33-36 animals during 2000 to 2006, increased to 43-46 animals from 2007 to 2010, then declined rapidly to just 12 caribou in 2016 (Wiles 2017). The proportion of calves in the subpopulation has been relatively low in recent years, averaging 9.9% per year from 2004 to 2016, which is below the estimated 12-15% needed to maintain a stable population with high adult survival (Wiles 2017). In recent years, nearly all of the caribou detections made during winter surveys occurred in British Columbia. This generally reflects the year-round occurrence of the animals in the subpopulation, with the remaining animals now spending little time in Washington or Idaho during any part of the year (Wiles 2017). However, occasional sightings of one or a few animals continue to occur annually in the US portion of the recovery area.

Approximately 94 percent of the CNF portion of the southern Selkirk recovery area is in public ownership. Approximately 6 percent is private. Crowell and Salmo CMUs are completely in Forest Service ownership, while Molybdenite has 6,683 acres of private land (23 %), and Thunder-Hall has 111 acres of private land (0.4%). As a whole, all four CMUs are made up of 6 percent private land. (K. Honeycutt, USFS, 2017, in litt.).

There are 105,309 acres within the four Caribou Management Units (Crowell, Molybdenite, Salmo, and Thunder-Hall CMUs). Most of that acreage (104,912 acres) is at or above 4000 feet. Of the total acres in the four CMUs, there are 99,513 acres on the Colville National Forest (K. Honeycutt, USFS, 2017, *in litt.).*

On the Colville National Forest portion of the CMUs, currently there are 29,671 acres of Wilderness (30%) within the four CMUs (total of 104,912 acres) (K.Honeycutt, 2017 *in litt.).*

Early winter caribou habitat consists of low to mid-elevation, cedar/hemlock forest stands and stands on the ecotone with subalpine fir/spruce habitats (Rominger and Oldemeyer 1989). Mature and old stand conditions and good canopy closure (70 percent+) are important habitat components (Rominger 1995). Currently, the hemlock/cedar forest type is 21% early successional condition, 60% mid-successional condition, and 19% late-successional condition. Estimates of the range of variability show that 55-83% of these forest types were in a late-successional condition, indicating there is substantial potential to improve habitat conditions for woodland caribou.

The Service consulted on the CNF's Sullivan Lake Ranger District Winter Recreation Management Program, and provided a letter of concurrence on August 20, 2007 (Reference #1-9-07-I-0103; M. Borysewicz 2007, *in litt.).* The Service's letter of concurrence stated that winter recreation in the caribou recovery area is essentially limited to snowmobiling. There are approximately 14.2 miles of groomed snowmobile routes (0.09 miles/square mile) and 32.6 miles of un-groomed routes (0.2 miles/square miles) in caribou recovery habitat. There are no designated off-road snowmobile play areas on the Sullivan Lake Ranger District. Roughly 40 percent of the CNF's portion of the recovery area includes non-motorized land designations such as wilderness or research natural areas. It is illegal to operate snowmobiles in these areas. In the remaining 60 percent of the recovery area, travel off groomed or un-groomed snowmobile routes is legal. However it is physically precluded by dense forest stands in almost all locations, or prohibited by existing road closures.

The USFWS Letter of Concurrence also stated that there are over 11,000 acres of suitable early winter habitat on the District, approximately 1,991 acres of which lie within 0.25 miles of a groomed or un-groomed snowmobile route. This is about 17 percent of the total acreage of suitable early winter stands in the CNF's portion of the caribou recovery area. There are over 5,000 acres of late winter habitat on the District, approximately 410 acres of which lie within 0.25 miles of a groomed or ungroomed snowmobile route. This represents 8 percent of the total acreage in the CNF's portion of the recovery area.

Border Patrol activities on the Forest have the potential to cause caribou disturbance through use of roads or trails that are normally closed to motorized use. The exact extent or amount of the impact over the life of the plan is difficult to predict because many factors could influence Border Patrol activities.

Environmental Baseline for Caribou Critical Habitat

Critical habitat occurs in a subset of the recovery area, and the portion of critical habitat on the CNF occurs in the northeast corner of the forest (Figure 10). The 30,010 acres (12,145 ha) that were designated as critical habitat for the woodland caribou occur above 5,000 feet in elevations and are all on federal lands. The land managers include the Colville National Forest and Idaho Panhandle National Forest. Of the 30,010 acres, 23,980 acres (9,705 ha) occur in Pend Oreille County (77 FR 71074), and 22,385 acres are on the Colville National Forest (K. Honeycutt, 2017, *in litt.*). Of those, 13,212 acres (59%) of critical habitat are in wilderness. Figure 10 displays critical habitat on the CNF.

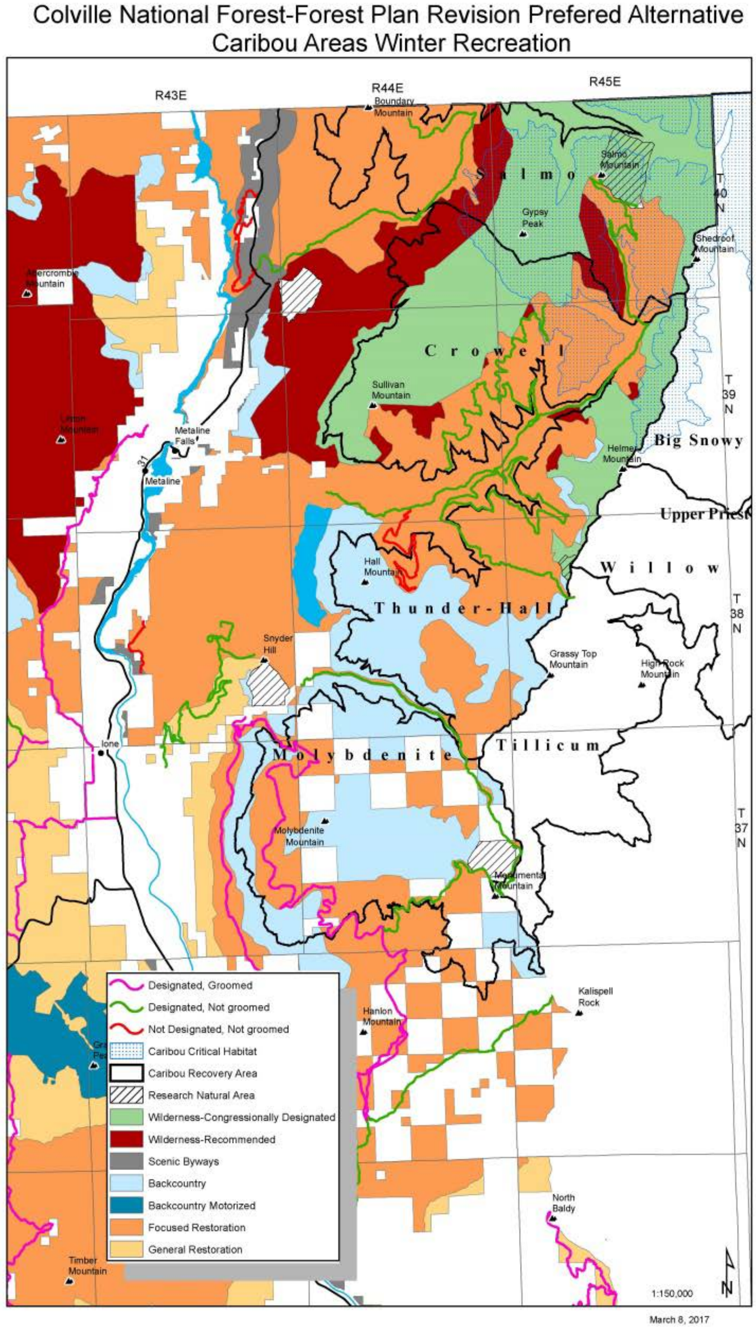


Figure 10. Caribou Critical Habitat and Winter Recreation (from BA Fig.9 p.140).

Conservation Role of the Action Area for Caribou and Critical Habitat

The CNF includes 4 of 17 caribou management areas within the caribou recovery area (USFWS 1994) in the U.S, and manages 98,093 acres in the caribou recovery area (more recent calculations are 99,513 acres; K. Honeycutt, 2017, *in litt.).*

The USFWS designated 30,010 acres of Federal land in Boundary County, Idaho, and Pend Oreille County, Washington as Critical Habitat for the southern Selkirk Mountains caribou population. Of that, there are 22,385 acres on the CNF (K. Honeycutt, 2017, *in litt.).* The critical habitat acres on the CNF are within CMUs.

Therefore, the CMUs and critical habitat on the CNF are important for a contribution to survival and recovery of the southern Selkirk subpopulation of caribou. The primary goal of the 1994 Recovery Plan was to increase mountain caribou populations and habitat suitability.

EFFECTS OF THE ACTION: CARIBOU

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

As stated earlier in the Opinion, the CNF Plan is a Federal action that provides a framework for the development of future CNF actions that will be authorized, funded, or carried out at a later time within the next 15 years. The overall goal of this section 7 consultation process is to evaluate the CNF Plan for its consistency with the conservation of listed species.

Appendix B (Borysewicz, M. 2017 *in litt.*)provides a list of the tasks in the Recovery Plan for the Selkirk Mountain Woodland Caribou (1994 Caribou Recovery Plan) (USFWS 1994), and how the CNF Plan addresses the applicable expectations in that plan. Below, we discuss the general effects of the CNF Plan on the caribou. In the following effects discussion, caribou will refer to either the listed southern Selkirk subpopulation, or the proposed southern mountain caribou, unless otherwise clarified.

The forest management activities that can most influence the recovery and viability of caribou based on the 1994 Recovery Plan and critical habitat (see below) include: 1) Vegetation management and natural disturbances affect the amount and connectivity of old forests of Engelmann spruce/subalpine fir and western red cedar/western hemlock. 2) Human access that can increase the potential for poaching and cause disturbance to caribou during the critical winter period.

Effects of the MAs

The recovery area and CMUs on the CNF are made up of the following MAs: Focused Restoration, Wilderness, Recommended Wilderness, Research Natural Areas, and Backcountry. These management areas will result in management that conserves the caribou, and ensures CNF contribution to 1994 Recovery Plan expectations. Figure 10 displays the CMUs and MA types and acres (K. Honeycutt, USFS, 2017, *in litt.),* and Table 7 tallies the CMUs and acreages by MAs.

Backcountry MA
Backcountry emphasizes non-motorized recreation opportunities and can include foot, horse, and mechanized (e.g., mountain bikes) modes of travel. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Focused Restoration MA
The management emphasis is to restore ecological integrity and ecosystem function at the landscape scale using both active management (mechanical treatment and prescribed fire) and passive management (natural processes including disturbances and succession), to restore management natural processes and improve resiliency, while emphasizing important fish and wildlife habitats. Focused Restoration areas are defined by the key watersheds, and grizzly bear and caribou recovery areas not included in Backcountry and Backcountry Motorized management areas. Important desired habitat conditions for aquatic, plant, and wildlife species are found in these areas. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Recommended Wilderness MA
There are 44,230 acres of RW recommended within the Pend Oreille subbasin, Abercrombie-Hooknose and Salmo-Priest Adjacent. There is an additional 17,400 acres in the Bald Snow RW for a total of 61630 acres. These areas are lands that have been identified and evaluated through the forest planning process as suited for recommendation for addition to the national wilderness preservation system. Wilderness characteristics are protected until Congress either designates the area as part of the National Wilderness Preservation System or the area is released from consideration. If Congress has not acted by the next planning effort, these areas may be further evaluated for wilderness designation. Management direction is to protect and maintain the social and ecological characteristics that provide the basis for the wilderness recommendation. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Wilderness MA
The Colville National Forest has one wilderness area, the Salmo-Priest. Wilderness areas are zoned using the Wilderness Resource Spectrum: pristine, primitive, semi-primitive and transition zones offer the spectrum of environmental and bio/physical settings typically found in wilderness. Due to the size, complexity and use patterns of the Salmo-Priest Wilderness, the area administered by the Colville National Forest (a portion of the Wilderness is administered by the Idaho Panhandle National Forest) is designated as "Primitive" in the Wilderness Resource Spectrum. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Table 7. Caribou Management Units by Management Area (K. Honeycutt, 2017, *in litt.*).

	Caribou Management Units USFS (acres)				
Management Area	**Crowell**	**Molybdenite**	**Salmo**	**Thunder-Hall**	**Grand Total**
Backcountry		11,336		9,248	**20,585**
Focused Restoration	10,205	8,827	9,596	12,108	**40,737**
Research Natural Area		716	1,405	115	**2,235**
Wilderness-Congressionally Designated	11,482		13,166	5,023	**29,671**
Wilderness-Recommended	2,873		3,102	311	**6,286**
Grand Total	**24,560**	**20,879**	**27,269**	**26,805**	**99,513**

The MAs provide areas with limited human access and limited vegetation management within caribou recovery areas. In recent years caribou distribution on CNF has been low to nonexistent; however, recovery efforts may increase herd size and change the distribution in the future. If the herd increases, exposure to management activities within the MAs may be more likely.

Vegetation Management Effects, including restoration, climate change, fire

The Status of the Species section described that vegetation management activities can result in the following stressors: loss of alpine forest habitat for seasonal use, loss of arboreal lichen; insect and disease outbreaks may result in logging in some MAs, resulting in loss of arboreal lichen; young forest and openings result in increased ungulates (deer, moose) that draw predators to caribou areas resulting in increased mortality; and disturbance from active logging or openings from recent logging may force caribou into openings where they are more vulnerable to predation.

In general, vegetation management on the CNF would be focused on restoring late successional and old forest habitats based on the historic range of variability. This would provide the amount, spatial arrangement, and connectivity of caribou habitat to mimic natural patterns and processes. The forest management activities that can influence the recovery and viability of caribou based on the 1994 Recovery Plan and critical habitat (see below) include: 1) Vegetation management and natural disturbances affect the amount and connectivity of old forests of Engelmann spruce/subalpine fir and western red cedar/western hemlock; and 2) Human access that can increase the potential for poaching and cause disturbance to caribou during the critical winter period (BA p.223). The following management direction in the CNF Plan provides conservation for caribou and its habitat:

> *FW-DC-VEG-01. Plant Species Composition*
> Native species and native plant communities are the desired dominant vegetation. National Forest System lands contribute to the diversity, species composition, and structural diversity of native upland plant communities. The full range of potential natural vegetation is maintained on the Forest where it supports plant and animal diversity including pollinators and other invertebrates, and robust ecological function.

FW-DC-VEG-03. Forest Structure
Forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to aesthetic settings, particularly along scenic byways and highways.

Forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. BA Table 14 contains desired conditions for each vegetation type.

FW-DC-VEG-05. Biological Legacies
Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem.

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.

FW-DC-WL-07. Woodland Caribou Seasonal Habitat Components
For the desired conditions for caribou, manage toward the upper 10% of the desired conditions for vegetation in late-successional-closed forest within western hemlock/red cedar and spruce/subalpine fir, measured at the caribou management unit scale. Seasonal habitat components of well-connected, large blocks of late-successional forest provide essential habitat for caribou.

FW-DC-WL-08. Woodland Caribou Habitat – Forage Availability
Preferred lichens (Bryoria and Alectoria) are present in sufficient quantities for woodland caribou to forage.

FW-OBJ-WL-04. Restoration of Late-Successional Forest Habitat and Associated Surrogate Species.
Within 15 years of plan implementation, restore western hemlock/western red cedar vegetation types within late-successional forest habitat for surrogate wildlife species on 1,400 acres within the following watersheds: Sullivan Creek (800 acres), LeClerc (600 acres). Generally focus activity in previously treated areas that are now early to mid-successional forest to enhance large tree development.

FW-GDL-VEG-03. Large Tree Management
Management activities should retain and generally emphasize recruitment of individual large trees (greater than 20 inches diameter at breast height) across the landscape. [Exceptions are listed in the guideline].

Trees need to be removed to promote special plant habitats (such as, but not limited to, aspen, cottonwood, whitebark pine)

FW-STD-WL-09. Woodland Caribou Recovery Areas – Management Activities
Management activities within lands identified as capable habitat for woodland caribou enhance or facilitate the development of suitable habitat. Management activities within stands identified as suitable habitat are avoided, except when a clear benefit of the activity to habitat conditions can be demonstrated.

FW-STD-WL-10. Woodland Caribou Recovery Area - Management and Caribou Calving
Management activities that cause disturbance shall be avoided in potential caribou calving habitat from June 1 to July 15.

These vegetation management and caribou-specific DCs, GDs, and STDs will result in maintenance and restoration of habitat conditions for caribou in the recovery area and within critical habitat. *FW-STD-WL-10* will minimize disturbance effects in potential calving habitat.

Increased insects and disease can cause the following stressors for the caribou: loss of cover, forage, habitat; insect and disease outbreaks may result in logging in some MAs resulting in loss of arboreal lichen. The CNF plan includes the following measures to address insects and disease:

FW-DC-IPM-01. Integrated Pest Management.
Unwanted plant, animal (vertebrate and invertebrate) and pathogen species are prevented, suppressed, contained, controlled or eradicated. Native insects and plant and animal disease pathogens exist at endemic levels. Forests are managed for resilience to pests and pathogens…pest response plans are prepared, or existing plans reviewed…to facilitate rapid response to new pest outbreaks and infestations.

FW-DC-VEG-02. Insects and Diseases. Native insects, diseases, fungi, bacteria, and viruses engage in their natural (endemic) role in contributing to ecosystem processes…. Landscapes provide a patchwork of varied structural, compositional, and successional stages that ensure the continuation of these processes.

FW-OBJ-IPM-01. Integrated Pest Management
Damaging plant, animal, insect and plant and animal disease pest outbreaks are prevented, suppressed, contained, controlled or eradicated in a timely manner in accordance with proactive pest response plans. New outbreaks are addressed within one year of detection through the life of the plan.

FW-STD-IPM-01. Integrated Pest Management. Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest.... Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species.

Responding to insect and disease outbreaks may result in short-term loss of cover or arboreal lichen, but may prevent expansion of the outbreak with larger loss of cover and arboreal lichen.

The status of the species section explained that climate change can result in the following stressors: increasing elevation of preferred habitats; loss of habitats; increased heat load on caribou results in hyperthermia; less snow affects access to arboreal lichen, change to amount or distribution of arboreal lichen. There might also be increased winter access by predators; resulting in altered distribution or abundance of caribou. The potential effects of climate change depend on the interaction, not only of seasonal temperatures and snowfall patterns, but also occurrence of wildfires, outbreaks of forest insects, and diseases (MCST 2005).

Climate change may affect caribou through changes in snow levels that affect predator access and forage availability. Distribution and use areas may change, and there may be direct impacts to individuals due to overheating (hyperthermia). Management adaptations to respond to the effects of climate change include a focus on forest restoration and reducing non-climatic factors that affect wildlife populations (e.g., restoring habitat effectiveness). Vegetation management and caribou-specific DCs, GDs, and STDs will result in CNF managing for large trees and caribou habitat that will moderate the effects of climate change for a time.

The WDFW analyzed the effects of climate change on caribou in Washington, and determined they were highly vulnerable (WDFW 2015, Appx C p.C-33). They determined caribou would be exposed to increased temperatures, changes in precipitation, altered fire regimes, reduced snowpack, earlier snowmelt, and increased insect and disease outbreaks. The WDFW (2015, Appx C p.C-33) noted the following: “Woodland Caribou occupy higher elevations and rely on old-growth Engelmann spruce/subalpine fir and western red cedar/western hemlock forests that support arboreal lichen, which constitute a large portion of the Woodland Caribou diet. In combination with fire, warmer temperatures, precipitation changes, climate-driven increases in forest disease and insect mortality, and reduced snowpack and earlier snowmelt are likely to alter suitable habitat and predation risk for Woodland Caribou. Fire creates younger-age stands and edge habitat that attract deer, elk, and Moose; higher ungulate densities increases associated predator density, and these predators (e.g. bears, Gray Wolves, Cougars) prey opportunistically on Woodland Caribou. Woodland Caribou require deep, consolidated snow for movement at higher elevations during winter. Reduced snowpack and earlier snowmelt will affect the seasonal movements of Woodland Caribou and other ungulates, likely increasing predation risk by extending the length of time Woodland Caribou share habitat with other ungulates. In general, warmer and drier conditions will favor the expansion of deer, elk, and Moose by increasing overwinter survival, exacerbating predation risk and shifts in Woodland Caribou habitat.”

The CNF Plan will address climate change through the following Desired Conditions, Guidelines, and Monitoring expectations:

FW-DC-WR-14. Resiliency to Climate Change
Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin is scale is used for Forest planning and 5th field watershed scale is used for project planning.

MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)
… Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest.

MA-DC-RW-04. Wildlife (recommended wilderness)
Recommended wilderness contributes to preserving natural behaviors and processes that sustain native wildlife populations.

MA-DC-BC-02. Habitat (backcountry)
The areas provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).

FW-DC-WL-03. Habitat Conditions for all Surrogate Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

MON-VEG-01
To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and FRCC, increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

As described above, there is management direction in the CNF Plan to implement these climate change adaptations through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats.

Large severe fires have resulted and are likely to continue to result from climate change and historic fire suppression. Stand-replacing events result in direct loss of caribou habitat including old-growth, increased openings results in higher ungulates (such as white tail deer and moose) and increased presence of caribou predators. Large fires may result in loss of caribou habitat, making large areas unsuitable, and likely changing the distribution of caribou. Fire suppression activities may ameliorate that effect, and decrease the likelihood of caribou habitat burning, but it will depend on site specifics. The CNF Plan includes the following guidelines and standards that address fire management:

FW-GDL-VEG-04. Planned and unplanned ignitions
Use of planned and management of unplanned ignitions may be authorized. Objectives and strategies for all unplanned ignitions shall be identified at the time of the fire.

MA-GDL-WCD-07. Wildland Fire
Fire camps, helispots, and other temporary facilities should be located outside the wilderness boundary to protect wilderness character.
Firelines and spike camps (i.e., a remote camp usually near a fireline) should not be constructed adjacent to trails or camp areas to protect wilderness character.
Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role or to achieve wilderness desired conditions.

Wildfires should be managed for the benefit of wilderness resources. A full suppression strategy may be used where or when a wildfire:

1. has a high potential to spread outside national forest boundaries, or into areas with extensive recreation or administrative developments;
2. is not meeting wilderness objectives;
3. would adversely affect an ESA-listed species.

FW-GDL-WR-05. Chemical Fire Suppression
Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by riparian and aquatic-dependent threatened, endangered, proposed, candidate, or sensitive species, or their habitats.

MA-STD-RMA-12. Wildland Fire and Fuels Management--Minimum Impact Suppression Tactics (riparian management areas)
Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas.

MA-STD-RMA-15. Aerial Application of Fire Chemicals (riparian management areas)
Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on avoidance area maps and intermittent streams with surface water at the time of retardant use.

In recent years caribou distribution on CNF has been low to nonexistent; recovery efforts may increase herd size and change that in future. If the herd increases, exposure to management activities within in the MAs may be more likely. Impaired feeding or sheltering may occur if foraging habitat is removed, or if caribou are displaced from breeding or feeding habitat. If the herd increases, exposure to insect and disease management activities within in the MAs may be more likely, and decreasing forage or cover may result in future adverse effects on the caribou. If the herd increases, exposure to the impacts of climate change may be more likely, potentially resulting in increased mortality and harm to individuals. Large fires may result in loss of caribou habitat, making large areas unsuitable, and likely changing the distribution of caribou. Fire suppression activities may ameliorate that effect, and decrease the likelihood of caribou habitat burning, but it will depend on site specifics.

National Forest Access System Effects, including roads, OHV trails

The status of the species section explained that roads and access can result in: poaching and accidental kills by hunters due to misidentification; accidental kills by vehicles, permanent or temporary roads fragment habitat and provide easy travel corridors for predators into caribou habitats resulting in increased predation. Human access can cause disturbance to caribou during the critical winter period (BA p. 223; effects from winter recreation are discussed in more detail below).

Accidental caribou kills on roads are still possible but less likely on CNF due to current distribution of caribou, with the small number of caribou in the southern Selkirks spending most of their time in Canada. Even if caribou numbers increase in the future, kills on the CNF are unlikely because there are non-high-speed roads within the caribou recovery area, and roads are generally low density and are likely to remain so based on the MAs and expectations of the CNF Plan. Mortalities and injuries are still a threat in B.C. Hwy 3 due in part to road salt drawing caribou to Hwy 3; there are no similar situations on the CNF.

Although poaching has occurred in the past, there is no recent evidence of poaching in the U.S. or Canada. Grizzly bear core areas and road management DCs, STDs, and GDLs also provide protections and limit poaching. The CNF's portion of the caribou recovery area is entirely included within the Selkirk Mountains Grizzly Bear Recovery Area. The following management framework related to grizzly bears should limit poaching opportunities afforded by open roads.

> *FW-DC-WL-06. Grizzly Bear Recovery Area – Core Areas*
> The amount of core areas available to grizzly bears within each grizzly bear management unit meets the standards in Table 1 [from Table 16 in CNF Plan]]. Core areas are expanded where other forest access priorities / obligations can also be met.
>
> *FW-GDL-WL-01. Hiding Cover for Wildlife*
> Where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to created openings. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments.
>
> *FW-STD-WL-07. Grizzly Bear Recovery Area - Road Densities*
> Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal

> actions shall not result in a net increase in open or total road densities above the levels in Table 1 [from Table 16 in CNF Plan]. Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in).

The caribou habitat occurs in Key Watersheds. Minimizing the threat of roads in key watersheds is emphasized with standard *FW-STD-07 Road Construction and Hydrologic Risk Reduction in Key Watersheds*. In key watersheds that are functioning properly with respect to roads, there will be no net increase is system roads that affect hydrologic function. In key watersheds that are functioning-at-risk or have impaired function with respect to roads, there will be a net decrease (for every mile of road construction there would be greater than one mile of road-related risk reduction) in system roads that affect hydrologic function to move toward proper function. By managing for a no net increase or net decrease, there will be a decrease in caribou displacement from roads.

Significant changes to road speeds or quality could have adverse effects on caribou, however the MAs and road density expectations make future mortality or injury from vehicles on roads unlikely to occur.

Livestock Grazing Effects

Livestock grazing may occur in backcountry MA, and the focused restoration MA. Grazing is not authorized in the Salmo-Priest Wilderness, but may be authorized in Recommended Wilderness.

Grazing is not listed in the literature as a threat to caribou. Grazing could result in impacts to caribou forage habitat in meadows or riparian areas. While there is one allotment within the recovery area, the measures to ensure adequate browse for deer and elk is likely to provide adequate forage for other ungulates including caribou:

> *FW-DC-LG-03. Deer and Elk Forage on Grazing Allotments*
> Adequate browse and forage occurs on deer and elk summer and winter ranges within commercial grazing allotments during the critical winter period of December 15 to April 1.

Livestock grazing is not expected to have adverse effects on caribou based on the current CNF plan.

Mining Effects

Mining relevant to caribou effects was not addressed in the BA and is not listed as a typical threat to caribou. Recommended wilderness is open to mineral entry; designated wilderness legislatively withdraws mineral entry, except for valid claims. Effects would generally be limited to possible disturbance, if the mining activity occurred in an area with caribou at the time the caribou were using the seasonal habitats. Any large mining developments in those areas would require additional consultation. Mining is not likely to result in future adverse effects to caribou based on the current CNF plan.

Recreation, especially Winter Recreation Effects

As described in the environmental baseline, the Service previously consulted on the Sullivan Lake Winter Recreation Management Program. Most caribou mortalities have been attributed to predation, including from mountain lions and wolves. Winter recreation activities are not considered to be a principal cause of caribou mortalities, rather they could contribute to caribou being displaced from preferred late winter habitat, or being precluded from using such habitat. Caribou reactions to snowmobiles can range from increased vigilance (with a resulting reduction in feeding and/or resting behavior) to hard running for an extended period of time through deep snow. This could result in reduced forage intake, increased energy expenditures, and an overall decline in physical condition due to a loss of body fat crucial for winter survival. Caribou displaced to steeper slopes could also be more at risk of mortality due to avalanches.

Past studies on the effects of snowmobiling on ungulates suggest that the relative impacts vary with each species, the frequency of snowmobile activity, noise levels, rate of travel, human scent, visibility, and terrain. Simpson (1987) concluded that "the aspects of snowmobiling most disturbing to caribou are human scent and large groups of machines moving rapidly around an area. Caribou can tolerate low levels of snowmobile use and, if they are not harassed by snowmobilers, their tolerance will probably increase." Hooge et al. (2001) reported caribou tolerance of snowmobile use in a few areas in British Columbia. However, these authors also suggest "the reduction in use or abandonment of high-quality winter ranges (in other locations) may indicate that the current level of snowmobile use interferes with caribou use of these areas." There is less risk of caribou being disturbed by winter recreation activities on early-winter range. On the Sullivan Lake Ranger District, most off-road travel in these areas is precluded by the heavily wooded nature of the preferred forest stand types. The potential for disturbance to caribou exists mainly where roads bisect these stands.

The following desired condition, standard, and monitoring indicator address winter recreation and caribou:

> *FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation*
> Winter recreation is managed so that woodland caribou are not displaced from suitable habitat and the caribou can make full use of existing habitat in the recovery area.
>
> *FW-STD-WL-10. Woodland Caribou Recovery Area - Management and Caribou Calving*
> Management activities that cause disturbance shall be avoided in potential caribou calving habitat from June 1 to July 15.
>
> *FW-STD-WL-11. Woodland Caribou and Snowmobiles*
> Restrict over-the-snow vehicle use to designated routes within the caribou recovery area.
>
> *MON-FLS-01-04*
> Woodland caribou: management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable habitat within the caribou recovery area.

As described in the environmental baseline, approximately 17% of the CNF's suitable early winter caribou habitat lies within 0.25 miles of groomed or ungroomed snowmobile routes. (USFWS 2007 *in litt*.; M. Borysewicz 2007). Approximately 8 percent of the suitable late winter habitat on the CNF lies within 0.25 miles of groomed or ungroomed snowmobile trails (USFWS 2007 *in litt*.; M. Borysewicz 2007). Because the standard listed above restricts over-the-snow vehicle use to designated routes within the caribou recovery area, it provides stronger conservation for the caribou than the existing Forest Plan, and decreases likelihood of caribou harassment.

The duration of the CNF Plan is 15 years. Currently, remaining caribou mainly stay in B.C. so unlikely to be exposed to displacement or disturbance. If recovery efforts increase the herd, exposure may be possible in the future, and may result in disturbance or impaired breeding, feeding, or sheltering. However, *FW-STD-WL-10* will minimize that effect.

Lands and Special Uses Effects

Lands and Special Uses includes land exchanges, acquisition, or leases to maintain, restore, and enhance plant, wildlife, and riparian resources; special uses include permitting activities other timber, minerals, and grazing of livestock (grazing was previously addressed above).

Linear features fragment caribou habitat. Transmission lines and clearing along the U.S./Canada border result in early seral vegetation and contribute to prey habitat, fragmentation, and increase caribou vulnerability to predation. The CNF Plan includes measures to address the effects of Lands and Special Uses activities:

> *FW-DC-LSU-01. Lands and Special Uses*
> Achieve a land ownership pattern and right-of-way acquisition pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land.
>
> *FW-STD-LSU-01. Land Acquisition, Conveyance, and Exchange*
> The Forest has a consolidated land ownership pattern that contributes to ecosystem resilience, allows reasonable public and/or Forest Service administrative access where suitable, and improves land management efficiencies. There is a downward trend in the number of isolated, non-Federal inholdings that occur within the proclaimed Forest boundaries. Congressionally designated areas lack private inholdings.
>
> *FW-GDL-WL-04. Federally Listed Species*
> Habitat for federally listed wildlife species within recovery areas that occur on National Forest System lands should be retained in public ownership.

There may be future effects to the recovery area and corridors due to cumulative or indirect effects of timber harvest on private lands, especially in the Moybdenite CMU (Figure 10).

In recent years caribou distribution on CNF has been low to nonexistent; however recovery efforts may increase herds and change their distribution in the future. If the herd increases, exposure to Lands and Special Uses activities may be more likely. Some lands and special uses

may make connectivity between habitat blocks more distant and result in impaired movement, foraging, or increased predation; or result in disturbance of caribou in adjacent habitats.

Monitoring

In addition to the CNF Plan components described above, there are vegetation, species, and habitat monitoring questions to be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

> *MON-FLS-01:* To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?
>
> *MON-FLS-01-03:* Woodland caribou: maintenance of seasonal habitat components of well-connected, large blocks of late-successional forest at or above current levels.
>
> *MON-FLS-01-04:* Woodland caribou: management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable habitat within the caribou recovery area.
>
> *MON-WL-01:* Have management activities met plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions?

Evaluation reports keep the CNF Plan set of documents up to date. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects to Caribou

The CNF Plan ensures continued commitments to managing caribou and its habitat within the caribou recovery area. Management direction will be implemented to minimize the effects of future actions. The effects to caribou are summarized as follows:

- The MAs provide areas with limited human access and limited vegetation management within caribou recovery areas. All of the CMU acres are made up of MAs that will conserve caribou habitat. In recent years caribou distribution on CNF has been low to nonexistent; however recovery efforts may increase numbers and change the distribution in the future. If the numbers increase, exposure to management activities within in the MAs may be more likely. If the herd increases, exposure to insect and disease management activities within in the MAs may be more likely, and decreasing forage or cover may result in future adverse effects on the caribou.

- Vegetation management activities may result in the following stressors: loss of alpine forest habitat for seasonal use, loss of arboreal lichen; insect and disease outbreaks may result in logging and loss of arboreal lichen; young forest and openings result in increased ungulates (deer, moose) that draw predators to caribou areas resulting in increased mortality; and disturbance from active logging or openings from recent logging may force caribou into openings where they are more vulnerable to predation. In general, vegetation management consistent with the CNF Plan would be focused on restoring late successional and old forest habitats based within the historic range of variability. Vegetation management and caribou-specific DCs, GDs, and STDs will likely result in maintenance and restoration of habitat conditions for caribou in the recovery area and within critical habitat. FW-STD-WL-10 will minimize disturbance effects in potential calving habitat. The management direction would provide the amount, spatial arrangement, and connectivity of caribou habitat to mimic natural patterns and processes, thereby decreasing but not eliminating effects. Adverse effects may occur if foraging habitat is removed, if caribou are exposed to the activity, or if caribou are displaced from breeding or feeding habitat.

- Responding to insect and disease outbreaks may result in short-term loss of cover or arboreal lichen, but may prevent expansion of the outbreak with larger loss of cover and arboreal lichen.

- Climate change may affect caribou through changes in snow levels that affect predator access and forage availability. Distribution and use areas may change, and there may be direct impacts to individuals due to overheating (hyperthermia). Responses to the effects of climate change include a focus on forest restoration and reducing non-climatic factors that affect wildlife populations (e.g., restoring habitat effectiveness). Vegetation management and caribou-specific DCs, GDs, and STDs will result in CNF managing for large trees and caribou habitat that will moderate the effects of climate change for a time, but not eliminate the effects. If the herd increases, exposure to the impacts of climate change may be more likely, potentially resulting in increased mortality and harm to individuals.

- Large severe fires have resulted, and are likely to continue to result from climate change and historic fire suppression. Stand-replacing events result in direct loss of caribou habitat including old-growth. Increased openings result in higher ungulates (such as white tail deer and moose) and increased presence of ungulate predators that may prey upon caribou. Large fires may result in loss of caribou habitat, making large areas unsuitable, and likely changing the distribution of caribou. Fire suppression activities may ameliorate that effect, and decrease the likelihood of caribou habitat burning, but it will depend on site specifics. The CNF Plan includes guidelines and standards that address fire management, but they do not completely avoid effects from planned or unplanned fires. If the caribou herd increases, exposure to management activities within in the MAs may be more likely.

- Although poaching has occurred in the past, there is no recent evidence of poaching in the U.S. or Canada. Grizzly bear core areas and road management DCs, STDs, and GDLs also provide protections and limit poaching. The CNF's portion of the caribou recovery area is entirely included within the Selkirk Mountains Grizzly Bear Recovery Area. Grizzly bear road management and hiding cover expectations should also limit caribou poaching. Significant changes to road speeds or quality could have adverse effects on caribou, however the MAs and road density expectations make future mortality or injury from vehicles on roads unlikely to occur.

- Grazing is not listed in the literature as a threat to caribou. Grazing could result in impacts to caribou forage habitat in meadows or riparian areas. While there is one allotment within the recovery area, the measures to ensure adequate browse for deer and elk is likely to provide adequate forage for other ungulates including caribou. Livestock grazing is not expected to have adverse effects on caribou based on the current CNF plan.

  Mining, relevant to caribou effects, was not addressed in the BA and is not listed as a typical threat to caribou. Recommended wilderness is open to mineral entry; designated wilderness legislatively withdraws mineral entry, except for valid claims. Effects would generally be limited to possible disturbance, if the mining activity occurred in an area with caribou at the time the caribou were using the seasonal habitats. Mining is not likely to result in future adverse effects based on the current CNF Plan, but any effects would be addressed through future consultations.

- As described in the environmental baseline, approximately 17 percent of the CNF's suitable early winter caribou habitat lies within 0.25 miles of groomed or ungroomed snowmobile routes. (USFWS 2007 *in litt.;* M. Borysewicz 2007). Approximately 8 percent of the suitable late winter habitat on the CNF lies within 0.25 miles of groomed or ungroomed snowmobile trails (USFWS 2007 *in litt.;* M. Borysewicz 2007). Because the standard listed above restricts over-the-snow vehicle use to designated routes within the caribou recovery area, it provides stronger conservation for the caribou than the existing Forest Plan, and decreases likelihood of caribou harassment. The duration of the CNF Plan is 15 years. Currently, remaining caribou mainly stay in British Columbia, reducing the risk of displacement or disturbance. If recovery efforts increase the herd, exposure risk may increase in the future, and may result in disturbance or impaired breeding, feeding, or sheltering.

- In recent years caribou distribution on CNF has been low to nonexistent at times; however recovery efforts may increase herds and change their distribution in the future. If the herd increases, exposure to Lands and Special Uses activities may be more likely. Some Lands and Special Uses activities may decrease connectivity between habitat blocks and result in impaired movement, foraging, or increased predation; or these activities may result in disturbance of caribou in adjacent habitats.

EFFECTS OF THE ACTION ON CRITICAL HABITAT

As described in the status of the species for critical habitat, the PCEs specific to the caribou are (77 FR 71070):

1. Mature to old-growth western hemlock (*Tsuga heterophylla*)/western red cedar (*Thuja plicata*) climate forest and subalpine fir (*Abies lasiocarpa*)/Engelmann spruce (*Picea engelmanni*) climax forest at least 5,000 feet in elevation; these habitats typically have 26-50% or greater canopy closure.
2. Ridge tops and high-elevation basins that are generally 6,000 feet in elevation or higher, associated with mature to old stands of subalpine fir/Engelmann spruce climate forest with relatively open (approximately 50%) canopy.
3. Presence of arboreal hair lichens.
4. High-elevation benches and shallow slopes, secondary stream bottoms, riparian areas, and seeps, and subalpine meadows with succulent forbs and grasses, flowering plants, horsetails, willow, huckleberry, dwarf birch, sedges and lichens. These are used by woodland caribou, including pregnant females, for feeding during the summer seasons.
5. Corridors/transition zones that connect the habitats described above. If human activities occur, they are such that they do not impair the ability of caribou to use these areas.

The PBF for caribou in the southern Selkirk Mountains population require the arrangement of the above habitat types and their components and transition zones on the landscape in a manner that supports seasonal movement, feeding, breeding, and sheltering needs (77 FR 71070). Each of the seasonal use areas creates space on the landscape that allows caribou to spread out and avoid predators. These areas should also have little or no disturbance from forest practices, roads, or recreational activities.

Effects of MAs

Critical habitat on the CNF includes the following MAs according to the CNF Plan: Wilderness (13,212 acres), Recommended Wilderness (2,399 acres), Research Natural Areas (1,064 acres) and Focused Restoration (5,710 acres) (K.Honeycutt, 2017, *in litt*.).

Management Areas within the caribou recovery areas, and including critical habitat, provide for the PBFs for caribou. PCEs are addressed through the management areas and the DCs, OBJs, GDLs, and STDs (see the Management Areas discussion under Effect to Caribou).

Vegetation Management, Restoration Effects

The forest management activities that can influence the PCE's of caribou critical habitat based on the caribou 1994 Recovery Plan and critical habitat include vegetation management and natural disturbances that affect the amount and connectivity of old forests of Engelmann spruce/subalpine fir and western redcedar/western hemlock (BA p.226). Vegetation management and caribou-specific DCs, GDs, and STDs will result in maintenance and restoration of habitat conditions for caribou in critical habitat. Specifically, the vegetation management, and caribou-specific DCs, GDs, and STDs will result in maintenance or restoration of the PCE 1 (mature to

old growth high elevation forests), PCE 3 (arboreal hair lichens), and PCE 5 (Corridors/transition zones.

Responding to insect and disease outbreaks may result in short-term loss of cover or arboreal lichens, but may prevent expansion of the outbreak with larger loss of cover and arboreal lichens. This will result in short-term adverse, but long-term benefits to PCE 1(mature to old growth high elevation forests) PCE 3 (arboreal hair lichens), and PCE 5 (Corridors/transition zones).

Climate change would likely alter the distribution and abundance of some of the PCE's (e.g., mature forest, lichens) of caribou habitat, and would also change snow depths and persistence, which affect seasonal movements of mountain caribou (WDFW 2012). The potential effects of climate change depend on the interaction, not only of seasonal temperatures and snowfall patterns, but also occurrence of wildfires, outbreaks of forest insects, and diseases (Mountain Caribou Science Team 2005). Management adaptations in the CNF Plan to address the effects of climate change include a focus on forest restoration and reducing non-climatic factors that affect wildlife populations (e.g., restoring habitat effectiveness). Climate change may affect caribou through changes in snow levels that affect predator access and forage availability. Distribution and use areas may change as a result of climate change. Vegetation management and caribou-specific DCs, GDs, and STDs will result in CNF managing for large trees and caribou habitat that will moderate the effects of climate change. Climate change will have effects on PCE 1 (mature to old growth high elevation forests), PCE 3 (arboreal hair lichens), and PCE 5 (corridors/transition zones).

Large fires and suppression activities could have adverse effects on all of the caribou PBFs and PCEs.

Access System, including Roads, and OHV trails Effects

Human access can increase the potential for poaching and cause disturbance to caribou during the critical winter period. Winter recreation is discussed below, under Recreation. Access Management and roads may affect caribou PCE 5 (corridors/transition zones) however the MAs and road density measures (described under caribou effects) minimize the effects, and make future mortalityor injury from vehicles on roads unlikely to occur.

Livestock Grazing Effects

There are no livestock allotments within caribou critical habitat on the CNF; therefore, no effect to critical habitat is expected.

Mining Effects

Mining would not occur in the 13,212 acres of wilderness within critical habitat. In other MAs, mining could affect PCE 5, Corridors/transition zones. Most effects from mining would be indirect effects from increased access, and would be similar to those discussed under access system.

Recreation Effects (especially winter recreation, snowmobiling, heli-or cat-skiing, and back-country skiing)

Disturbance from winter recreation could have effects on all 5 PCEs through disturbance impacting caribou's access to the habitats. DCs and STDs manage and limit winter recreation so that most caribou habitat would still be available.

Lands and Special Uses Effects

This includes land exchanges, acquisition, or leases to maintain, restore, and enhance plant, wildlife, and riparian resources. Special uses include permitting activities other timber, minerals, and grazing of livestock (previously addressed above).
All 5 PCEs could be affected by lands and special uses, either directly or indirectly (through disturbance or connectivity); however, CNF Plan measures are expected to minimize those effects.

Summary of Effects on Critical Habitat

Future actions that affect critical habitat will require future site-specific consultations. The federal register notice designating critical habitat explains that activities that may affect critical habitat (77 FR 71074), and may require future consultation include, but are not limited to:

> (1) Actions that would reduce or remove mature old-growth vegetation (greater than 100–125 years old) within the cedar/hemlock zone and subalpine fir/Engelmann spruce zone at higher elevations stands (at or greater than 5,000 ft (1,520 m)), including the ecotone between these two forest habitats. Such activities could include, but are not limited to, forest stand thinning, timber harvest, and fuels treatment of forest stands. These activities could significantly reduce the abundance of arboreal lichen habitat, such that the landscape's ability to produce adequate densities of arboreal lichen to support persistent mountain caribou populations is at least temporarily diminished.
>
> (2) Actions that would cause permanent loss or conversion of old-growth coniferous forest on a scale proportionate to the large landscape used by the southern Selkirk Mountains population of woodland caribou. Such activities could include, but are not limited to, recreational area developments, certain types of mining activities (e.g. open-pit mining), and road construction. Such activities could eliminate and fragment mountain caribou and arboreal lichen habitat.
>
> (3) Actions that would increase traffic volume and speed on roads within southern Selkirk Mountains population of woodland caribou critical habitat areas. Such activities could include, but are not limited to, transportation projects to upgrade roads or development, or development of a new tourist destination. These activities could reduce connectivity within the old-growth coniferous forest landscape for mountain caribou.
>
> (4) Actions that would increase recreation in southern Selkirk Mountains population of woodland caribou critical habitat. Such activities could include, but are not limited to, recreational developments that facilitate winter access into mountain caribou habitat units, or management activities that increase recreational activities within designated critical habitat throughout the year, such as snowmobiling, OHV use, and backcountry skiing. These activities have the potential to displace the southern Selkirk Mountains population of woodland caribou from suitable habitat or increase their susceptibility to predation. Displacement of caribou may result in: (1) Additional energy expenditure when they vacate an area to avoid disturbance, at a time when their energy reserves are

already low; (2) an effective temporary loss of available habitat; and (3) potential long-term habitat loss if they abandon areas affected by chronic disturbance.

The caribou strongly prefers old-growth forests to young forests in all seasons (77 FR 71074). In designated critical habitat, management actions that alter vegetation structure or condition in young forests over limited areas may not represent an adverse effect to caribou critical habitat. However, an adverse effect could result if these types of management activities reduce and fragment areas in a manner that creates a patchwork of different age classes or prevents young forests from achieving old-growth habitat characteristics. For example, a commercial thinning or fuels reduction project in a young forest that may affect, but would not be likely to adversely affect critical habitat would not require formal consultation. However, a commercial thinning or fuels reduction project conducted within an old-growth forest that may affect, and would be likely to adversely affect, critical habitat would require formal consultation. Federal agencies should examine the scale of their activities to determine whether direct or indirect alteration of habitat would occur to an extent that the value of critical habitat for the conservation of the caribou would be appreciably diminished.

CUMULATIVE EFFECTS: CARIBOU AND CRITICAL HABITAT

Fuels reduction projects are possible on all land ownerships, in particular where they are near residences (BA p.225). This may result in loss of foraging habitat, or potentially slow or prevent fires, thereby conserving adjacent habitats. Most of the caribou habitat, and all of the critical habitat, occurs on federal lands.
Recreation is likely to increase on all land ownerships due to increasing demands from the public. This would increase the effects of human disturbance on caribou on non-NFS lands and result in NFS lands that have relatively low human disturbance becoming more important to wildlife such as caribou.

Big game hunting continues on both sides of the U.S./Canada border. Encounters with hunters may result in caribou mortality as a result of mistaken identification. Legal harvest of caribou by Treaty Indians does occur, but with few statistics on the number of animals taken it is difficult to evaluate the influence of this on the caribou population. Fatal collisions with vehicles occur on open roads in caribou habitat and are likely to continue, especially on Highway 3 in British Columbia. Predation by mountain lions, wolves and other predators would continue, with the effect on the caribou population dependent on big game populations, predator populations and a variety of other factors.

In the British Columbia portion of the recovery area, human activities that would continue to impact caribou habitat include gas, powerline, and international border corridors, recreation activities, timber harvest, and highways.

The IDL has lands within the recovery area and is likely to continue to manage the lands to generate income to the Trust Beneficiaries (primarily public school systems). The IDL consults with IDFG during timber sale development to identify and mitigate potential impacts to wildlife species. The IDL harvested approximately 1,800 acres within the Selkirk subpopulation Recovery Area since 2003, with an additional 600 acres sold but not yet harvested. Private lands comprise only a small portion of caribou habitat. However, private and IDL managed lands have less stringent requirements for protection of habitat and remain at some risk for habitat modification and infrastructure development. Since recovery of habitat due to past conversions may take 60 to 100 years or more (Environment Canada 2014), effects from past timber harvest will continue into the future.

INTEGRATION AND SYNTHESIS OF EFFECTS

The current listed caribou population (southern Selkirk subpopulation) in the U.S. and Canada is declining. Figure 8 shows the caribou population above 50 in the early 1990's, and then varying for several years with a peak of 43-46 animals between 2009 to 2010, then a rapid decline to 12 animals in 2016. Nearly all of the winter survey detections have been in British Columbia since about 1999, with no detections on the US side in five of six survey years since 2011 (Wiles 2017). Threats to caribou habitat include forest harvest, forest fires, human development, recreation, and climate change. Over the 15-year duration of the CNF Plan, it is possible that recovery efforts will increase the population, making use of the CNF more likely.

The most imminent threats to the species are a combination of low population size coupled with predation pressure (from wolves, cougars, or bears) and injury and mortality from collisions on Highway 3 in British Columbia. Caribou have not been documented on the CNF in recent years. However, continued management of CMUs and designated critical habitat will provide opportunities for future herds or populations to use the CNF.

The CNF plan has management areas that will ensure management within the caribou recovery area supports habitat for the caribou, and minimizes effects from winter recreation, timber harvest, and other actions. The CNF Plan includes desired conditions, objectives, guidelines, standards, and monitoring expectations that will ensure that caribou and their habitat is managed as expected in the caribou 1994 Recovery Plan (USFWS 1994). Appendix C compares the expectations of the 1994 Recovery Plan, to the commitments of the Forest in the CNF Plan. The Forest is doing what is expected in the 1994 Recovery Plan, and specific measures (such as FW-STD-WL-09) ensure they will manage for caribou habitat. Based on these commitments, the Service determines that implementation of the CNF Plan will not result in any significant decreases in the number, distribution, or reproduction of southern Selkirk subpopulation of caribou as a result of implementation of the CNF Plan. While there may be future effects to the species from management actions, the standards and guidelines in the CNF Plan should prevent any long-term adverse effects.

The 1994 Recovery Plan for the Caribou provides recovery expectations, and the caribou 5-year review (USFWS 2008) provided the following recommendations for future actions:

- Work with State and private landowners to incorporate caribou habitat management guidelines into their timber management operations. The U.S. Forest Service currently incorporates caribou habitat management guidelines into the design and implementation of timber management activities within the caribou recovery area to maintain or enhance caribou habitat quality. However, similar standards or guidelines are not in place for State or private forestry activities within caribou habitat. Habitat management guidelines which avoid creating early successional habitat within or adjacent to caribou habitat would help ensure connectivity and minimize habitat for other ungulates such as moose, elk and white-tailed deer.

- Work with Federal, State and private landowners, Tribes, the BC government and the public to address the impacts of winter recreation activities within the caribou recovery area and to develop guidance that clearly reflects where such activities are and are not appropriate.

- Manage predator and alternate prey populations within and adjacent to the recovery area. Work with the game management agencies of BC, Idaho, and Washington to maintain predator and prey populations within and adjacent to the caribou recovery area at relatively low levels to help minimize the predator pressure on caribou.

- Continue augmentation efforts to increase the population. Work with BC, the Tribes, and the States to facilitate planning and implementation of periodic augmentation efforts to help boost caribou numbers and improve genetic variability.

As a land management agency the CNF can contribute most to the first and second recommendations above. The CNF Plan includes management direction for caribou habitat management in the caribou recovery area, to address and minimize the impacts of winter recreation activities within the caribou recovery area. Thus, the CNF Plan appears to be consistent with recommendations in the Recovery Plan for the caribou. Implementation of the CNF Plan is not likely to result in any significant decreases in the number, distribution, or reproduction of the southern Selkirk subpopulation of woodland caribou.

As described in the status of the species, in 2014 the USFWS proposed to amend the current listed entity (the southern Selkirk Mountains population of woodland caribou) as a new southern mountain caribou DPS including a larger area and more caribou herds in British Columbia. The proposed threatened DPS is a transboundary population that moves between British Columbia, Canada, northern Idaho, and northeastern Washington including parts of the CNF. This new designation has not been finalized to date. However, the boundaries of the new DPS in Washington are similar to the boundaries for the original listed entity. Therefore, it is likely that the future habitat management expectations in Washington, including on the CNF would be similar. As such, implementation of the CNF Plan is not likely to result in any significant decreases in the number, distribution, or reproduction of the proposed southern mountain caribou DPS.

The CNF has 22,385 acres of designated critical habitat for the caribou (K. Honeycutt, 2017, *in litt*.). Of that, 13,212 acres (59 percent) are in Wilderness. The management direction for woodland caribou and vegetation management in the Plan, would contribute to the maintenance and restoration of the PCEs of designated critical habitat for the woodland caribou. While there may be future effects to critical habitat from management actions, activities implemented consistent with the CNF Plan direction would not destroy or adversely modify critical habitat for the caribou.

In the 2012 final rule designating critical habitat (77 FR 71071), the USFWS stated that previous forest plans and amendments on the CNF and IPNF contributed to the protection of the essential PBFs by: "(1) Retaining mature to old-growth cedar/hemlock and subalpine spruce/fir stands; (2) analyzing timber management actions on a site-specific basis to consider potential impacts to caribou habitat; (3) avoiding road construction through mature old-growth forest stands unless no other reasonable access is available; (4) placing emphasis on road closures and habitat mitigation based on caribou seasonal habitat needs and requirements; (5) controlling wildfires within Southern Selkirk Mountains population of woodland caribou management areas to prevent loss of coniferous species in all size classes; and (6) managing winter recreation in the CNF in Washington, with specific attention to snowmobile use within the Newport/Sullivan Lake Ranger District." The proposed CNF Plan continues those expectations, and therefore also contributes to the protection of the essential PBFs. The USFWS believes that implementation of the CNF Plan will allow the designated critical habitat to continue to serve its intended conservation role for the species.

CONCLUSION

After reviewing the current status of the caribou, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the southern Selkirk subpopulation of mountain caribou and is not likely to destroy or adversely modify designated critical habitat.

The southern mountain caribou DPS is proposed to be listed. See the Reinitiation Notice regarding future confirmation of the conference opinion as a biological opinion.

GRIZZLY BEAR CHAPTER
STATUS OF SPECIES: GRIZZLY BEAR

Taxonomy and Species Description

Grizzly bears (*Ursus arctos horribilis*) are vertebrates that belong to the Class Mammalia, Order Carnivora, and Family Ursidae. Grizzly bears are a member of the brown bear species (*U. arctos*) that occurs in North America, Europe, and Asia; the subspecies *U. a. horribilis* is limited to North America (Rausch 1963, p. 43; Servheen 1999, pp. 50–53). Grizzly bear coloration varies from light brown to almost black, with guard hairs often paled at the tips. Grizzly bears, in general, are larger than black bears (*Ursus americanus*) and can be distinguished from them by longer, curved claws, humped shoulders, and a more concave face. Grizzly bears are large (averaging 400-600 lbs. for males, and 250-350 lbs for females) and long-lived (up to 40 years old) (Storer and Tevis 1955), but usually no more than 15-25 years in the wild.

Listing Status

The grizzly bear of the conterminous United States was listed as threatened under the Act on July 28, 1975 (40 FR 31734). Threatened status was deemed appropriate for the following reasons: the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, sporting, scientific, or educational purposes; the inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence.

Since the original listing of the grizzly bear, the Service has completed four, 5-year status reviews (72 FR 19549; 46 FR 14652; 52 FR 25523; 56 FR 56882). None of these reviews warranted a change in the listing status of the grizzly bear. Since then, the Service has undertaken a number of actions to review the status of individual grizzly bear populations.

On March 13, 1990, the Service received a petition requesting the grizzly bear in the North Cascades Ecosystem (NCE) be reclassified from threatened to endangered. We made a positive 90-day finding on the petition and initiated a status review of the North Cascades Ecosystem grizzly bear population (55 FR 32103). On January 28, 1991, we received a petition requesting that we reclassify the grizzly bear populations in the Cabinet Yak Ecosystem (CYE), Selkirk Ecosystem (SE), and the Northern Continental Divide Ecosystem (NCDE) from “threatened” to “endangered.” Then, on February 4, 1991, we received a petition requesting that grizzly bear populations in the SE, CYE, Yellowstone Grizzly Bear Ecosystem (YGBE) and NCDE recovery zones be reclassified from threatened to endangered. In 1992, we made a positive finding on these two petitions regarding the CYE and SE and initiated a status review for these two ecosystems (57 FR 14372). This same finding found that there was not substantial information presented about the YGBE or NCDE recovery zones and that the request to uplist the North Cascades Ecosystem population was already being addressed through initiation of a status review in 1990 (see 55 FR 32103, August 7, 1990).

In July 1991, the Service released a 12-month finding that reclassification of the NCE population from threatened to endangered was warranted but precluded by higher priority listing actions (56

FR 33892). In 1993, we published a 12-month finding that the grizzly bear population in the CYE was warranted for uplisting to endangered status while the population in the SE was not (58 FR 8250, February 12, 1993). This warranted status for the CYE, like the North Cascades Ecosystem population, was determined to be precluded by higher priority actions. In 1998, we re-affirmed this position, publishing a notice that the North Cascades population and the CYE populations are warranted for endangered status, but precluded by higher priority actions (63 FR 30453, June 4, 1998). In 1999, after a Court remanded our finding regarding the SE population back to the Service, we released a 12-month finding that both the CYE and the SE populations were warranted for endangered status but precluded by higher priority actions (64 FR 26725). Since then, the NCE, SE, and the CYE populations have remained warranted for reclassification from threatened to endangered status but precluded by higher priority actions (64 FR 57534; 66 FR 54808; 67 FR 2004; 70 FR 24870; 71 FR 53756,; 72 FR 69034; 73 FR 75176; 74 FR 57804)

On March 29, 2007, the Service designated the Greater Yellowstone Area (GYA) population of grizzly bears, which inhabits the Greater Yellowstone Area Recovery Zone, as a DPS and removed the Greater Yellowstone Area Distanct Population Segment (GYA DPS) from the List of Threatened and Endangered Wildlife under the ESA. The delisting became effective on April 30, 2007 (72 FR 14866-14938). However, on September 21, 2009, the Federal District Court in Missoula, Montana, issued an order enjoining and vacating the delisting of the GYA DPS of the grizzly bear. In compliance with this order, the grizzly bear population in the GYA was again listed as threatened under the Act and no longer considered a DPS.

On March 11, 2016, the Service opened a 60-day comment period on a proposed rule to identify the Greater Yellowstone Ecosystem population of grizzly bears as a DPS and remove it from the Federal List of Endangered and Threatened Wildlife (81 FR 13173). On September 6, 2016, the Service reopened the comment period on the proposed rule to delist the Greater Yellowstone Ecosystem population of grizzly bears. The extended comment period allowed the public to comment on the protective measures passed by Idaho, Montana, and Wyoming for post-delisting management of grizzly bears. On June 30, 2017 the USFWS delisted the Greater Yellowstone Ecosystem population of grizzly bears (82 FR 30502).

To date, no critical habitat for grizzly bears has been designated under the ESA.

Life History

Grizzly bears are omnivorous, and display diet plasticity (fish, berries, grasses, leaves, insects, roots, carrion, small mammals, fungi, nuts, and ungulates) even within a population (Edwards et al. 2011, pp. 883–886)—and shift and switch food habits according to their availability (Servheen 1983, pp. 1029–1030; Mace and Jonkel 1986, p. 108; LeFranc et al. 1987, pp. 113–114; Aune and Kasworm 1989, pp. 63–71; Schwartz et al. 2003, pp. 568–569; Gunther et al. 2014, p. 65). They require caloric intake in excess of maintenance requirements, particularly in later summer and fall, in order build fat levels to survive denning. Generally solitary, grizzly bears avoid one another, except during the mating season when male and female bears tolerate one another. Grizzly bears do not defend territories, but instead have home ranges they share with other grizzly bears, although social systems influence movements and interactions among resident bears. Home range sizes for adult female grizzlies vary from 50 to 150 square miles; an adult male can have a home range size as large as 600 square miles (Schwartz et al. 2003).

Grizzly bears have one of the lowest reproductive rates among terrestrial mammals. Mating appears to occur from late May through mid-July, with a peak in mid-June and estrus lasting from a few days to over a month (Craighead et al.1969, Herrero and Hamer1977). Females in estrus are receptive to practically all adult males (Homocker 1962). A male may isolate and defend a female in areas of low bear density; but in areas of high density, males and females both may be promiscuous (Craighead et al.1969). Age of first reproduction and litter size varies and may be related to nutritional state (Herrero 1978, Russell et al.1978). Age at first reproduction varies from 3.5 to 8.5 years of age, and averages 5.5 years in the areas studied in the lower 48 States. Litter size varies from one to four cubs with an average of approximately two throughout much of the range of the species. Reproductive intervals for females average 3 years, and animals that lose young early in the year may come into estrus and breed again that same year. Cubs remain with their mother for 2 to 3 years (Foresman 2001). Grizzly bear females cease breeding successfully some time in their mid to late 20s (Schwartz et al. 2003).

Grizzly bears in the contiguous United States spend 4 to 6 months in dens, typically beginning in October or November (Craighead and Craighead 1972; Nagy and Gunson 1990; Hellgren 1998). The bears hibernate for as long as 7 months. During this period, they do not eat, drink, urinate, or defecate. Over the course of the denning season, a bear may lose 30 percent of its body weight. All of this weight is stored as fat, which is acquired during the 2 to 4 months prior to entering dens. During the pre-denning period, bears increase their food intake dramatically and may gain as much as 3.64 pounds per day (Schwartz et al. 2003).

The causes of natural mortality for grizzly bears or other bears are not well known. Bears do kill each other. It is known that adult males kill juveniles and that adults also kill other adults. Parasites and disease do not appear to be significant causes of natural mortality (Jonkel and Cowan 1971, Kistchinskii 1972, Rogers and Rogers 1976) but they may very well hasten the demise of weakened bears.

Habitat

Grizzly bears are habitat generalists. Basic habitat requirements include the availability of food, security (from humans and other bears), and den sites (Archibald et al. 1987; Heinrich et al. 1995; Mace et al. 1996, 1999; Linnell et al. 2000). While biologists agree that preferred habitats of grizzly bears are early seral, fire-successional types, the proximity of secure cover is also an important variable that has been shown to influence the use of foraging habitat. Given equal foraging opportunities, under cover and in the open, bears prefer to feed under cover.

Grizzly bears are selective in their seasonal use of various kinds of forage and, therefore, move across the landscape as they follow the phenological development and abundance of their preferred forage items. As a result, the productivity of grizzly bear populations is likely more strongly influenced by the availability of high quality food resources than by density-dependent regulating factors (IGBC 1987, pp. 51-59). It has also been observed that grizzly bears of all ages will congregate readily at plentiful food sources and form a social hierarchy unique to that grouping of bears (USFWS 1993).

With the exception of a few forest vegetation types, such as horsetail associations, the majority of vegetative food items preferred by grizzly bears occur in early seral communities where forest cover is absent or relatively sparse (Hamer and Herrero 1983). Foraging areas that are consistently described in the literature as favored by bears include avalanche chutes (Zager et al. 1980; Mace et al. 1996; Waller and Mace 1997; Ramcharita 2000; McLellan and Hovey 2001), fire-mediated shrub fields (Almack 1985, 1986; Hamer and Herrero 1987a, b; McLellan and Hovey 2001), and riparian areas (Servheen 1983; McLellan and Hovey 2001). Avalanche chutes may be used at any time of year, but seem to attract bears particularly in the spring. These areas are usually quite wet (due to deep snows that melt later than in other areas), and they contain both valuable forage species and a tangle of vegetation that provides visual screening. Fire-mediated shrub fields often contain soft-mast (e.g., berry) producing shrub species, an important food source for foraging bears in mid-summer and early fall. Riparian areas are primarily used in spring and early summer when habitats at higher elevations are still covered with snow or plant growth is otherwise delayed.

When bears emerge from their dens in the spring, their fat stores have been severely depleted; therefore, foraging to rebuild energy reserves is their primary focus. It is important that bears have adequate spring foraging opportunities close to their dens, especially when cubs have been born, to build up fat stores quickly. In their study of radio-collared female grizzly bears, Mace et al. (1999) found that the upper elevation limit observed for habitat use in spring was 4,900 feet. Waller and Mace (1997) defined the spring period as the period from den exit to July 15 based on apparent changes in food habitats and behavior.

Cover

In addition to foraging habitat, security cover and isolation from humans and human-associated activities are necessary habitat components for grizzly bears (Archibald et al. 1987; McLellan and Shackleton 1988, Kasworm and Manley 1990; Mace et al. 1996, 1999). Human activities can result in direct mortality of bears, as well as indirect negative effects by displacing bears to less suitable habitats (Mace and Waller 1998; McLellan et al. 1999; Benn and Herrero 2002; Wakkinen and Kasworm 2004; Schwartz et al. 2006).

While secure cover allows grizzly bears to avoid contact with humans, the cover is sometimes necessary for bears to avoid contact with other bears. Strict territoriality among grizzly bears is not known, and intraspecific defense behavior generally tends to be limited to defense of limited food concentrations, defense of young, and surprise encounters (USFWS 1993). Adult male bears are known to kill juveniles, and adults also occasionally kill other adults. Females with cubs require spatial separation from aggressive males. This is particularly true in spring, when cubs-of-the-year are most prone to attack. Data are insufficient to fully assess the effects of predation on younger bears by adult bears (USFWS 1993), particularly when considering potential indirect effects of various human activities that may displace a subadult bear into the home range of an aggressive adult bear. Sows with cubs often select rugged and isolated habitats for this reason (Reynolds and Hechtel 1980). Shrub and tree cover, as well as topographic landscape features, are commonly used as security from humans or other bears (McLellan and Hovey 2001; Wielgus et al. 2002), and dispersing subadult bears may be forced to choose poor home ranges that may be equally dangerous to their survival (USFWS 1993). There are no broadly accepted Service or Interagency Grizzly Bear Committee (IGBC) standards related to grizzly bear cover.

Denning

Another key habitat requirement for grizzly bears is the presence of suitable denning habitat. Den site characteristics are variable, but several researchers have described dens located at high elevations in remote areas with slopes greater than 30 degrees, deep soils, and aspects where snow accumulates (Pearson 1975; Servheen 1981; Zager and Jonkel 1983). Sloped sites are often selected because they facilitate easier digging and are generally stabilized by trees, boulders, or root systems of herbaceous vegetation. In addition to excavating dens, grizzly bears den in natural caves and hollows under the roots of trees. While individual den sites are rarely reported to be used for more than one winter, researchers have observed that dens rarely occur singly, but are concentrated in areas that apparently possess appropriate environmental conditions (Craighead and Craighead 1972).

The literature on disturbance and impacts to grizzly bears during denning suggests that the greatest risk involves females with young cubs that have recently emerged from den sites (Mace and Waller 1997; Graves and Reams 2001). Cubs are still vulnerable at this age, and it has been observed that these family groups will remain near dens for some time before heading for lower-elevation areas with better forage. Bears generally appear to tolerate motorized activities occurring more than 1 kilometer (0.6 miles) from the den (Linnell et al. 2000), however, there is some indication that close encounters with dens can cause physiological stress (Reynolds et al. 1986) or, in some cases, den abandonment (Swenson et al. 1997). Den abandonment can increase the likelihood of cub mortality.

Home Range and Dispersal

Most areas currently inhabited by the species are in contiguous, relatively undisturbed mountainous habitat exhibiting high topographic and vegetative diversity. Although adult grizzly bears are normally solitary (Nowak and Paradiso 1983), home ranges of adult bears frequently overlap and bears are not considered territorial (Schwartz et al. 2003). Home range size is affected by resource availability, sex, age, and reproductive status (LeFranc et al. 1987; Blanchard and Knight 1991). The annual home range of adult male grizzly bears in the lower 48 States is typically 2-3 times the size of an adult female's annual home range whereas the lifetime home range of an adult male grizzly bear is typically 3-5 times that of an adult female (LeFranc et al. 1987). Generally, females with cubs-of-the-year have the smallest home range sizes (Blanchard and Knight 1991). In the lower 48 States, annual home range sizes for female grizzly bears are approximately 400 sq km (150 sq mi) (LeFranc et al. 1987). For males, annual home ranges vary from 286-1,398 sq km (110-540 sq mi), but average approximately 800 sq km (309 sq mi) (LeFranc et al. 1987). The large home ranges of grizzly bears, particularly males, enhance genetic diversity in the population by enabling males to mate with numerous females (Blanchard and Knight 1991; Craighead et al. 1998).

Grizzly bears exhibit a high degree of home range fidelity (Schwartz et al. 2003). Within its home range, a grizzly bear uses a diverse mixture of forests, moist meadows, grasslands, and riparian habitats to complete its life cycle. Grizzly bears, in general, prefer large, remote areas of habitat isolated from human development for feeding, denning, and reproduction (USFWS 1993). They require dense forest cover for hiding and security. Long distance movements of some grizzly bears increase the risk of contact with highway crossings, hunters, recreationists, and a variety of developments associated with human use. The search for food has a primary influence on grizzly bear movements. Upon emergence from the den, they seek lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges where their food requirements can be met.

Habitat Linkage

An important habitat component for wildlife is the presence of habitat linkage. Servheen et al. (2001) define habitat linkages as "the area between larger blocks of habitat where animals can live at certain seasons where they can find the security they need to successfully move between these larger blocks of habitat." The importance of maintaining habitat linkage is an issue recognized by federal, state, and county governments; conservation organizations; and many others (Servheen et al. 2001). The main factors generally considered to affect the quality of linkage zones are major highways, railroads, road density, human site development, availability of hiding cover, and the presence of riparian areas (Servheen et al. 2001 and 2003).

Habitat linkage and connectivity are important components of grizzly bear habitat (Servheen et al. 2001, 2003; U.S. Fish and Wildlife Service 1993). Maintaining linkage and connectivity between small, isolated grizzly bear populations can benefit grizzly bears in several ways, including (1) allowing immigrant grizzlies to bolster a resident population in an area that has been affected by catastrophic events or negative environmental conditions, and (2) preserving genetic diversity by reducing negative effects from inbreeding. Task 37 in the federal *Grizzly Bear Recovery Plan* (U.S. Fish and Service 1993) called for the evaluation of linkage potential between grizzly bear recovery zones.

Populations and Distribution

Historically, grizzly bear ranged from the Great Plains to the Pacific Ocean and from the northern United States border with Canada to the southern border with Mexico. The current distribution of grizzly bears in the contiguous United States is reduced to roughly two percent of its former range. Grizzly bear currently occupy parts of British Columbia and Alberta in Canada, and Montana, Idaho, Wyoming, Washington, and Alaska in the United States. Within the contiguous United States, six recovery zones/ecosystems have been identified in the 1993 Grizzly Bear Recovery Plan (USFWS 1993): (1) Greater Yellowstone Area; (2) Northern Continental Divide; (3) Cabinet-Yaak; (4) Selkirk; (5) North Cascades; and (6) Bitterroot. The Bitterroot Ecosystem is not currently occupied by grizzly bears (Table 8). Grizzlies do occur both within the formally designated recovery zones and in some adjacent habitat (Wittinger et al. 2002; U.S. Forest Service 2009).

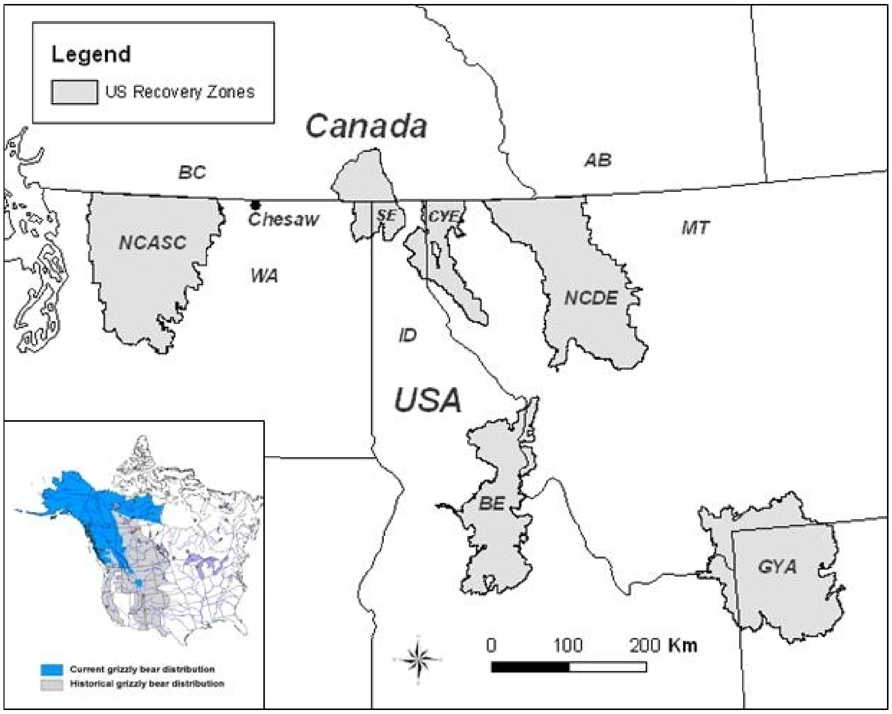


Figure 11. Current grizzly bear recovery ecosystems (GYA = Greater Yellowstone Area; NCDE = Northern Continental Divide Ecosystem; CYE = Cabinet-Yaak Ecosystem; SE = Selkirk Ecosystem; BE = Bitterroot Ecosystem; NCASC = North Cascades Ecosystem. Inset map illustrates historic (grey shade) and current grizzly bear distribution (dark blue) (U.S. Fish and Wildlife Service 1993).

Recovery Zones/Ecosystems Status and Trend

Although there are six grizzly bear recovery zones (Figure 11), only five are currently occupied. The current range and distribution of grizzly bears in the lower 48 States is fluid as dispersal is occurring and the specific distribution has not been quantified systematically across all ecosystems. Grizzly bear distribution, conflicts, and mortalities have been documented in areas far outside of recovery zone boundaries.

Table 8. Estimated Grizzly Bear Population Size (in terms of individuals) and Population Growth Rate by Recovery Zone/Ecosystem (USFWS 2011a; IGBC 2013; Kasworm *in litt.,* 2017; pers comm, H. Cooley 2017; pers comm, W. Kasworm 2017).

Recovery Zone	Estimated Population Size	Trend (Percent change annually)
Greater Yellowstone Area	>650	+0 to 2%
Northern Continental Divide	765	+2%
Cabinet-Yaak	56	+1.6%
Selkirk	70-80	+1.8%
North Cascades	<20	Unknown
Bitterroot	0	n/a

There are approximately 1,500 grizzly bears in the lower 48 States: 765 in the NCDE; more than 650 in the GYA; 56 in the CYE; between 70 and 80 in the SE; and less than 20 in the North Cascades Ecosystem. The population in the GYA is increasing at up to 2 percent annually. The population in the NCDE is increasing by approximately 2 percent annually. The CYE population is increasing by 1.6 percent. This is a change from previous data that showed a negative decline of 3.8 percent due to unsustainable levels of mortality. This improvement is largely a result of reduced mortality rates particularly among subadult females (pers. com, W. Kasworm and H. Cooley 2017). The SE grizzly bear population is slowly increasing at a rate of 1.8 percent annually (Kasworm *in litt.*, 2017). Subadult and adult female survival has the largest influence on population trend in all ecosystems (Mace and Waller 1998; Wakkinen and Kasworm 2004). One of these recovery zones, the SE is within the action area and therefore is considered in this biological opinion, and so is discussed in more detail. The GYA, NCDE, CYE, and Bitterroot Ecosystems' recovery zones are not affected by the proposed Colville Nation Forest Plan Amendment.

Following is a description of the six recovery zones and the status of the grizzly bear in each.

<u>Northern Continental Divide</u>

The NCDE extends from the Rocky Mountains of northern Montana into contiguous areas in Alberta and British Columbia, Canada. It includes the Bob Marshall Wilderness Complex and Glacier National Park. Grizzly bears are well distributed throughout the NCDE Recovery Zone, and their range has expanded outside of the NCDE Recovery Zone boundary to the east, and somewhat to the west and south (IGBC 2013). The Grizzly Bear Management Plan for Western Montana identifies 37,460 sq km (14,463 square miles) of the NCDE as occupied, including some intervening habitat between the NCDE and the Cabinet-Yaak. The estimate of average annual population growth was calculated in 2016, with a resulting rate of more than 2 percent per year, calculated from the years 2004 to 2014 (pers comm. H. Cooley 2017) and a total population estimate of approximately 765 grizzly bears (Table 8). The NCDE population of grizzly bears is contiguous with grizzly bears in Canada, resulting in high genetic diversity (IGBC 2013). Grizzly bears are well distributed throughout the NCDE Primary Conservation Area and Zone I although density is higher inside the Primary Conservation Area (IGBC 2013).

Threats to grizzly bears in the NCDE include increasing human use, lack of standards on developed sites, and other issues with human access management. A draft conservation strategy for grizzly bears in the NCDE was released in May 2013 (IGBC 2013). The purpose of the conservation strategy is to describe the coordinated management and monitoring efforts necessary to maintain a recovered grizzly bear population in the NCDE and document the commitment of participating agencies to this shared goal.

Selkirk

The SE Recovery Zone includes approximately 2,200 square miles of northeastern Washington, northern Idaho and southern British Columbia, Canada. Approximately 1,040 square miles of this area is within British Columbia (Kasworm et al. 2016). Similar to other grizzly bear recovery zones, the USFWS Grizzly Bear Recovery Plan establishes specific recovery targets and guidelines for the SE (USFWS 1993). The current grizzly bear population in the SE is estimated at approximately 80 grizzly bears (Proctor et al. 2012) and is approximately equally divided between the Canadian and U.S. portions of the ecosystem (Kasworm et al. 2016).

The SE Recovery Zone will be discussed in depth in the Environmental Baseline section given that it the only occurring Grizzly Bear Recovery Zone occurring within the Colville National Forest.

Cabinet-Yaak

The CYE in northwestern Montana and northeastern Idaho has at least 56 (Table 8) grizzly bears (USFWS 2011a). The CYE encompasses approximately 6,800 km^2 (2,626 mi^2) of northwest Montana and northern Idaho. The Cabinet Mountains constitute about 58% of the CYE and lie south of the Kootenai River. The Yaak River portion borders Canadian grizzly populations to the north. There are two potential linkage areas between the Yaak and the Cabinets. However, grizzly bear movement between the Cabinet Mountains and the Yaak River drainage is unknown but thought to be minimal (Kasworm et al. 2015).

Threats to grizzly bears in the CYE include motorized access, unsustainable human-caused mortality, small population size, and population fragmentation that resulted in genetic isolation (USFWS 2011a). The Service considers this population threatened because of continuing high levels of human-caused mortality, a decreasing population trend, genetic and geographic isolation, and inadequate habitat protections. The grizzly bear population is also threatened by increasing habitat fragmentation within the CYE Recovery Zone (due to mines and private land development), and in intervening habitat with other grizzly bear populations (USFWS 2011a). After a 12 month finding, the Service found that grizzly bears within the CYE were warranted for endangered status, but precluded by other listing actions (February 12, 1993; 58 FR 8250-8251).

Bitterroot

The Bitterroot Ecosystem (BE) is currently unoccupied by grizzly bears (as defined in USFWS 2000), and has been since before the time of listing. Most suitable habitat within the BE is protected under the Wilderness Act. The Service prepared an Environmental Impact Statement and signed a Record of Decision on November 13, 2000, authorizing the reintroduction of 25 grizzly bears over 5 years to the BE. These bears would be classified as an Experimental Population under section 10(j) of the ESA. To date, no bears have been released in the BE.

A male grizzly bear that likely originated in the SE of Northern Idaho was shot in the BE in 2007 (USFWS 2011a). Prior to 2007, no grizzly bears had been confirmed in the BE in more than 60 years. It is unknown what route the bear took to reach the BE, as it did not have a radio collar.

North Cascades

The NCE encompasses approximately 9,800 square miles, or 6.1 million acres, within the state of Washington (USFWS 1997). This includes the 682,000-acre North Cascades National Park Service Complex (park complex). The park complex includes North Cascades National Park and Ross Lake and Lake Chelan National Recreation Areas, and makes up approximately 11% of the NCE grizzly bear recovery zone. The Mt. Baker-Snoqualmie and Okanogan-Wenatchee National Forests, including nearly 2 million acres of wilderness, and make up roughly 74% of the NCE grizzly bear recovery zone. Approximately 5% of the NCE grizzly bear recovery zone is made up of state lands, and 10% is made up of private lands (USFWS 1997). Combined, the park complex and national forest wilderness areas within the NCE comprise over 2.6 million acres of federally designated wilderness. Adjoining the NCE grizzly bear recovery zone to the north are protected lands in British Columbia, Canada, including approximately 442,300 acres of provincial park land within the Canadian portion of the NCE.

Despite the historical presence of grizzly bears in the NCE, and the availability of sufficient habitat to recover and maintain a viable population, there is no confirmed evidence of current grizzly bear presence within the NCE grizzly bear recovery zone in the United States (NPS 2017). The population in the adjacent British Columbia portion of the NCE is estimated to be about six grizzly bears (NPS 2017). Only four confirmed grizzly bear sightings have been documented within the NCE during the past decade; three of these observations were of the same bear, and one observation was of a second bear (IGBC NCE Subcommittee 2016). All of these sightings have been in British Columbia. It Last photographed grizzly bear from the U.S. portion of the NCE should be noted that grizzly bears in the portion of the NCE in British Columbia are also considered threatened by the British Columbia government. This area, highly fragmented by roads, is surrounded to the west, north, and east by grizzly bear population units (GBPUs) where bears are either threatened or extirpated. Therefore, the likelihood of bears naturally emigrating in the NCE from areas within British Columbia is negligible (NPS 2017).

Greater Yellowstone

The Greater Yellowstone Area is synonymous with Greater Yellowstone Ecosystem, and Yellowstone Ecosystem. To maintain consistency through this Opinion, GYA is used to describe the Greater Yellowstone area, the Greater Yellowstone Ecosystem and Yellowstone Ecosystem. The 23,828 sq km (9,209 square miles) GYA includes portions of Wyoming, Montana, and Idaho and portions of six National Forests (Beaverhead, Bridger-Teton, Custer, Gallatin, Shoshone, and Targhee), Yellowstone and Grand Teton National Parks, John D.

Rockefeller Memorial Parkway, adjacent private and State lands, and lands managed by the Bureau of Land Management.

At the time of the grizzly bear listing under the ESA, the southernmost—and most isolated—population was in the GYA, where 136 grizzly bears were thought to live in the mid-1970s. The estimated GYA grizzly bear population increased from as few as 136 in 1975 to a 2014 estimate of approximately 757 (Servheen pers. comm. 2015; Haroldson, van Manen, and Bjornlie 2014), and the grizzly bears have gradually expanded their occupied habitat by more than 100% (NPS 2017). As monitored by the Interagency Grizzly Bear Study Team, the criteria used to determine whether the population within the GYA has recovered include estimated population size, distribution of females with cubs, and mortality limits as outlined in the 1993 Grizzly Bear Recovery Plan (USFWS 1993). The number of females producing cubs has remained relatively stable since 1996, suggesting that the ecosystem may be at or near ecological carrying capacity for grizzly bears (NPS 2017).

On March 11, 2016, the Service opened a 60-day comment period on a proposed rule to identify the Greater Yellowstone Ecosystem population of grizzly bears as a DPS and remove it from the Federal List of Endangered and Threatened Wildlife (81 FR 13173). On September 6, 2016, the Service reopened the comment period on the proposed rule to delist the Greater Yellowstone Ecosystem population of grizzly bears. The extended comment period allowed the public to comment on the protective measures passed by Idaho, Montana, and Wyoming for post-delisting management of grizzly bears. On June 30, 2017 the USFWS delisted the Greater Yellowstone Ecosystem population of grizzly bears (82 FR 30502).

Threats

Habitat degradation and fragmentation, and negative human/bear interactions are the primary factors responsible for grizzly bears' current threatened status (USFWS 2011a). Grizzly bears preferentially use large areas with a low density of roads and low levels of human activity. Secure habitat is defined as areas larger than 10 acres in size and greater than 500 meters from an open road (USFWS 2011a). The average amount of secure habitat in each recovery zone ranges from 53 percent in the SE to 86 percent in the GYA (USFWS 2011a).

Grizzly bears have been threatened by motorized and dispersed recreational use and forest management activities, including timber harvest. Dispersed recreational uses include hunting, fishing, camping, horseback riding, hiking, biking, off-road vehicle (ORV) use, and snowmobiling. Roads, ORVs, and some recreational uses can displace grizzly bears from available habitat (loss of habitat effectiveness due to human disturbance). Timber management programs may negatively affect grizzly bears by (1) removing thermal, resting, and security cover; (2) displacement from habitat during the logging period; and (3) increases in human/bear confrontation potential or disturbance factors as a result of road building and management. New roads into formerly unroaded areas may cause bears to abandon the area. Positive aspects of timber management programs include an increase in bear forage (forbs, berries, and grasses) in certain regions through vegetative manipulation such as tree removal, riparian management and prescribed burning (USFWS 1993, p. 8). Increased development on private land, primarily of residential housing, also decreases habitat availability. Finally, grizzly bears face a decrease in the quality of available habitat due to a loss of biodiversity (especially early succession-related vegetative types) and sub-optimal composition, structure, and juxtaposition of vegetation as a result of fire suppression, management strategies, and advancing succession.

General Effects of Roads on Grizzly Bears

The presence of roads and human activity associated with roads creates some of the most pervasive and chronic effects on grizzly bears and their habitat. Grizzly bears generally respond to (or are affected by) roads and human presence in four ways. First, they may be disturbed by human presence, responding with a relatively short term – short distance response. Second, they may be displaced from roaded areas, responding with a longer term avoidance response and movement to another area. When bears avoid roaded areas, they forgo the resources in these areas, which may result in under-use of key habitats. They may also be displaced into competition with other bears, or conflicts with humans. Third, grizzly bears may become habituated to human activities and roads but then expose themselves to a greater probability of encounter with humans. And fourth, roads facilitate human access into grizzly bear habitat, which directly or indirectly increases the risk of mortality to grizzly bears.

Roads and Grizzly Mortality Relationships

The presence of roads alone does not necessarily result in direct mortality of grizzly bears. However, the proximity of roads to human population centers, resulting in high numbers of people using roads, and dispersed recreation in habitat around roads can pose considerable risks to grizzly bears. Social values and attitudes also contribute to the level of mortality risk to grizzly bears. Incidental or accidental human-caused grizzly bear mortality, combined with a few individuals intent on illegally shooting grizzly bears, can collectively result in serious, detrimental effects to grizzly bear populations. Access management can be partially instrumental in reducing mortality risk to grizzly bears by managing the present and anticipated future road use-levels resulting from the increasing human population.

Grizzly bears are more vulnerable to illegal and legal harvest as a consequence of increased road access by humans in Montana (Mace et al. 1987) and in the Yellowstone region (Mattson et al. 1992). In southeastern British Columbia, McLellan and Shackleton (1988) reported roads increased access for legal hunters and poachers, the major source of adult grizzly mortality. McLellan (1989) reported that 7 of 13 successful legal hunters interviewed had been on a road when they harvested their grizzly bear. McLellan and Mace (1985) found that a disproportionate number of mortalities occurred near roads. In the Yellowstone ecosystem, Mattson and Knight (1991) reported that areas influenced by secondary roads and major developments were most lethal to grizzly bears. Aune and Kasworm (1989) reported 63 percent of known, human-caused grizzly bear deaths on the east front of the Rocky Mountains occurred within 1 kilometer (0.6 miles) of roads, including 10 of 11 known female grizzly bear deaths. In Montana, Dood et al. (1986) reported that 48 percent of all known, non-hunting mortalities during the period of 1967 through 1986 occurred within 1 mile of roads.

Human-caused grizzly bear mortality occurs near roads, and but also away from roads and for a variety of reasons and circumstances. In one study of grizzly bears in roaded environments of the

NCDE, Mace and Waller (1998) found that bears with designated wilderness in their home range had higher rates of mortality (0.129) than bears that lived only in the Forests-administered "multiple use" roaded areas (0.009) and slightly lower rates of mortality than bears that used the private "rural" lands and "multiple use" public lands in their home range (0.176). Mortalities in the wilderness areas resulted from "mistaken identity" during the big game hunting season and human defense of life. In rural areas, mortalities resulted from malicious killing and the management removal of habituated or food-conditioned bears (Mace and Waller 1998).

Similarly, in and around the CYE Recovery Zone, many of the human-caused grizzly bear mortalities from 1982-2007 occurred on private lands around the periphery of the recovery zone, especially since 1999 (Kasworm et al. 2008: pg. 64, Appendix Table 1, Table 13 {page 64}, Figure 63 {pg. 65}). In the recovery zone area, disproportionately more grizzly bears were killed on private land since 1999, which constitutes 10 percent of the CYE, than on public lands, which constitute 90 percent of the CYE.

On National Forest lands, grizzly bear mortality occurs both near roads and away from roads. From 1982 through 2009, Kasworm et al. (2010) reported 52 instances of known and probable grizzly bear mortalities from all causes inside and within about 10 miles of the CYE recovery zone (including Canada). Thirty-seven (of the 52) mortalities are classified as human-caused (Ibid.). Fourteen of those human-caused mortalities were documented on National Forest land, while 23 were off of National Forest (Ibid.). Of the 14 human caused mortalities on National Forest land, 9 were within 500 meters of an open road, while 5 were greater than 500 meters from an open road (Ibid.). Similarly, using much of the same data plus data from Idaho, the Forests (BA 2010, pg. 25) analyzed patterns of mortality in relation to roads and ownership and found that of the 90 total human-caused mortalities, 64 were within 500 meters of an open road, 13 were farther than 500 meters from an open road, and 13 were of an unknown distance from a road. Of those 90 mortalities, 20 occurred on National Forest lands. On Forest lands, 15 were within 500 meters of an open road, 10 were farther than 500 meters from an open road, and 4 were of an unknown distance from a road.

Schwartz et al. (2010) reported similar patterns in the Yellowstone ecosystem as those observed in the NCDE (Mace and Waller 1998) and CYE (Kasworm et al. 2010): bears in the Schwartz study died at higher rates in less secure habitat, lower elevations, and zones of human development.

Occasionally, grizzly bears are struck and killed by motor vehicles on roads (Greer 1985, Palmisciano 1986). Anecdotally, these events typically occur on paved roads or high-standard unpaved roads, which allow relatively fast vehicle speeds and reduced time for driver reaction (as compared to most forest roads).

Disturbance, Displacement, Habituation

Some grizzly bears, particularly subadults, readily habituate to humans and consequently suffer increased mortality risk. However, many grizzly bears under-use or avoid otherwise preferred habitats that are frequented by people. Such under-use of preferred habitat can result in a significant change in normal grizzly bear behavior. Negative association with roads arises from the grizzly bears' wariness of people, vehicles, vehicle noise and other human-related noise around roads, human scent along roads, and hunting and shooting of bears along or from roads. Grizzly bears that experience and survive such negative consequences learn to avoid the disturbance and annoyance generated by roads. Some may not change this resultant avoidance behavior for long periods after road closures. Even occasional human-related vehicle noise can result in annoying grizzly bears to the extent that they continue to avoid areas near roads.

All of the factors contributing to direct links between roads and displacement of grizzly bears from preferred habitat have not been quantified. As with mortality risk, the level of road-use by people is likely an important factor in assessing the potential displacement caused by any road. Contemporary research, however, indicates that grizzly bears consistently were displaced from roads and habitat surrounding roads, often despite relatively low levels of human use (Hamer and Herrero 1983; Mattson et al. 1987; McLellan and Shackleton 1988; 1989; Aune and Kasworm 1989; Nagy et al. 1989; Kasworm and Manley 1990; Mace and Manley 1993; Mattson 1993; Heinrich et al. 1995; Mace et al.1996; Wakkinen and Kasworm 1997).

Avoidance behavior is often strongest in adult grizzly bears, with males selecting for high quality habitats and absence of humans (Gibeau et al. 2002). Males that were found using high quality habitat near roads, did so during the night where hiding cover was available (Gibeau et al. 2002). However, adult females were more likely to avoid humans all together, rather than seek out the highest quality habitats. Mueller et al. (2004) reported all age and sex classes used habitats closer to high-use roads and development during the human inactive period. All bears showed a considerably greater avoidance of high-use roads and development during periods of high human activity. They did show, however, that regardless of the time of day, subadult bears were found closer to high-use roads than adult bears. Gibeau et al. (2002) also demonstrated that subadults were almost always closer to human activity than adults.

In Montana’s Rocky Mountain Front, Aune and Stivers (1982) reported that grizzly bears avoided roads and adjacent corridors even when the area contained preferred habitat for breeding, feeding, shelter and reproduction. McLellan and Shackleton (1988) found that grizzly bears used areas near roads less than expected in southeastern British Columbia and estimated that 8.7 percent of the total area was rendered incompatible for grizzly bear use because of roads. In Yellowstone, Mattson et al. (1992) reported wary grizzly bears avoided areas within 2 kilometers (1.2 miles) of major roads and 4 kilometers (2.4 miles) of major developments or town sites.

In the South Fork of the Flathead River study area (NCDE, Montana), Mace and Manley (1993) reported use of habitat by all sex and age classes of grizzly bears was less than expected in habitats where total road densities (including open and closed roads) exceeded two miles per square mile (22 percent of the South Fork Study area exceeded two miles per square mile). Adult grizzly bears used habitats less than expected when open road density exceeded 1 mi/mi2. Further, female grizzly bears in the South Fork Study area tended to use habitat more than 0.5 mile from roads or trails greater than expected. As traffic levels on roads increased, grizzly bear use of adjacent habitat decreased (Mace et al. 1996).

In the SE/CYE, Wakkinnen and Kasworm (1997) examined the relationship between the distribution of six female grizzly bears and the densities of motorized access routes. They found that, on average, habitats with total road density greater than 2 miles per square mile, and open road densities greater than 1 mi/mi2, were used less than expected (*Ibid.*). The amount of area within six female grizzly bears' home ranges with a total road density exceeding 2 miles per square mile averaged 26 percent. Home ranges averaged 33 percent open road density exceeding 1 mile per square mile, and on average, 55 percent of each home range was comprised of core area (Wakkinnen and Kasworm 1997) (core area is discussed below).

Mace et al. (1996) and other researchers have used 500 meters as the zone of influence around roads. Waller and Servheen (2005) also demonstrated avoidance of areas within 500 meters of US-2. Benn and Herrero (2002) set zones of influence of 500 meters and 200 meters around roads and trails, respectively. They reported that all 95 human-caused grizzly bear mortalities with accurate or reasonable locations that occurred in Banff and Yoho National Parks between 1971 and 1998 occurred within these zones of influence along roads and trails or around human settlements. Gibeau and Stevens (2005) documented bears further from roads when these roads were distant from high quality grizzly bear habitat, indicating avoidance behavior.

Research suggests that grizzly bears benefit from road closures aimed at minimizing traffic on roads within important seasonal habitat, especially in low elevation habitats during the spring (Mace et al. 1999). When roads are located in important grizzly bear preferred habitats such as riparian zones, snowchutes and shrub fields, habitat loss through avoidance behavior can be significant. Mace et al. (1996) found that most of the roads within grizzly bear seasonal ranges were either closed to vehicles or used infrequently by humans. Some grizzly bears avoided areas with a high total road density even when the roads were closed to public travel. In the Swan Mountain study (Mace et al. 1996), female grizzly bear home range selection of unroaded cover types was greatest and as road densities increased, selection of these habitat areas by bears declined. Zager (1980) reported the underuse of areas near roads by females with cubs. Aune and Kasworm (1989) and McLellan (1989) found that female cubs generally established their home range within or overlapping with their mother's home range, whereas males generally dispersed from their mother's home range. Long-term displacement of a female from a portion of her home range may result in long-term under-use of that area by female grizzly bears because cubs have limited potential to learn to use the area. In this way, learned avoidance behavior could persist for more than one generation of grizzly bears before grizzly bears again utilize habitat associated with closed roads. Thus, displacement from preferred habitats may significantly modify normal grizzly bear behavioral patterns.

Grizzly bears can also become conditioned to human activity and show a high level of tolerance especially if the location and nature of human use are predictable and do not result in overtly negative impacts for grizzly bears (Mattson 1993). In Glacier National Park, Jope (1985) suggested grizzly bears in parks habituate to high human use and showed less displacement, even in open habitats. Yonge (2001) found that grizzly bears near Cooke City, Montana, were willing to consistently forage in very close proximity to high levels of human use if cover was sufficient and energetically efficient feeding opportunities were present. Both Mattson (1993) and Yonge (2001) postulated that areas with higher levels of human activity might have a positive effect for bears by serving as a kind of refugia for weaker population cohorts (subadults and females with cubs) seeking to avoid intra-specific competition (adult males). However, Mattson qualified this observation by adding that the beneficial effects vary as to whether hunting is allowed, and how closely the human population is regulated. Further, food-conditioned grizzly bears were much more likely to be killed by humans. Both Yonge (2001) and Mattson (1993) indicated that increases in human use levels can be deleterious if some human activities are unregulated, such as the use of firearms, the presence of attractants, and the nature and duration of human uses. Conversely, a level of coexistence between humans and grizzly bears can be achieved if such activities are controlled. Near Cooke City, Montana, the New World Mine reclamation project had minimal effects on grizzly bears, in part because reclamation activities were temporally and spatially predictable and people associated with the work were carefully regulated against carrying firearms or having attractants available to grizzly bears. (Tyers, unpublished 2006).

In the Swan Valley of Montana, raw location data from a small number of collared grizzly bears show nocturnal use of highly roaded habitat (USFWS 2011b, p.A-53). The Swan Valley data have not been statistically analyzed; the study was not designed to determine the impact of roads on bears; the sample size is very small; and perhaps most importantly, mortality rates for these grizzly bears were not yet known. Additional anecdotal monitoring evidence from the area continues to show high levels of tolerance by some grizzly bears in relatively roaded and developed habitats, but not without some mortality. These data indicate that some grizzly bears can apparently habituate to relatively high levels of human activity.

In some cases, high road densities in low-elevation habitats may result in avoidance of or displacement from important spring seasonal habitat for some grizzly bears or high mortality risk for those individuals that venture into and attempt to exploit resources contained in these low-elevation areas. Low-elevation riparian habitats are of significant seasonal importance to grizzly bears. Grizzly bears typically use the lowest elevations possible for foraging during spring. Craighead et al. (1982) described the value of low-elevation habitats to grizzly bears. Montana Fish, Wildlife and Parks concluded that maximum numbers of grizzly bears can be maintained only if the species continues to have the opportunity to use both the temperate and subalpine climatic zones (Dood et al. 1986).

Research identified the following individual home-range selection patterns in local grizzly bear population segments: (1) some individual animals live almost exclusively (except for denning) in low elevation habitats; (2) other individuals maintain home ranges in more mountainous or remote locations; and (3) some individuals migrate elevationally on a seasonal basis (Servheen 1981, Aune and Stivers 1982).

Specific causes or factors involved in the selection or preferences for certain home ranges by grizzly bears are not well understood. Mace and Manley (1993) found that grizzly bear home ranges in the South Fork Study area included remote areas in high elevations. South Fork Study grizzly bear habitat-use data, road density analyses of the South Fork Study area, previous studies and CEM analysis (U.S. Forest Service 1994, Mace et al. 1999) suggested that low-elevation habitats were not freely available to grizzly bears because of high road densities and associated human use in these areas.

Habituation to Human Attractants

Continued exposure to human presence, activity, noise, and other elements can result in habituation of grizzly bears, which is essentially the loss of a grizzly bear's natural wariness of humans. High road densities and associated increases in human access into grizzly bear habitat can lead to the habituation of grizzly bears to humans. Habituation in turn increases the potential for conflicts between people and grizzly bears. Habituated grizzly bears often obtain human food or garbage and become involved in nuisance bear incidences, and/or threaten human life or property. Such grizzly bears generally experience high mortality rates as they are eventually destroyed or removed from the population through management actions. Habituated grizzly bears are also more vulnerable to illegal killing because of their increased exposure to people. In the Yellowstone region, humans killed habituated grizzly bears over three times as often as non-habituated grizzly bears (Mattson et al. 1992).

Subadult grizzly bears are more often vulnerable to habituation and illegal killing or they conflict with people and are removed through management action. Subadult grizzly bears frequently traverse long distances or unknown territory, increasing the likelihood of encountering roads, human residences or other developments where human food or other attractants are available, increasing the potential for habituation and/or conflicts with people. Between 1988 and 1993, six of seven grizzly bear management removals from the Flathead National Forest and surrounding area involved subadults (U.S. Forest Service 1994). In the Yellowstone ecosystem, roads impacted individual age and sex classes of grizzly bears differently. Subadults and females with young were most often located near roads, perhaps displaced into roaded, marginal habitat by dominant grizzly bears (Mattson et al. 1987, Mattson et al. 1992).

Years in which natural grizzly bear food production and availability are high can result in younger age classes of grizzly bears accustomed to fairly good food availability. A year of drought and poor food production can compel grizzly bears to search widely for food. Such wide-ranging movements can bring grizzly bears into closer contact with humans, increasing grizzly bear/human encounters and resultant management actions. Direct human-caused mortality can occur in several ways: (1) mistaken identification by big game hunters; (2) malicious killing; (3) defense of human life; or (4) management removals. Bears are removed (management removals) to protect human life or property, usually because bears have become dangerously bold as a result of food conditioning at campsites, lodges, resorts, and private residences, or they become habituated predators of livestock. Habituation is the loss of a bear's natural wariness of humans caused by the continued exposure of the grizzly bear to human presence, activity, noise, etc. A grizzly bear habituates to other bears, humans, or situations when such interactions give it a positive return in resources, such as food, that outweighs the cost of the stress that precedes such habituation.

Climate change

Climate change may result in a number of changes to grizzly bear habitat, including a reduction in snowpack levels, shifts in denning times, shifts in the abundance and distribution of some natural food sources, and changes in fire regimes. Most grizzly bear biologists in the U.S. and Canada do not expect habitat changes predicted under climate change scenarios to directly threaten grizzly bears (Servheen and Cross 2010). These changes may even make habitat more suitable and food sources more abundant. However, these ecological changes may also affect the timing and frequency of grizzly bear/human interactions and conflicts (Servheen and Cross 2010).

The western U.S. will likely experience milder, wetter winters with warmer, drier summers and an overall decrease in snowpack (Leung et al. 2004). While some climate models do not demonstrate significant changes in total annual precipitation for the western U.S. (Duffy et al. 2006), an increase in "rain on snow" events is expected (Leung et al. 2004; McWethy et al. 2010). The amount of snowpack and the timing of snowmelt may also change, with an earlier peak stream flow each spring (Cayan et al. 2001; Leung et al. 2004; Stewart et al. 2004). Although there is some disagreement about changes in the water content of snow under varying climate scenarios (Duffy et al. 2006), reduced runoff from decreased snowpack could translate into decreased soil moisture in the summer (Leung et al. 2004).

Because timing of den entry and emergence is at least partially influenced by food availability and weather (Craighead and Craighead 1972; Van Daele et al. 1990), less snowpack would likely shorten the denning season as foods become available later in the fall and earlier in the spring. In the GYA, Haroldson et al. (2002) reported later den entry times for male grizzlies corresponding with increasing November temperatures from 1975 to 1999. This increased time outside of the den could increase the potential for conflicts with humans (Servheen and Cross 2010).

Climate change could create temporal and spatial shifts in grizzly bear food sources (Rodriguez et al. 2007). Changes in plant community distributions have already been documented, with species' ranges shifting further north and higher in elevation due to environmental constraints (Walther et al. 2002; Walther 2003; Walther et al. 2005) or outbreaks of insects or disease (Bentz et al. 2010). Decreased snowpack could lead to fewer avalanches, thereby reducing avalanche chutes, an important habitat component to grizzlies, across the landscape. However, increases in "rain on snow" events may decrease the stability of snowpack resulting in increases in avalanches. Changes in vegetative food distributions also may influence other mammal distributions, including potential prey species like ungulates. While the extent and rate to which individual plant species will be impacted is difficult to foresee with any level of confidence (Walther et al. 2002; Fagre et al. 2003), there is general consensus that grizzly bears are flexible enough in their dietary needs that they will not be impacted directly by ecological constraints such as shifts in food distributions and abundance (Servheen and Cross 2010).

Fire regimes can affect the abundance and distribution of some vegetative bear foods (e.g., grasses, berry producing shrubs) (LeFranc et al. 1987). For instance, fires can reduce canopy cover which usually increases berry production. However, on steep south or west aspects, excessive canopy removal due to fires or vegetation management may decrease berry production through subsequent moisture stress and exposure to sun, wind, and frost (Simonen 2000). Fire frequency and severity may increase with late summer droughts predicted under climate change scenarios (Nitschke and Innes 2008; McWethy et al. 2010). Increased fire frequency has the potential to improve grizzly bear habitat, especially low to moderate severity fires. For example, fire treatment most beneficial to huckleberry shrubs is that which results in damage to stems, but does little damage to rhizomes (Simonen 2000). High intensity fires may reduce grizzly bear habitat quality immediately afterwards by decreasing hiding cover and delaying regrowth of vegetation but Blanchard and Knight (1996) found that increased production of forb foliage and root crops in the years following the high intensity, widespread Yellowstone fires of 1988 benefited grizzly bears

Grizzly bears have been identified as having a low sensitivity to climate change because they are opportunistic, as omnivores eat a diverse array of food resources and are highly adaptable (Servheen and Cross 2010). Anticipated impacts may include changes in the timing of denning due to longer snow-free periods and reduced snowpack (Lawler et al. 2014) and changes in the availability of food sources (Servheen and Cross 2010). These changes may put bears at risk of negative human interactions for a longer period of time each year (Servheen and Cross 2010). This would make education, proper food and garbage storage, carcass disposal measures, and human access management that much more important.

Livestock Grazing

Livestock operations can benefit the long-term conservation of grizzly bears through the maintenance of large blocks of open rangeland and habitats that support a variety of wildlife species (Dood et al. 2006). However, when grizzlies were listed in 1975, the USFWS identified "…livestock use of surrounding national forests" as detrimental to grizzly bears "…unless management measures favoring the species are enacted." (40 CFR 31734, p. 31734). Impacts to grizzly bears from livestock operations potentially include: direct mortality from control actions resulting from livestock depredation; direct mortality due to control actions resulting from grizzly bear habituation and/or learned use of bear attractants such as livestock carcasses and feed; increasing the chance of a grizzly bear-livestock conflict; displacement due to livestock or related management activity; direct competition for preferred forage species.

Genetic Isolation

The 1975 listing of grizzly bear in the coterminous U.S. identified genetic isolation of some populations of grizzly bear as a potential threat (40 FR 31734). Loss of genetic diversity is a potential concern for SE grizzly bears, because of the large distances between this and other U.S. populations (USFWS 2011a) and the small population size. The 1993 Grizzly Bear Recovery Plan characterizes the Selkirk population as isolated from other populations and suggested genetic management may become appropriate for this population (USFWS 1993).

Environmental Baseline

A general environmental baseline description, applicable to all listed, proposed, or candidate species was previously described and is incorporated here by reference. The following discussion provides a more specific environmental baseline for the grizzly bear. In order to understand the status of the species in the action area, we must also describe the status in the SE as a whole.

The SE Recovery Zone of northwestern Idaho, northeastern Washington, and southeastern British Columbia includes about 1,080 square miles (2797.2 sq km) in the U.S. portion and about 875 square miles (2266.2 sq km) in the Canadian portion of the SE Recovery Zone. The SE Recovery Zone is the only defined grizzly bear recovery zone that includes part of Canada because the habitat in the United States portion is not of sufficient size to support a minimum viable population. Elevation in the SE Recovery Zone ranges from 1,772 ft to 7,792 ft (540 to 2,375 m). Weather patterns are characterized as Pacific maritime-continental climate, with long winters and short summers. Most of the precipitation falls during winter as snow, with a second peak in spring rainfall. Selkirk Mountains area vegetation is dominated by various forest types. Dominant tree species include subalpine fir (*Abies lasiocarpa*), Englemann spruce (*Picea engelmannii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). Major shrub species include alder (*Alnus spp*.), fool's huckleberry (*Menziesia ferruginea*), mountain ash (*Sorbus scopulina*), and huckleberry (*Vaccinium spp*.). Historically, wildfire was the primary disturbance factor in the Selkirk Mountains. The 1967 Trapper Peak (14,826 acres, 6,000 ha) and Sundance (22,239 acres, 9,000 ha) fires produced large seral huckleberry shrubfields. Timber management and recreation are currently the principal land uses.

Grizzly bear habitat is contiguous across the border, and radio-collared bears are known to move back and forth. Therefore, the grizzly bears north and south of the U.S./Canada border are considered one population (USFWS 1993). In the Canadian portion of the ecosystem, land ownership is approximately 65% Crown lands and 35% private land. In the US portion, land ownership is about 80% federal lands, 15% State lands, and 5% private lands (BA p. 145). The population of grizzly bears in the SE is estimated at between 70 to 80 bears (Kasworm *in litt*., 2017). The population is estimated to be increasing at a rate of 1.8 percent annually (Table 8) with subadult female survival having the largest influence on overall population trends. Wakkinen and Kasworm (2004) reported that 80% of the known grizzly bear mortalities in the Selkirks were human caused.

The Interagency Grizzly Bear Committee Access Management Task Force (IGBC 1998) developed a methodology to measure the degree of human influence on grizzly bear habitat. Based on this approach, areas with relatively limited human access are referred to as core areas and are tracked in Grizzly Bear Management Units (GBMUs) that have been identified throughout the recovery area (BA p. 146). A GBMU is intended to approximate the size of a female grizzly bear home range, include some portion of all seasonal habitats, and not cross political boundaries of land management agencies. Boundary lines follow natural features such as rivers, streams, and watershed boundaries; and man-made features such as roads, ownership and Public Land Survey System section lines. GBMUs function as a project analysis unit upon which direct, indirect and cumulative effects analyses are performed.

The Selkirk Grizzly Bear Recovery Area has 3 GBMUs within the Colville National Forest (with portions on the Idaho Panhandle National Forest): LeClerc, Salmo-Priest, and Sullivan-Hughes. Table 9 shows the current amount of Core Area, Open Motorized Road Density (OMRD, includes motorized routes or trails), and Total Motorized Road Density (TMRD, includes motorized routes or trails) in the GBMUs within the CNF and those in the Selkirk Ecosystem Recovery Area. Table 9 describes the expectations for each GBMU on the CNF.

Table 9. Current Percent Core Area, OMRD and TMRD within Grizzly Bear Management Units that occur in the Selkirk Recovery Zone (from BA Table 23 p. 146).

Grizzly Bear Management Units in the Selkirk Ecosystem Recovery Zone that are also on the Colville National Forest			
Grizzly Bear Management Unit (GBMU)	Current Core Percent	OMRD Percent	TMRD Percent
Le Clerc	>27%	37	58
Salmo-Priest (87,115 ac)	>64%	33	26
Sullivan-Hughes (78,210 ac)	>61%	24	19
Grizzly Bear Management Units in the Selkirk Ecosystem Recovery Area that occur outside of the Colville National Forest (on the Idaho Panhandle National Forests).			
Blue Grass (57,325 ac)	50	29	28
Long-Smith (65,735 ac)	73	21	14
Ball-Trout (57,907 ac)	72	17	11
Mytrle (63,781 ac)	60	30	20
Kalispell-Granite (85,641 ac)	50	33	28
Lakeshore (17,971 ac)	19	83	54

Expectations for Core, open motorized road density, and total motorized road density in each GBMU are listed in Table 10 (CNF Plan, USFWS 2011a). These Standards were set depending on the site-specific capability of each GBMU. According to the BA, on the Colville National Forest, there have been 23 miles of road constructed in the recovery zone and 150 miles of roads closed since 1975. In addition, any new roads constructed in the recovery zone on the CNF are closed to non-administrative motorized use. The CNF published a Motor Vehicle Use Map (Map) in 2008, identifying few open roads on the Map in the recovery zone and no motorized trails in the recovery zone. Off-road motorized travel is prohibited except to access a campsite within 300 feet of a designate motorized route. The Colville National Forest has met the expected Core, open road density, and total road density standards for their GBMUs (BA p.147).

Table 10. Grizzly bear habitat standards for the shared GBMUs of the CNF and Idaho Panhandle National Forests (from BA Table 24 p. 147).

Bear Management Unit	Maximum Open Roads >1 mi/sq. mi.	Maximum Total Roads >2 mi/sq. mi	Minimum Percent Core Habitat
Salmo-Priest (99% NFS land)	33%	26%	64%
Sullivan-Hughes (99% NFS land)	24%	19%	61%
LeClerc (64% NFS land)	37%	58%	27%

Threats to grizzly bears in the SE include motorized access, human-caused mortality, small population size, and population fragmentation that resulted in genetic isolation. Although the population may be slowly increasing and reconnecting with adjacent populations, high levels of human-caused mortality and a lack of regulatory protective mechanisms in British Columbia and the U.S. still threaten this population (USFWS 2011a). Proper management of stored food while working or recreating in bear habitat is an important factor in reducing bear-human conflicts. The Colville National Forest has a "sanitation rule" that applies to contractors, campers, and others working or recreating in the recovery zone. Many of the recreation sites have been fitted with bear-resistant garbage and storage structures (BA p. 148).

There is one cattle allotment on the Colville National Forest that occurs within the Selkirk Recovery Zone. Additionally, there is one sheep grazing allotment on the Forest; however, it is vacant and is not in the Selkirk Grizzly Bear Recovery Zone (BA, p. 145; pers. comm. K. Honeycutt).

The population demography recovery criteria for the SE are: 1) 6 females with cubs over a running 6-year average both inside the recovery area and within a 10-mile area immediately surrounding the recovery area, including Canada; 2) 7 of 10 GBMUs on the US portion occupied by females with young from a running 6-year sum of verified sightings and evidence; and 3) known human-caused mortality not to exceed 4% of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 30% of this 4% mortality limit shall be females (USFWS 1993; BA p.141). These mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved. Cubs are defined as offspring in the first 12 months of life, whereas yearlings are offspring in their second twelve months.

According to Kasworm (2016), there were a total of 34 credible grizzly bear sightings in 2015 occurring in all of the SE GBMUs except Lakeshore. There were 8 credible sightings of a female with cubs in Blue-Grass and LeClerc GBMUs, state land, and B.C. GBMUs. There were five females with yearlings in Blue-Grass, Myrtle, and Salmo-Priest GBMUs and south of the recovery zone adjacent to the Myrtle GBMU (Kasworm et. al 2016). Seven of 10 GBMUs in the U.S. portion of the recovery zone had sightings of females with young (cubs, yearlings, or 2-year-olds) during 2010–15. Occupied GBMUs were: Blue-Grass, LeClerc, Long-Smith, Myrtle, Salmo-Priest, State Lands, and B.C. GBMUs. Recovery plan criteria indicated the need for 7 of 10 U.S. GBMUs to be occupied.

Ten known or probable human caused mortalities of grizzly bears have occurred in or within 10 miles of the SE Recovery Zone in the U.S. or in the South Selkirk in B.C. during 2010–15. These human caused mortalities include 4 females (all B.C.) and 6 males (Ball-Trout and B.C. GBMUs). The four adult female mortalities were caused by one vehicle collision and three are under investigation, There was one adult male mortality by management, and four subadult male mortalities; two management, one mistaken identity, and one self-defense. Average annual human caused mortality for 2010–15 was 1.7 bears/year and 0.7 females/year. These mortality levels for total bears and female mortality were greater than the calculated limit during 2010-15. The recovery plan established a goal of zero human-caused mortality for the Selkirk recovery zone due to the initial low number of bears; however, it also stated "this may be unrealistic given there will generally be some level of conflict between humans and bears within the ecosystem" (USFWS 1993 p.102; Kasworm et. al 2016).

On-going research from 2011 through 2016 (Kasworm *in litt.*, 2017) has shown that the 6-year running average of females with cubs has increased to 2.16 females with cubs per year from the 0.5 reported in 2011. In addition, the distribution criterion was met in 2015 and 2016, with 7 out of 10 U.S. GBMUs being occupied. Lastly, the average annual human caused mortality for 2011-2016 was 1.67 bears/year and 0.3 females/year. These did meet the human caused mortality criterion of known human-caused mortality not to exceed 4% of the population estimate based on the most recent 3-year sum of females with cubs and no more than 30% of this 4% mortality limit shall be females (USFWS 1993; BA p.141; Kasworm *in litt*., 2017). However, it did not meet the 0 mortality goal set in the recovery plan.

Grizzly bears can also be found in areas outside of the recognized recovery area but within the action area. These areas include habitat outside of designated grizzly bear recovery zones, and specifically areas between the Selkirk Recovery Zone and the North Cascades Recovery Zone (USFWS 1993, 1997). For example, the action area includes the "Wedge" that is located at the northern end of the Kettle Range near the Canadian border. In 2011, five individual grizzly bears were observed in this area, and in 2012 a sow and cubs were seen on several dates in April and May of 2012 (WDFW 2013). A DNA hair sample was found to be a male grizzly bear in the Wedge near Sheep Creek in 2012. Grizzly bears are documented using the Wedge, particularly during the spring. There are other verified grizzly bear sightings between the Wedge and the Selkirk Recovery Zone, including a young female grizzly bear using the area in 2009. Generally, grizzly bears could occur throughout the action area.

The environmental baseline includes ongoing federal actions. Border Patrol activities on the Forest have the potential to cause disturbance through use of roads or trails that are normally closed to motorized use. The exact extent or amount of the impact over the life of the plan is difficult to predict because many factors could influence Border Patrol activities.

Recovery Needs/Conservation Strategies

The most effective way to minimize the risk of adverse interactions between humans and bears is to provide spatial separation between areas of human activity and areas of bear activity. In areas where such separation is not possible, providing large areas of secure habitat that include seasonal habitats may reduce the potential for contact and minimize risk of disturbance and illegal mortality (Mace and Waller 1998). Managing public motorized access to grizzly bear habitat is one of the most common and effective ways to maintain a level of separation between grizzly bears and humans.

The 1993 Grizzly Bear Recovery Plan outlines recovery strategies for the various grizzly bear ecosystems (USFWS 1993). The Plan defines a recovered population as one that can sustain the existing level of known and unknown human-caused mortalities that exist in the ecosystems and are well distributed throughout their recovery zones. Within the contiguous United States, there are six recovery zones, as described previously.

Grizzly bear recovery zones have been established to include areas large enough and of sufficient habitat quality to support a recovered bear population in each zone. According to the Grizzly Bear Recovery Plan (USFWS 1993), a recovery zone is defined as that area in each grizzly bear ecosystem within which the population and habitat criteria for achievement of recovery will be measured. Areas outside of recovery zones may provide habitat that grizzly bears will use, but are not considered necessary for the survival and recovery of this species. The area outside the recovery zone but within a 10 mile diameter buffer is managed to conserve grizzly bear and their habitat whenever possible; population and mortality data within this buffer zone are collected and used to assess recovery criteria. Beyond the 10 mile buffer, grizzly bear populations are not considered when determining whether recovery goals have been met. Grizzly bears are still protected under the Act wherever they occur in the US, including outside of recovery zones.

In an effort to facilitate consistency in the management of grizzly bear habitat within and across ecosystems, the Interagency Grizzly Bear Guidelines were developed by the IGBC for use by land managers (IGBC 1986). The IGBC developed specific land management guidelines for use in each of the five ecosystems currently occupied by grizzly bears. Areas within recovery zones are also stratified into Management Situation Zones 1, 2, 3, 4, or 5; each having a specific management direction.

"Management Situation 1" (Management Situation (MS)1) lands contain population centers of grizzly bears, are key to the survival of the species and are where management decisions will favor the needs of the bear even when other land use values compete.

"Management Situation 2" (MS2) lands are those areas that lack distinct population centers and the need for this habitat for the survival of grizzly bear is more uncertain. The status of such areas is subject to review. Management will, at least, maintain those habitat conditions that resulted in the area being classified as MS2.

"Management Situation 3" (MS3) designation is intended for lands where grizzly bear may occur infrequently. There is a high probability that Federal activities here may affect the species survival and recovery. Management focus is on grizzly bear/human conflict minimization rather than habitat maintenance and protection.

"Management Situation 4" (MS4) lands are areas where grizzlies do not occur in the area but habitat and human conditions make the area potentially suitable for grizzly occupancy, and the area is needed for the survival and recovery of the species. Grizzly bear/human conflict minimization is not a management consideration on these lands.

"Management Situation 5" (MS5) lands are areas where grizzly bear do not occur or occur only rarely in the area. Habitat may be unsuitable, unavailable, or suitable and available but unoccupied. The area lacks survival and recovery values for the species or said values are unknown. In this area, maintenance of grizzly habitat is an option. Grizzly bears involved in grizzly bear/human conflicts are controlled.

The IGBC guidelines and the recovery plan (USFWS 1993 p.110) expects management stratification within GBMUs and recovery zones. The Selkirk recovery area has been stratified into Management Situation 1, 2, and 3 areas that are used to determine where management direction is applied. Areas outside of the recovery area but still on the Colville National Forest are managed as Management Situation 5. The effects of forest management activities on grizzly bears that may occur outside of the designated recovery area, especially if they are documented as regularly using an area, would be evaluated under subsequent section 7 consultations (BA, p. 146).

Conservation Role of the Action Area

A complete discussion of the conservation needs of the grizzly bear is presented in the Grizzly Bear Recovery Plan (USFWS 1993). The recovery zones are divided into smaller areas called GBMUs for the purpose of habitat evaluation and monitoring. GBMUs were designed to:

- Assess the effects of existing and proposed activities on grizzly bear habitat without having the effects diluted by consideration of too large an area;
- Address unique habitat characteristics and bear activity and use patterns;
- Identify contiguous complexes of habitat meeting year-long needs of the grizzly bear;
- Establish priorities for areas where land use management needs would require cumulative effects assessments.

The Selkirk Ecosystem is one of 6 grizzly bear recovery zones. In the SE, there are nine GBMUs. The CNF shares management with the IPNF of three of the GBMUs. As described in the environmental baseline, the Interagency Grizzly Bear Committee Access Management Task Force (IGBC 1998) developed a methodology to measure the degree of human influence on grizzly bear habitat, and developed standards for Core, TMRD, and OMRD for each GBMU. Appendix B summarizes the recovery plan tasks relevant to the CNF, and compares the CNF Plan direction.
The population demography recovery criteria for the SE are: 1) 6 females with cubs over a running 6-year average both inside the recovery area and within a 10-mile area immediately surrounding the recovery area, including Canada; 2) 7 of 10 GBMUs on the US portion occupied by females with young from a running 6-year sum of verified sightings and evidence; and 3) known human-caused mortality no to exceed 4% of the population estimate based on the most recent 3-year sum of females with cubs. Furthermore, no more than 30% of this 4% mortality limit shall be females (USFWS 1993; BA p.141). These mortality limits cannot be exceeded during any 2 consecutive years for recovery to be achieved.

EFFECTS OF THE ACTION ON GRIZZLY BEAR

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

As stated earlier in the Opinion, the CNF Plan is a Federal action that provides a framework for the development of future CNF actions that will be authorized, funded, or carried out at a later time within the next 15 years. The overall goal of this section 7 consultation process is to evaluate the CNF Plan for its consistency with the conservation of listed species.
Appendix B provides a matrix comparing the list of the tasks in the Recovery Plan for the grizzly bear (*Ursus arctos*) (USFWS 1993), and how the CNF Plan addresses the applicable expectations in that plan. Below, we discuss the general effects of the CNF Plan on the grizzly bear.

The forest management activities that influence the recovery of the grizzly bear identified in the grizzly bear recovery plan (USFWS 1993) include: human access that can displace bears from important seasonal habitats or increase the risk of bear-human interactions, disposal of livestock carcasses within range allotments to avoid attracting bears to a potential food source, placement of apiaries under special use permits, and the storage of food and garbage to reduce the potential for bears to associate humans with food sources. One of the key aspects of grizzly bear recovery is human access management. Access management remains one of the most influential tools used to contribute towards the recovery of grizzly bear populations (IGBC 1998). Proper management of stored food while working or recreating in bear habitat is an important factor in reducing bear-human conflicts.

Effects of the MAs

As stated previously, the way to minimize the risk of adverse interactions between humans and bears is to provide spatial separation between areas of human activity and areas of bear activity. Managing public motorized access to grizzly bear habitat is one of the most common and effective ways to maintain a level of separation between grizzly bears and humans. All of the listed MAs provide varying degrees of forage opportunities for whitebark pine, berry-producing shrubfields, and access to riparian habitats and natural meadows for grizzly bear. Connectivity and forest cover are maintained. The MAs and other management direction will contribute to denning habitat, and minimize disturbance and fragmentation within the SE. Figure 12 displays the MA’s, grizzly bear management units, and core areas.

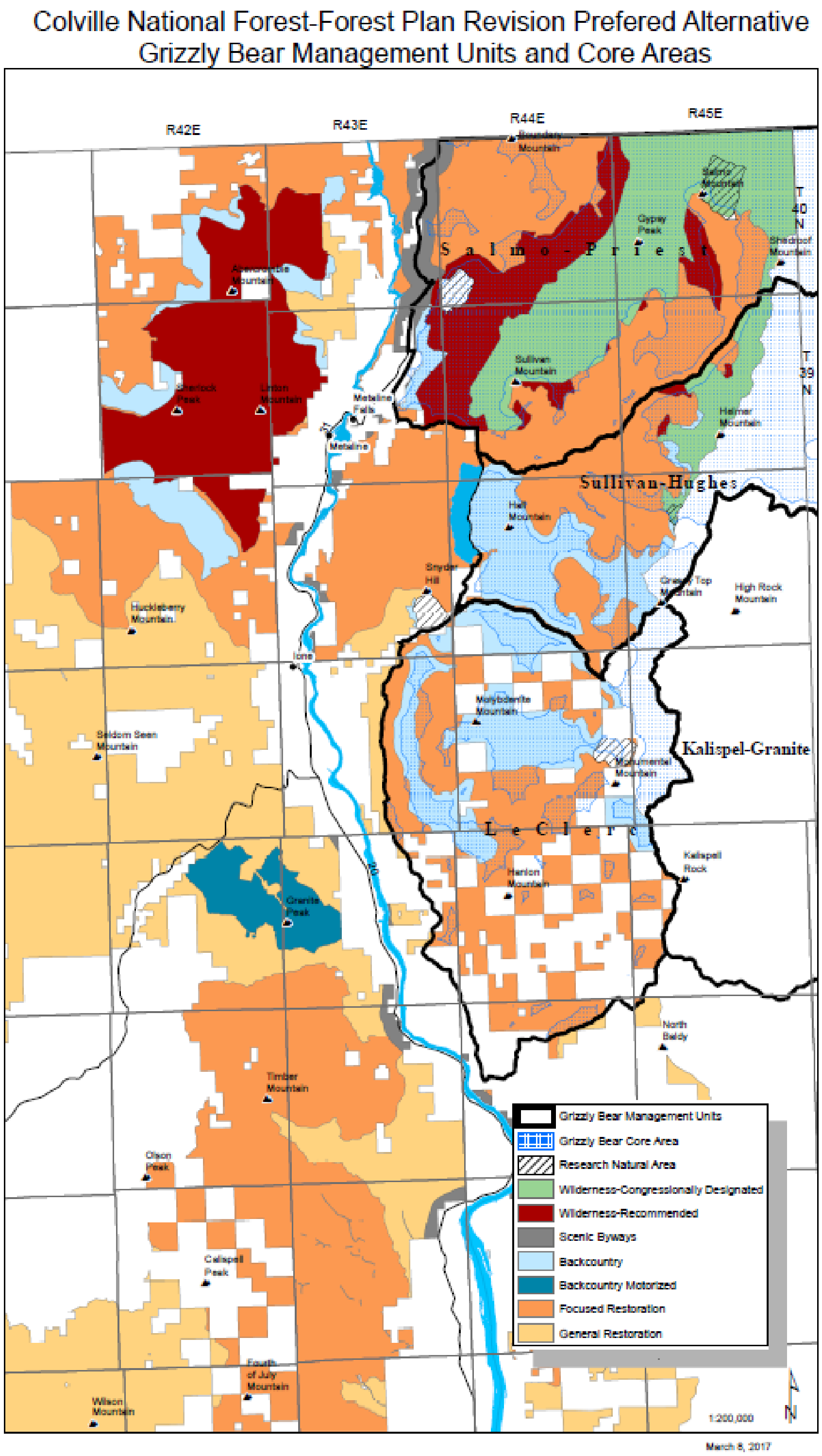


Figure 12. Management Areas, GBMUs, and Core Area.

The MAs that particularly provide habitats with limited human use and motorized access include: Congressionally Designated Wilderness, Recommended Wilderness, Backcountry, and Research Natural Areas. These management areas, with their associated desired conditions, objectives, standards and guidelines will result in management that conserves the bear, and ensures CNF contribution to grizzly bear recovery expectations by providing habitat connectivity, forage opportunities, contributing to denning habitat and minimizing disturbance and displacement from humans and their associated activities.

Recommended Wilderness MA

There are 44,230 acres of RW identified within the Pend Oreille subbasin, Abercrombie-Hooknose and Salmo-Priest Adjacent. There is an additional 17,400 acres in the Bald Snow RW for a total of 61,630 acres. These areas are lands that have been identified and evaluated through the forest planning process as suited for recommendation for addition to the national wilderness preservation system. Wilderness characteristics are protected until Congress either designates the area as part of the National Wilderness Preservation System or the area is released from consideration. If Congress has not acted by the next planning effort, these areas may be further evaluated for wilderness designation. Management direction is to protect and maintain the social and ecological characteristics that provide the basis for the wilderness recommendation. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Congressionally Designated Wilderness MA

The Colville National Forest has one wilderness area, the Salmo-Priest. Wilderness areas are zoned using the Wilderness Resource Spectrum: pristine, primitive, semi-primitive and transition zones offer the spectrum of environmental and bio/physical settings typically found in wilderness. Due to the size, complexity and use patterns of the Salmo-Priest Wilderness, the area administered by the Colville National Forest (a portion of the Wilderness is administered by the Idaho Panhandle National Forest) is designated as "Primitive" in the Wilderness Resource Spectrum. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Backcountry MA

The management emphasis is to have a natural landscape with a variety of native plant communities. The desired conditions for vegetation are achieved through a combination of ecological processes and management activities. While the landscape is predominantly natural appearing, a few locations have a vegetation structure that is altered to contribute to the recreational setting such as openings created and retained for scenic views. Backcountry emphasizes non-motorized recreation opportunities and can include foot, horse, and mechanized (e.g., mountain bikes) modes of travel. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Research Natural Area MA

RNA are a part of a national network of ecological areas designated in perpetuity for research and education and/or to maintain biological diversity on NFS lands. They are protective of wildlife, watershed, aquatic and riparian habitats. The action area includes 3,818 acres of RNAs and 2,086 acres of proposed RNAs. The Salmo (1,410 acres), Halliday Fen (727 acres), Maitlen Creek (655 acres), Round Top Mountain (214 acres), and Bunchgrass (812 acres) RNAs cover approximately 3,818 acres in the Pend Oreille Sub-basin. They are established to provide for study and protection of a full range of habitat types and remain in a relatively unaltered condition for non-manipulative research, observation, and study. Specific desired conditions and standards are described under the proposed action section of the Opinion.

In areas where such separation or the absence of motorized vehicles is not possible, the following MAs still provide large areas of secure habitat that include seasonal habitats providing denning habitat, forest cover, and forage opportunities which may reduce the potential for contact and minimize risk of disturbance and illegal mortality (Mace and Waller 1998). In addition to the above MAs, the Selkirk Grizzly Bear Recovery Zone on the CNF includes Focused Restoration.

Focused Restoration MA
The management emphasis is to restore ecological integrity and ecosystem function at the landscape scale using both active management (mechanical treatment and prescribed fire) and passive management (natural processes including disturbances and succession), to restore management natural processes and improve resiliency, while emphasizing important fish and wildlife habitats. Focused Restoration areas are defined by the key watersheds, and grizzly bear and caribou recovery areas not included in Backcountry and Backcountry Motorized management areas. Important desired habitat conditions for aquatic, plant, and wildlife species are found in these areas. These areas contribute important habitat for grizzly bear and minimize human interactions by maintaining a low road density and relatively low level of human disturbance (BA, p. 22). Specific desired conditions and standards are described under the proposed action section of the Opinion.

Grizzly bears may also occur in other MAs throughout the CNF. Many of those areas would still provide cover, forage, and connectivity, but they are not expected to emphasize grizzly bear management for recovery.

Vegetation Management Effects, including Restoration, Climate Change, and Fire

The Status of the Species section described that vegetation management activities can result in the following stressors: (1) removal of thermal, resting, and security cover; (2) displacement from habitat during the logging period; and (3) increases in human/bear confrontation potential or disturbance factors as a result of road building and management.
In general, vegetation management on the CNF would be focused on restoring late successional and old forest habitats based the historic range of variability. This would provide the amount, spatial arrangement, and connectivity of grizzly bear habitat to mimic natural patterns and processes. The forest management activities that can influence the recovery and viability of grizzly bear based on the grizzly bear recovery plan (see below) include: 1) Vegetation management and natural disturbances affect the amount and connectivity of habitat components that are important to grizzly bear such as whitebark pine, riparian habitats, berry producing shrubfields, and forest cover, 2) Human access that can increase the potential for human bear interactions leading to mortality or displacement of bears to less suitable habitat, 3) Road building associated with timber harvest or restoration projects can result in disturbance thus dislocating the bear and sometimes even mortality. The following management direction in the CNF Plan provides conservation for grizzly bear and its habitat by minimizing the scope and scale of the stressors mentioned above:

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.

FW-DC-WL-05. Grizzly Bear Recovery Area
Key Habitat Components for Grizzly Bear.
Key grizzly bear habitat components (such as whitebark pine, riparian habitats, berry-producing shrubfields, natural meadows, and forest cover) are available within core areas and in quantities that contribute toward a recovered bear population.

FW-DC-WL-06. Grizzly Bear Recovery Area – Core Areas
The amount of core areas available to grizzly bears within each grizzly bear management unit meets that standards in Table 2 (Table 16 in CNF Plan). Core areas are expanded where other forest access priorities/obligations can also be met.

FW-OBJ-WL-03. Grizzly Bear Recovery Area – Habitat Restoration
During the expected 15 years of plan implementation, maintain or restore grizzly bear seasonal habitats on 900 acres in the following bear management units [Table 11].

Table 10. Grizzly bear seasonal habitats objective.

Bear Management Unit	Number of Acres Restored
LeClerc	300
Salmo-Priest	300
Sullivan Hughes	300

FW-STD-WL-07. Grizzly Bear Recovery Area -Road Densities
Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal actions shall not result in a net increase in open or total road densities above the levels in Table 12. Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in).

Table 11. Grizzly bear habitat standards for the shared GBMUs of the Colville and Idaho Panhandle National Forests.

Bear Management Unit	Maximum Open Roads >1 mi/sq. mi.	Maximum Total Roads >2 mi/sq. mi	Minimum Percent Core Habitat
Salmo-Priest (99% NFS land)	33%	26%	64%
Sullivan-Hughes (99% NFS land	23%	18%	61%
LeClerc (64% NFS land)	48%	60%	27%

FW-GDL-WL-03. Unique Habitats
Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

FW-GDL-WL-11. Grizzly Bear Recovery Area – Forest Management Activities
Management activities (such as timber harvest, road building, blasting, etc.) and helicopter use that may displace grizzly bears should be scheduled to occur outside of the critical period of den emergence (April 1 to June 15). Administrative, motorized vehicle entries on restricted-use roads should be managed to not exceed levels prescribed by the Interagency Grizzly Bear Committee.

FW-GDL-WL-12. Grizzly Bear Recovery Area – Hiding Cover
Hiding cover for grizzly bears is defined as topography or vegetation capable of screening 90 percent of a bear at a distance of 200 feet. Within the grizzly bear recovery area, no point in a created opening should be farther than 600 feet from forested hiding cover. Blocks of forested cover retained within harvest units specifically for grizzly bears should be at least 600 feet across. Hiding cover should be maintained where it exists along open roads. Roadside cover can be provided by topography, or by strips / patches of shrubs / trees retained within harvest units.

Because grizzly bears are habitat generalists there are no specific minimization measures for grizzly bears related to vegetation management, restoration, or insects and disease. The following desired conditions should support grizzly bear habitat:

FW-DC-VEG-01. Plant Species Composition
Native species and native plant communities are the desired dominant vegetation. National Forest System lands contribute to the diversity, species composition, and structural diversity of native upland plant communities. The full range of potential natural vegetation is maintained on the Forest where it supports plant and animal diversity including pollinators and other invertebrates, and robust ecological function.

FW-DC-VEG-03. Forest Structure
Forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to aesthetic settings, particularly along scenic byways and highways.

Forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. The BA Table 14 contains desired conditions for each vegetation type.

FW-DC-VEG-05. Biological Legacies
Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem.

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.

FW-GDL-WL-01. Hiding Cover for Wildlife
Where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to created openings. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments.

Grizzly bears are generalists, and are not particularly sensitive to vegetation management activities. Implementation of the management direction above is consistent with the expectations of the grizzly bear recovery plan, and will minimize, but not avoid the effects of vegetation management. Within the recovery area, there will still be activities that may disturb or displace grizzly bears, but through the management direction core areas will be maintained that provide secluded habitat for the grizzly bears. Within and outside of the recovery area, human activities including vegetation management may displace grizzly bears from seasonal feeding areas, such as riparian zones in spring, or huckleberry fields in the fall. Therefore, depending on the site specifics and distribution of grizzly bears at the time, there may still be effects to the grizzly bear.

Climate change impacts to grizzly bears may include changes in the timing of denning due to longer snow-free periods and reduced snowpack (Lawler et al. 2014) and changes in the availability of food sources (Servheen and Cross 2010). The WDFW analyzed the effects of climate change on grizzly bear in Washington and determined they were moderately vulnerable (WDFW 2015, Appx C p.C-24). They determined grizzly bear would be exposed to increased temperatures, earlier snowmelt, and changes in precipitation timing. The WDFW (2015, Appx C p.C-24) noted the following: “Grizzly Bears are diet generalists, feeding on a variety of food items, which may decrease overall sensitivity of this species. However, where and how food sources change could potentially exacerbate human/bear conflict and mortality. Additionally, warmer temperatures, delayed snowfall, and earlier snowmelt may alter the timing of den entry and exit, which could increase the potential for bear/human conflicts in spring and fall. Altered fire regimes may remove important habitat but could also open up new areas.”

The CNF Plan will respond to climate change through the following Desired Conditions, Guidelines, and Monitoring expectations:

> *FW-DC-WR-14. Resiliency to Climate Change*
> Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin scale is used for Forest planning and 5th field watershed scale is used for project planning.
>
> *MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)*
> … Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest.
>
> *MA-DC-RW-04. Wildlife (recommended wilderness)*
> Recommended wilderness contributes to preserving natural behaviors and processes that sustain native wildlife populations.
>
> *MA-DC-BC-02. Habitat (backcountry)*
> These areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).
>
> *FW-DC-WL-03. Habitat Conditions for all Surrogate Species*
> Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-05 and 05) and contribute to the viability of surrogate species and associated species.
>
> *FW-GDL-WL-04. Federally Listed Species*
> Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.
>
> *MON-VEG-01.*
> To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

Climate change could affect food availability and thus, how bears move across the landscape. For example, a year of drought and poor food production can compel grizzly bears to search widely for food. Such wide-ranging movements can bring grizzly bears into closer contact with humans, increasing grizzly bear/human encounters and resultant management actions. Many of the measures described above for management within GBMUs will decrease this risk, but only within the recovery areas. As described above, there is management direction in the CNF Plan to implement these climate change adaptations through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats.

National Forest Access System Effects, including roads, OHV trails

As stated in the BA and the Status of the Species, one of the key aspects of grizzly bear recovery is human access management. Motorized recreation and the use of forest roads may influence the habitat use and populations of grizzly bears. Access management remains one of the most influential tools used to contribute towards the recovery of grizzly bear populations (IGBC 1998). Direct human-caused mortality can occur in several ways: (1) mistaken identification by big game hunters; (2) malicious killing or poaching; (3) defense of human life; or (4) management removals. Bears are removed (management removals) to protect human life or property, usually because bears have become dangerously bold as a result of food conditioning at campsites, lodges, resorts, and private residences, or they become habituated predators of livestock.

Roads may also result in accidental vehicle kills of grizzly bears; however, most forest roads are not high-speed roads, especially in the SE Recovery Zone where grizzly bear are more likely to occur, making accidental vehicle kills less likely.

Grizzly bear habitat consists of large tracts of relatively undisturbed land that provides security from human depredation and competing use (USFWS 1993a). Core habitat for grizzly bears is defined as areas lying further than 500 meters from open and restricted roads and motorized trails (USDI 2001, USDA 2011). Within this 500 meter “zone of influence,” grizzly bears are most prone to being disturbed and displaced from suitable habitat by encounters with vehicle traffic or people on foot. The risk of bear mortality is higher in these areas. The higher the road density is in a given area, the fewer acres of core habitat and the greater the risk of human-caused bear mortality. Grizzly bears usually adjust their movements to avoid areas of human activity, which can reduce the amount of core habitat available to them. Additionally, human activities in an area increase the probability of human-bear confrontations, often to the detriment of the bear. Timber harvest, road construction, restoration, and their associated activities could negatively affect grizzly bear habitat by increasing human access into an area. The disturbance associated with timber harvest, road construction, and other restoration activities could displace a transient bear from a foraging or resting site and reduce core habitat.

Within the recovery zone and GBMUs, the CNF plan includes specific measures and criteria for Core, Total Motorized Road Densities, and Open Motorized Road Densities. As described above, these criteria are consistent with the expectations of the IGBC’s Access Management Task Force. Figure 13 displays core areas and roads within GBMUs.

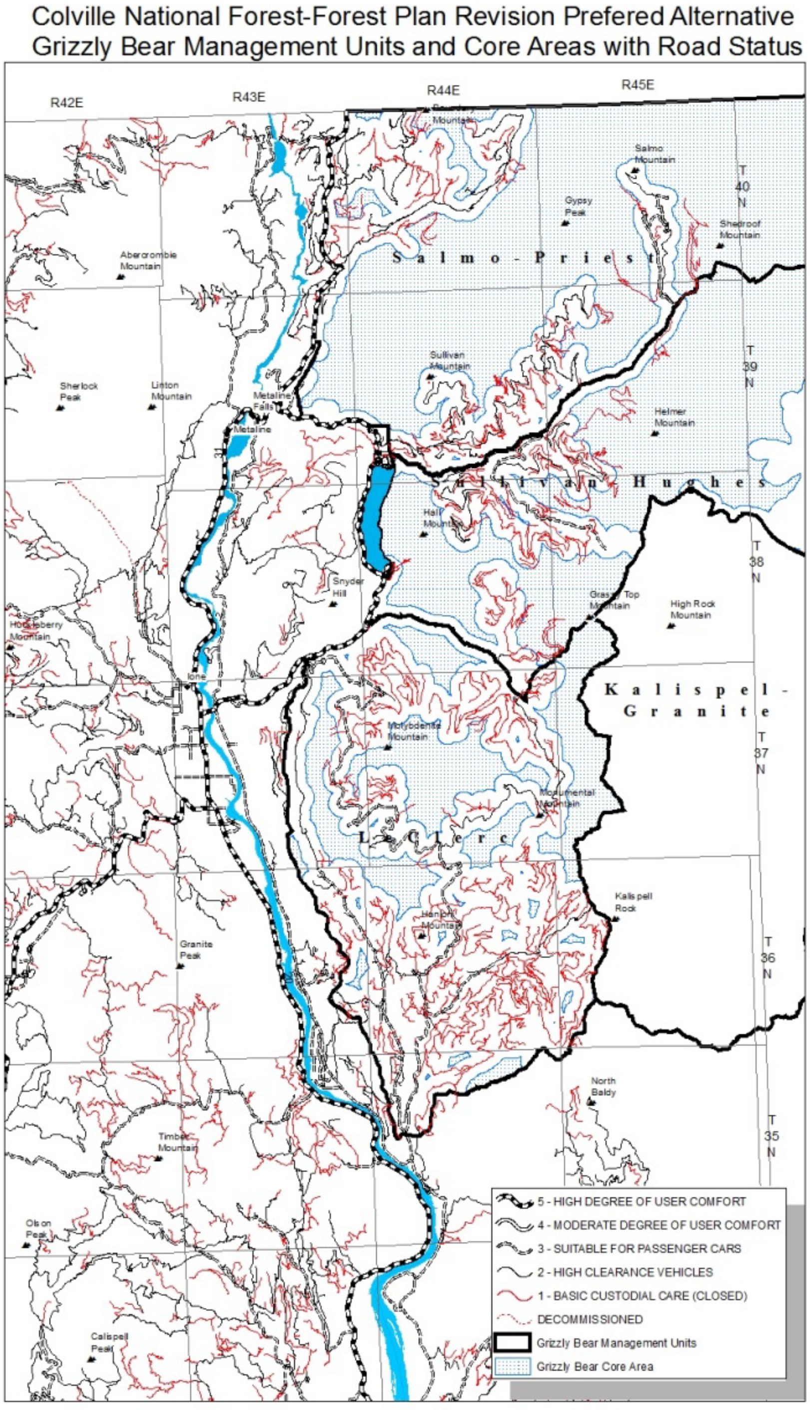


Figure 13. CNF Plan GBMUs and Roads

Effects to grizzly bears may occur from future changes to road use, or development of roads or OHV trails in the recovery zone, or throughout the Forest. These effects will be ameliorated somewhat by the grizzly-specific management direction within the recovery zone. Outside of the recovery zone, road density expectations in focused restoration, and general restoration somewhat ameliorate the effects to grizzly bears, but would not avoid effects.

Recreation Effects, including Dispersed Recreation

Recreation can result in grizzly bear displacement or disturbance from seasonal habitats, and direct or indirect mortality due to increased human/bear interactions. Within the SE Recovery Zone and the GBMUs, the management direction and criteria for core habitat, total motorized road densities, and open motorized road densities helps ameliorate disturbance and displacement of grizzly bears and decreases the likelihood of human/bear interactions. Furthermore, the following measures address sanitation and food storage forest-wide.

> *FW-DC-WL-01. Proper Storage of Human Food, Garbage, and Other Wildlife Attractants*
> All administrative sites, developed recreation sites, and dispersed recreation sites where garbage disposal services are provided, are equipped with animal-resistant food and waste storage devices so that food, garbage, and other attractants can be made inaccessible to wildlife.
>
> Forest visitors are aware of the need to properly store all wildlife attractants through one-on-one contacts with campground hosts and agency employees, signage and the media. Compliance with the Forest's food storage order is increasing.
>
> FW-STD-WL-08. Proper Storage of Human Food, Garbage and Other Wildlife Attractants
> Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest. Apiaries shall not be placed where they would increase the potential for human-bear conflicts.
>
> *FW-OBJ-WL-01. Wildlife Habitats – Proper Storage of Human Food, Garbage and Other Wildlife Attractants*
> Maintain the wildlife-resistant garbage storage devices installed in all developed campgrounds on the Colville National Forest, as needed. Within 15 years of CNF Plan implementation install at least 15 wildlife-resistant food storage lockers at developed campgrounds or heavily used dispersed campsites. Priority will be given to sites within or adjacent to the grizzly bear recovery area.
>
> *FW-GDL-REC-01. Recreation Opportunities*
> …Food and other items that attract wildlife should be managed to prevent reliance on humans and to reduce human-wildlife conflicts. …

Additional Desired Conditions and Standards provide secluded habitats and minimize disturbance:

MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)
… Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with <u>little human disturbance</u> are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest.

MA-DC-RW-02. Retention of Wilderness Characteristics (recommended wilderness)
Visitor use does not reduce the quality of wilderness character (untramelled, undeveloped, natural, outstanding opportunities for solitude or a primitive and unconfined type of recreation) or other features of value associated with the existing condition identified in the forest plan wilderness evaluations.

MA-DC-BC-02. Habitat (backcountry)
These areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from <u>low human use</u> (e.g., these areas provide a high level of habitat effectiveness).

FW-GDL-WL-03. Unique Habitats
Limited Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

On the CNF, the woodland caribou recovery zone is entirely included in the grizzly bear recovery zone. Grizzly bears are most likely to den in the higher elevation areas used by woodland caribou (above 4,000 feet). While grizzly bears would often be denning during most of the over-snow recreation season, there could be some overlap in late spring/early summer. Thus, the following management framework related to winter recreation in caribou habitat is directly applicable to maintaining seclusion for grizzly bears in the den, and immediately following den emergence.

FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation
Winter recreation is managed so that woodland caribou are not displaced from suitable habitat and the caribou can make full use of existing habitat in the recovery area.

FW-STD-WL-11. Woodland Caribou and Snowmobiles
Restrict over-the-snow vehicle use to designated routes within the Selkirk Mountain Woodland caribou recovery area.

While the DC's, STDs, and GDLs addressing recreation help ameliorate the effects, future recreation activities may still have adverse effects to grizzly bears. Human activities can displace grizzly bears from seasonal habitats, especially in riparian areas and wet meadows where recreation and grizzly bears may overlap seasonally. Increased recreational developments may increase the likelihood of human/bear interactions, potentially resulting in grizzly bear mortalities. Sanitation and food storage rules minimize effects and decrease the likelihood of habituation of grizzly bears; however, they are not always followed by forest users.

Lands and Special Uses Effects, including Livestock Grazing and Mining

Proper management of stored food while working or recreating in bear habitat is an important factor in reducing bear-human conflicts. Activities such as recreation, grazing, mining, gas, and oil development, timber harvest, and restoration can increase the likelihood of human-bear interactions. The following management direction in the CNF Plan provides conservation for grizzly bear and its habitat:

> *FW-DC-MIN-01. Mineral Materials Availability*
> Saleable mineral materials are available to Federal, State or local governments for public works, and to the public at the discretion of the authorized officer based upon agency needs, public interest and community needs, material availability, resource protection and capability. Production and administration of mineral material would meet the demand consistent with the management of other surface resources as long as the benefits derived exceed the cost and impacts of resource disturbance.
>
> *FW-DC-MIN-02. Reclamation and Extraction*
> Approved mining operations include concurrent, interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats; and scenic integrity objectives.
>
> *FW-DC-WL-01. Proper Storage of Human Food, Garbage, and Other Wildlife Attractants*
> All administrative sites, developed recreation sites, and dispersed recreation sites where garbage disposal services are provided, are equipped with animal-resistant food and waste storage devices so that food, garbage, and other attractants can be made inaccessible to wildlife.
>
> Forest visitors are aware of the need to properly store all wildlife attractants through one-on-one contacts with campground hosts and agency employees, signage and the media. Compliance with the Forest's food storage order is increasing.
>
> *FW-STD-WL-08. Proper Storage of Human Food, Garbage and Other Wildlife Attractants*
> Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest. Apiaries shall not be placed where they would increase the potential for human-bear conflicts.

Livestock grazing may occur in Backcountry MA and Focused restoration MA. Grazing is not authorized in the Salmo-Priest Wilderness, but may be authorized in Recommended Wilderness.

There is one cattle allotment within the LeClerc GBMU. Livestock grazing can decrease forage and cover in meadows or riparian areas. Livestock depredation from bears can increase human/bear conflicts. The Plan provides standards for human access, disposal of livestock carcasses, and food and garbage storage within the Selkirk Grizzly Bear Recovery Area (IGBC 1998, USFWS 1993, USFWS 2001). The Plan standards have largely been met and would continue to be followed. The Plan includes guidance that would limit the placement of apiaries within the grizzly bear recovery zone (BA, p. 227).

The following DCs, STDs, and GDLs address grazing.

> *MA-DC-RMA-03. Livestock Grazing*
> Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment.
>
> *FW-GDL-LG-01. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments*
> If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey.
>
> *FW-GDL-WL-03. Unique Habitats*
> Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.
>
> *FW-STD-WL-08. Proper Storage of Human Food, Garbage, and Other Wildlife Attractants.*
> Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest. Apiaries shall not be placed where they would increase the potential for human-bear conflicts.
>
> *FW-GDL-WL-04. Federally Listed Species*
> Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

The CNF Plan will address infrastructure development through the following Desired Conditions, Standards, and Guidelines:

> *MA-DC-WCD-02. Human Developments (Congressionally designated wilderness)*
> …Wilderness is undeveloped except for those facilities deemed necessary for administration of the area as wilderness or essential for accommodating provisional uses…

MA-STD-RW-01. Existing and Proposed Uses (recommended wilderness)
Management actions must maintain the wilderness characteristics of the recommended wilderness areas that were identified in the 2009 wilderness evaluations for the Abercrombie Hooknose, Salmo-Priest Adjacent, and Bald Snow recommended wilderness areas prior to designation or release from wilderness consideration by Congress.

MA-DC-BC-04. Developments and Improvements (backcountry)
Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters (see direction under Administrative and Recreation Sites Management Area) as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments.

FW-GDL-WL-03. Unique Habitats
Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

Most lands and special uses and infrastructure development consistent with the CNF Plan would not be of the scale to result in increased mortality or impaired movements. Transportation corridors are places where transportation infrastructure (roads, railways, etc.) is concentrated together. Transportation corridors and other developments may affect grizzly bear if located within habitat or between habitat patches. These developments can result in direct loss of habitat and displacement and disturbance. Adverse effects may occur from large scale actions, or from actions that increase human use densities but it will depend on the site specifics and distribution of grizzly bear at the time.

Monitoring

In addition to the CNF Plan components described above, there are vegetation, species, and habitat monitoring questions to be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan includes monitoring conducted in compliance with other laws, policies, and site-specific decisions.

MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

MON-FLS-01-01: Grizzly Bear: progress toward achieving and maintaining standards for percent core area, open motorized road density (OMRD) and total motorized road density (TMRD) within the Recovery Zones.

MON-WL-01: Have management activities met plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions?

The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments.. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects to Grizzly Bear:

The CNF Plan ensures continued commitments to managing grizzly bear within the grizzly bear recovery area. Management direction inside and outside of the recovery zone will minimize effects to the grizzly bear. However, adverse effects may occur that include, but are not limited to, the following activities:

- Activities that will increase levels of human/bear interactions that occur within the MAs that are in the recovery area or areas with known bear presence, such as road building, road use, recreation site development.
- Within the recovery area, there will still be activities that may disturb or displace grizzly bears, but through the management direction core areas will be maintained that provide secluded habitat for the grizzly bears.
- Within and outside of the recovery area, human activities including vegetation management may displace grizzly bears from seasonal feeding areas, such as riparian zones in spring, or huckleberry fields in the fall.
- Transportation corridors and other developments may affect grizzly bear if located within habitat or between habitat patches. These developments can result in direct loss of habitat and displacement and disturbance. Adverse effects may occur from large scale actions, or from actions that increase human use densities but it will depend on the site specifics and distribution of grizzly bear at the time.
- Human activities can displace grizzly bears from seasonal habitats, especially in riparian areas and wet meadows where recreation and grizzly bears may overlap seasonally. Increased recreational developments may increase the likelihood of human/bear interactions, potentially resulting in grizzly bear mortalities. Sanitation and food storage rules minimize effects and decrease the likelihood of habituation of grizzly bears; however, they are not always followed by forest users.
- There may be adverse effects from future actions, such as timber harvest and associated road construction, recreational activities that can cause disturbance to bears and create potential for human-bear conflicts and human development that fragment grizzly bear habitat.

- Appendix B displays that the CNF Plan is addressing the relevant expectations in the grizzly bear recovery plan.

Step-down consultations would be required in the future for any actions that result in effects to the grizzly bear. Effect determinations for future actions may also depend on the population distribution of grizzly bear at the time, and whether exposure of individuals is likely.

CUMULATIVE EFFECTS

Past, present and reasonably foreseeable non-federal future actions that could affect grizzly bears include timber harvest and associated road construction, recreational activities that can cause disturbance to bears and create potential for human-bear conflicts and human development that fragment grizzly bear habitat. Fuels reduction projects are possible on all land ownerships, in particular where they are near residences.

Recreation is likely to increase on all land ownerships due to increasing demands by the public. This would increase the effects of human disturbance on grizzly bears and result in NFS lands that have relatively low human disturbance (e.g., core areas) becoming more important to wildlife such as grizzly bears. Black bear hunting on both sides of the international border within the Selkirk Recovery Area has the potential to add cumulatively to the mortality of grizzly bears. Hunters that encounter grizzly bears may mistakenly identify the bear, kill the bear in self-defense, or opportunistically poach the bear. Human access management within the recovery area and continued education efforts are key to reducing the risk of mortality to grizzly bears from black bear hunting.

On private lands, the presence of garbage, pet food, fruit trees, or other attractants may lure bears into conflict situations. Bears that become habituated or a nuisance may lead to the bear being killed. Continued community outreach regarding living and recreating in bear country are important for reducing human-bear interactions.

Cumulative effects are evaluated across the Recovery Area by tracking activities within GBMUs. Other land managers have adopted and are following similar management direction (USFS 2015) and overall recovery is coordinated by the Selkirk Grizzly Bear Management Subcommittee. GBMUs that occur on the Colville National Forest include the LeClerc, Salmo-Priest, and Sullivan-Hughes. The contribution made on federal lands to grizzly bear recovery would help to mitigate potential cumulative effects from off-forest activities. The LeClerc GBMU in particular has a large percentage of private land, much of it private timberland. Timber management would be expected to continue on the private land in the future, with associated roads that can disturb or displace grizzly bears.

INTEGRATION AND SYNTHESIS OF EFFECTS

The current listed grizzly bear population (*Ursus arctos*) in the U.S. and Canada is increasing in some parts of their range. Grizzly bears were originally listed due to activities that caused

habitat degradation and fragmentation, and negative human/bear interactions. The CNF Plan action area includes a portion of the SE Recovery Zone. Threats to grizzly bears in the SE include motorized access, human-caused mortality, small population size, and population fragmentation resulting in genetic isolation. The recovery area is divided into 9 GBMUs, three of which occur on the Colville National Forest.
Research in the Selkirk Ecosystem (Kasworm in lit, 2017) has shown that the 6-year running average of females with cubs has increased to 2.16 females with cubs per year from the 0.5 reported in 2011. In addition, the distribution criterion was met in the SE Recovery Zone in 2015 and 2016, with 7 out of 10 U.S. GBMUs being occupied. Lastly, the average annual human-caused mortality for 2011-2016 was 1.67 bears/year and 0.3 females/year. These levels meet the known human-caused mortality criterion of less than 4% of the population estimate based on the most recent 3-year sum of females with cubs, with no more than 30% of this 4% mortality limit being females (USFWS 1993; BA p.141; Kasworm *in litt*., 2017). However, it did not meet the 0 mortality goal set in the 1993 Recovery Plan.

The CNF plan has management area designations that will ensure management within the Selkirk Ecosystem Recovery Area consistent with the recovery plan and IGBC expectations. The CNF Plan includes desired conditions, objectives, guidelines, standards, and monitoring expectations that will ensure that grizzly bear and their habitat is managed as expected in the Grizzly Bear Recovery Plan (USFWS 1993). Appendix B compares the expectations of the recovery plan, to the commitments of the Forest in the CNF Plan and shows how the CNF Plan meets the expectations set forth in the recovery plan. Based on these commitments, the Service determines that implementation of the CNF Plan will not result in any significant decreases in the number, distribution, or reproduction of grizzly bear as a result of implementation of the CNF Plan. In fact, recent information shows that the grizzly bear population is increasing. While there may be future effects to the species from management actions, the standards and guidelines in the CNF Plan minimize the potential for any long-term adverse effects to the population.

CONCLUSION

After reviewing the current status of the grizzly bear, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the Service’s Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the grizzly bear.

CANADA LYNX CHAPTER
STATUS OF SPECIES, CANADA LYNX

Taxonomy and Species description

The Canada lynx (*Lynx canadensis*) is an elusive forest-dwelling cat of northern latitudes (Interagency Lynx Biology Team (ILBT) 2013). The Canada lynx (referred to as either lynx or Canada lynx below) is a medium-sized member of the cat family (Felidae*).* Females weigh from 5-12 kilograms (11- 27 pounds) and males from 6-17 kilograms (13-37 pounds). Although lynx and bobcat share many similarities, lynx can be distinguished visually by their larger size, large furry feet, tufted ears, and the distinctive black fur that completely encircles the tip of the tail. The pelage of a lynx is grayish-brown with poorly defined spotting. Lynx have sharp, retractile claws on four functional toes that can spread over approximately 10 cm (~4 in). This adaptation, along with long legs, allows for access to their primary prey, snowshoe hare, in areas with deep snow (Anderson and Lovallo 2003).

Federal Listing Status

The lynx was listed as a Threatened species under the federal Endangered Species Act in 2000 (65 FR16053). The listing was challenged in 2003 but the USFWS concluded that an endangered listing was not warranted because many activities that could potentially impact lynx were often localized and dependent on habitat quality, and would not necessarily impact the larger population (ILBT 2013).

Critical habitat has been designated for the lynx, and is addressed in the Status of Critical Habitat Section.

The lynx is currently listed as a threatened species by Washington State, although WDFW recommended in 2016 that it be changed from threatened to endangered (Lewis 2016).

In contrast to conservation of lynx in the US, lynx populations in British Columbia are classified as a big game species and furbearing animal and are managed by the FLNRO. Regulations regarding hunting and trapping are located in the Hunting Trapping Regulations Synopsis 2014-2016 (FLNRO 2014).

Life History and Habitat

Lynx are closely associated with boreal forests and are highly adapted to environments that receive considerable winter snowpack (Aubry et al. 2000, Koehler and Aubry 1994, Maletzke 2004, von Keinast 2003). In the Okanogan area of Washington lynx select for Engelmann spruce and subalpine fir forest, moderate canopy cover, flat to moderate slopes, and relatively high elevations; and select against Douglas-fir and ponderosa pine forests, forest openings, recent burns, sparse canopy and understory, and relatively steep slopes (Koehler et al. 2008, Maletzke et al. 2008). A complete set of lynx habitat components (e.g., foraging habitat, denning habitat, travel habitat) are provided by landscapes that contain a mix of forest age classes (ILBT 2013). Across the northern boreal forests of Canada, snow conditions are very cold and dry. Snow depths are relatively uniform and moderately deep (Kelsall et al. 1977, as referenced in ILBT 2013 p.25-26). In the southern portion of lynx range, snow depths are generally deeper, with the deepest snows in the mountains of southern Colorado. Snow in southern lynx habitats may be subjected to more freezing and thawing than in the northern range (Buskirk et al. 2000b, as referenced in ILBT 2013 p.25-26), although this varies with elevation, aspect, and local conditions. It has been suggested that crusting or compaction of snow may reduce the competitive advantage that lynx have over other predators in soft snow because of their long legs and low foot loadings (Buskirk et al. 2000a, as referenced in ILBT 2013 p.25-26).

In the contiguous U.S., lynx focus their foraging in conifer and conifer-hardwood habitats that support their primary prey of snowshoe hares. Winter habitat may be more limiting (Squires et al. 2010, ILBT 2013 p.27). Dense saplings or mature multi-layered stands are the conditions that maximize availability of food and cover for snowshoe hares at varying snow depths throughout the winter. Landscapes with a mix of forest age classes are more likely to provide lynx foraging habitat throughout the year (Poole et al. 1996, Griffin and Mills 2004, all as referenced in ILBT 2013; Squires et al. 2010,). Lynx do not appear to hunt in openings during winter where lack of cover limits habitat for snowshoe hares (Mowat et al. 2000, Maletzke et al. 2008, Squires et al. 2010, all as referenced in ILBT 2013 p.28). Areas with recent timber harvest and areas recently burned provide herbaceous summer foods for snowshoe hares, and woody winter browse will develop on older sites (Fox 1978, as referenced in ILBT 2013 p.28). Multi-story stands may provide a greater availability of browse as snow depths vary throughout the winter.

Lynx generally avoid areas disturbed by wildfire or timber harvest that have resulted in young, regenerating conifer stands (Von Kienast 2003) that do not provide snowshoe hare forage in winter, although lynx use of unburned areas (“skips”) within fire perimeter has been documented in Washington (Vanbianchi 2015). However, regrowth in recently disturbed areas may provide summer foods for snowhoe hares (ILBT 2013).

Snowshoe hares

In North America, the distribution of lynx is nearly coincident with that of snowshoe hares (Bittner and Rongstad 1982; McCord and Cardoza 1982, all as referenced in ILBT). Lynx survivorship, productivity and population dynamics are closely related to snowshoe hare density (USFWS 2005). Quality habitat for lynx occurs where understory stem densities and other forest structures provide forage and cover needs of snowshoe hares (Koehler 1990a, Agee 2000, Hodges 2000b). Good snowshoe hare habitat has a common denominator – dense, horizontal vegetative cover three to ten feet above the ground or snow level (Hodges 2000b, Lewis et al. 2011, Walker 2005) in predominantly spruce-fir forests (Apps 2000, Aubry et al. 2000, McKelvey et al. 2000a, Koehler et al. 2008, Squires et al. 2010). These habitat characteristics also include a dense, multi-layered understory that maximizes cover and browse at both ground level and at varying snow depths throughout the winter. Such habitat structure is common in early-seral stages but may also occur in coniferous forests with mature but relatively open overstories (Hodges 2000b, Lewis et al. 2011, Walker 2005). The summer diet of lynx, particularly in the southern portion of the range may be more diverse (Koehler and Aubry 1994, Mowat et al. 2000), with red squirrels being the second most important food source in Alaska (Staples 1995, ILBT 2013 p.9)

The classic lynx-snowshoe hare cycle is less evident in the southern portion of the range as snowshoe hare densities tend to be lower and habitat is less contiguous (Elton and Nicholson 1942, Koehler 1990b, Mowat et al. 2000, Wirsing et al. 2002, Strohm and Tyson 2009). The boreal forests within the southwestern part of the range become discontinuous and patchy, resulting in lynx densities that are lower than and less reliant on snowshoe hare populations than those found farther north (Aubry et al. 2000, Mowat et al. 2000). In general, hare densities are also lower in the southern part and higher in the northern part of the lynx range (Koehler and Aubry 1994) with 4–6 hares/ha in the north (Hodges 2000a) as compared to <1.0–4.85/ha in the western United States (<0.4–2.02/ac; Koehler 1990b, Hodges 2000b, Lewis et al. 2011).

The quality of foraging habitat depends on cover, stem density and edges. Lynx will often hunt along edges of dense stands, including riparian areas, to allow for easier movement and cover (Mowat et al. 2000) or use less dense stands that offer greater vulnerability of hares and easier visibility and access for lynx (Fuller et al. 2007). Lynx distribution and habitat use reflect seasonal changes in prey abundance. Lynx appear to avoid openings in winter, where lack of cover limits habitat for snowshoe hares (Mowat et al. 2000, Maletzke et al. 2008, Squires et al. 2010). Multi-story forests provide a greater availability of browse as snow depths vary throughout the winter and may also include habitat components important for denning (ILBT 2013).

Across northern boreal forests conditions that favor hares are cold and dry, moderately deep (100–127 cm [39–50 in]) snow with relatively uniform depth (Kelsall et al. 1977, as referenced in ILBT 2013 p.11). Studies documenting the relationship between snow depth and hare feeding patterns in Alberta (Johnstone 1981, Ives and Rentz 1993, all as referenced in ILBT 2013 p.11), British Columbia (Sullivan and Sullivan 1982 as referenced in ILBT 2013 p.11), Colorado (Zahratka 2004 as referenced in ILBT 2013 p.11), Montana (Zimmer 2004 as referenced in ILBT 2013 p.12), north-central Washington (Koehler 1990b, ILBT 2013 p.12), and northern Idaho (Wirsing and Murray 2002, Ellsworth 2009, all as referenced in ILBT 2013 p.12) showed that snow accumulation and persistence influence hare feeding patterns.

Home Ranges and Territoriality

Lynx home ranges are comprised of foraging, denning and travel habitats and can vary depending on sex, reproductive status and snowshoe hare populations. Male home ranges are usually larger than females and the home range of a female with kittens will expand as they venture from the den and the kittens mature. Although lynx may have home ranges that overlap, the degree of overlap, or territoriality, often depends on the sex of the individuals. Related females and opposite sex tend to be more tolerant of overlap (Poole 1995, Mowat et al. 2000). Home range size is 5–10 ha (12–25 ac); estimates vary depending on the sampling method (e.g., live-trapping vs. radio telemetry; Keith 1990, Hodges 2000a, Murray 2003, all as referenced in ILBT 2013 p.10). Although hares are non-migratory and generally occupy the same area throughout the year, short-distance seasonal movements between winter and summer foraging areas have been documented (Adams 1959, Bookhout 1965, Wolff 1980, Wolfe et al. 1982, all as referenced in ILBT 2013 p.10). Lynx maintain territories but do so with a somewhat passive mechanism of avoidance rather than actively defending their home range (Mowat et al. 2000).

Reproduction

As with many aspects of lynx population dynamics, lynx reproduction is closely tied to hare populations and will fluctuate according to hare density (Aubry et al. 2000). Breeding occurs in early spring and kittens arrive in approximately 9-10 weeks (Quinn and Parker 1987, Anderson and Lovallo 2003). Lynx may reproduce as early as their first year with litter sizes that generally range from 1- 4 kittens with lower litter numbers in the southern part of the range (Brittell et al. 1989, Koehler 1990a, Brainerd 1985). Females and kittens stay close to the den for approximately 3-4 weeks and then explore the home range and other maternal dens (Olson et al. 2011).

Denning Habitat

An important component of lynx habitat is areas that are used for denning (Koehler 1990, Moen et al. 2008, Squires et al. 2008). The common component of natal den sites appears to be large woody debris, in the form of either down logs or root wads (Koehler 1990, Mowat et al. 2000, Slough 1999, Squires and Laurion 2000, Squires et al. 2008). These structures are often associated with late-successional forests. Den sites may be located within older regenerating stands (>20 years since disturbance) or in mature conifer or mixed conifer-deciduous (typically spruce/fir or spruce/birch) forests (Koehler 1990, Slough 1999, Squires et al. 2008). Stand structure appears to be of more importance than forest cover type (Mowat et al. 2000).

Populations, Distribution, Trend

Historically, lynx ranged from Alaska across Canada and into the United States (Anderson and Lovallo 2003). Lynx in the contiguous U.S. are at the southern margins of their range (USFWS 2005). This range extends into different regions that are separated from each other by ecological barriers consisting of unsuitable lynx habitat. The Recovery Outline designated five geographic management areas: Northeast, Great Lakes, Southern Rocky Mountains, Northern Rocky Mountains, and Cascade Mountains (USFWS 2005). The Northern Rocky Mountains Geographic Area encompasses western Montana on both sides of the Continental Divide, northeastern and southeastern Washington, northern, central, and southeastern Idaho, north-eastern Oregon, northeastern Utah, and western Wyoming. Landforms, climate, and vegetation across this large area are complex and highly variable (ILBT 2013 p.56). The Cascade Mountains Geographic Area is in the Cascade Mixed Forest-Coniferous Forest-Alpine Meadow Province (McNab and Avers 1994 as referenced in ILBT 2013), and includes three sections: Oregon and Washington Coast Ranges, Western Cascades, and Eastern Cascades (ILBT 2013 p.63). Current (Koehler et al. 2008, Maletzke et al. 2008) and historical (McKelvey et al. 2000b) records suggest that the Eastern Cascades section is the only section in the Cascade Geographic Area that supports a reproductive lynx population (ILBT 2013 p.63).

The lynx is native to Washington State and it historically occurred throughout the boreal forests within the Cascade Range and northeastern Washington (Lewis 2016). The lynx was listed as a Washington State threatened species in 1993. State management guidance was originally found in the “Washington State Recovery Plan for the Lynx” (Stinson 2001) and has been supplemented by data and information collected over the past 15 years. Washington Department of Fish and Wildlife recently conducted a periodic status review for lynx and uplisted lynx to endangered based on: 1) the range contraction observed in Washington following protection efforts (Federal listing in 2000), 2) the substantial loss of habitat in the last 20 years, and 3) the ongoing and anticipated threats to lynx population persistence (Lewis 2016). Numerous survey and research efforts have determined that a resident population of lynx resides in the Cascade Mountains while no population has been identified in the northeastern part of Washington (Lewis 2016). While lynx have been occasionally detected within their historical range in northeastern Washington (McKelvey et al. 2000, Koehler et al. 2008) these detections are too few and do not include the necessary evidence of reproduction to represent a resident population (Lewis 2016).

Threats

Threats to lynx and lynx habitat within the Contiguous U.S. are described within the Canada Lynx Conservation Assessment Strategy (LCAS) as anthropogenic influences and are divided into two tiers: "those that have the potential to negatively affect lynx populations and habitat, and those that may affect individual lynx but are not likely to have a substantial effect on lynx populations and lynx habitat" (ILBT 2013). The first tier includes climate change, vegetation management, wildland fire and fragmentation of habitat. Second tier influences have less impact on lynx and lynx habitat and include: incidental trapping, recreation, minerals and energy exploration and development, illegal shooting, forest/backcountry roads and trails, and domestic livestock grazing. Both direct and indirect impacts to lynx are described below.

<u>Climate Change</u>

Recent research suggests climate change is likely to impact lynx, potentially exacerbating habitat loss through increased wildfire, leading to even smaller and more isolated populations in the future with decreased habitat suitability and genetic diversity (Yan et al. 2013, Gonzalez et al. 2007, Hoving et al. 2005). The potential effects of climate change on lynx include: 1) an upward shift in elevation or latitudinal distribution of lynx and prey as snowpack recedes, 2) a decrease in the amount of habitat and population size from reduced snow persistence and increased disturbance events (e.g., increased frequency and severity of wildfires), 3) changes in demographic rates, such as survival and reproduction, and 4) changes in predator-prey relationships and interspecific competition, 5) changes to habitat (reduction, fragmentation, composition) (ILBT 2013, Yan et al. 2013).

Climate change adaptations to address these effects include restoration of landscape-scale disturbance regimes to better mimic natural patterns and processes (Spies et al. 2010, Gaines et al. 2012), and maintaining or restoring habitat connectivity to allow lynx to adjust their ranges to changing conditions (Heller and Zavaleta 2009, ILBT 2013, Squires et al. 2013).

<u>Vegetation Management</u>

As summarized in the LCAS (ILBT 2013), the impact of vegetation management depends greatly on the objective of the treatment and the techniques used to accomplish the treatment. Historically, traditional vegetation management techniques have been designed to remove the smaller stem trees and horizontal cover favored by snowshoe hare, thus decreasing foraging opportunities for lynx. Additionally, removal of large woody debris through harvest or prescribed fire can decrease denning habitat. However, these techniques can also be used with un-even stand management, leaving patches and clumps and to re-initiate early successional stands to provide snowshoe hare habitat.

Wildland Fire and Fire Suppression

Fire and other natural disturbance processes historically played an important role in maintaining a mosaic of successional stages that support both snowshoe hare and lynx (Fox 1978, Bailey et al. 1986, Quinn and Thompson 1987, Koehler and Brittell 1990, Poole et al. 1996, Slough and Mowat 1996, all as referenced in ILBT 2013). However, for the first few years after a burn, there appears to be a negative correlation between lynx use and the amount of area burned (Fox 1978). This short-term effect is likely a response to a reduction of snowshoe hare populations, reduced cover, and possibly also to increased competition from coyotes in the now-open habitat (Stephenson 1984, Koehler and Brittell 1990, all as referenced in ILBT 2013). Vanbianchi et al. (2017) found lynx used unburned areas within the wildfire perimeter.

Wildland fire management may either diminish, enhance, or sustain the density and distribution of snowshoe hare prey resources and lynx habitat, depending on the design and implementation of programs and actions" (ILBT 2013). Higher-elevation spruce-fir forests have been less affected by past fire suppression and are mostly within the historical range of variability (Agee 2000, as referenced in ILBT 2013).

Westerling et al. (2006) suggested fuel management and ecological restoration practices will likely not reverse current wildfire trends; large increases in wildfires in the western United States since 1970 resulted from increased temperatures and earlier spring snowmelt. Particularly in the western United States, ecosystem restoration is primarily focused in the dry and mesic forest types at lower elevations, rather than in lynx habitat, and includes reestablishing frequent, low-intensity fire in those systems. Nonetheless, applying ecosystem restoration across a landscape may reduce the risk of uncharacteristic large, stand-replacing fires occurring in the lower-elevation forest types, and thereby prevent their spread into adjacent lynx habitat (ILBT 2013).

Connectivity and Disturbance

Although lynx are highly mobile and capable dispersers, connectivity between blocks of habitat to support populations and promote genetic exchange is important (ILBT 2013). Uncharacteristically large wildfires and timber harvest have affected lynx habitat across the landscape, thereby influencing the distribution and movement of lynx in Washington (Koehler et al. 2008). Additionally, because habitat is limited, lynx populations in the US are small and isolated relative to the larger populations in Canada. As such, U.S. lynx populations may depend on immigration from populations in Canada to ensure genetic diversity and population persistence. The north end of the Kettle Crest is bisected by low elevation dry forest and Highway 3 in British Columbia, potentially affecting the connectivity of habitat and potential movements from Canada (ILBT 2013).

The influence that roads and trails can have on lynx resource selection varies by study area and by the behavior being evaluated. In Montana and Washington, forest roads with low vehicular or snowmobile traffic had little effect on lynx seasonal resource selection patterns (McKelvey et al. 2000b, Squires et al. 2010). However, in Maine, Fuller et al. (2007) found that roads and their associated edges were selected against within home ranges. Squires et al. (2008) reported that lynx denned further away from roads when compared to random expectation. They attributed the observed avoidance of roads as a function of the correlation of roads and landscape patterns; fewer roads were located in denning habitat and higher road densities occurred where there were managed forest stands, which lynx generally avoided (Squires et al. 2010).

Fragmentation of Habitat

Habitat fragmentation occurs when human-caused alterations such as timber harvest or roads alter the natural landscape pattern and impair connectivity for lynx (ILBT 2013). Because boreal forests along the southern part of lynx range are inherently patchier, any additional impact from human actions is exponentially greater. Fragmentation can result in a reduction in snowshoe hare habitat and thus snowshoe hare densities and use by lynx (Koehler 1990a, Mowat et al. 2000) and increase in openings which can increase competition (Buskirk 2000a).

Trapping and Hunting

General hunting of lynx is not permitted and trapping and snaring of lynx has been prohibited in Washington since 1991. However, with general big game hunting, misidentification (i.e. with bobcats) and incidental trapping can be a concern. Incidental trapping or snaring of lynx can occur in areas where regulated trapping for other species, such as coyote, fox, and bobcat, overlaps with lynx habitats (ILBT 2013). In contrast, lynx are considered a game species in BC. Trapping in BC potentially prevents lynx from reaching the US, decreasing immigration, or removes individuals dispersing from US populations, thereby decreasing emigration, both of which could result in decreased genetic diversity and demographic support.

Winter Recreation

Although participation in outdoor recreation continues to grow, the impact on lynx is not fully understood. Impacts may result from habitat loss through infrastructure development and disturbance (ILBT 2013). Winter recreation in particular may influence habitat connectivity and lynx habitat use (ILBT 2013). Plowed roads, packed trails from snowmobiles and grooming may provide travel routes for competitors like coyotes (Koehler and Aubry 1994) while disturbance from snowmobiles and backcountry skiers may displace lynx.

Forest Roads

Although forest roads (i.e. gravel surface, low levels of traffic) in general do not tend to negatively influence lynx, forest roads can become sources of lynx mortality at high traffic volumes and speeds (ILBT 2013).

Livestock Grazing

Although there not a good deal of information about the subject of grazing and its effect on lynx or snowshoe hares, research in Colorado (Shenk 2008) and Wyoming (Berg and Gese 2012) have examined grazing effects on riparian areas that provide habitat for snowshoe hares, a primary food resource for lynx. Although domestic livestock grazing could have localized effects on riparian areas, if not managed properly, overall, grazing is unlikely to have a substantial effect on snowshoe hare or lynx (ILBT 2013).

Recovery Needs/Conservation Strategies

In 2005 the USFWS developed a detailed recovery outline that identified objectives and recovery actions that would serve as interim guidance until approval of a formal recovery plan. The outline stratified lynx habitat into core, secondary and peripheral areas based on lynx occupancy, reproduction, and use as documented by historical and current records (USFWS 2005). Six core areas were identified in the lower 48 states to indicate areas where long-term persistence of lynx had been documented and are important for lynx recovery (Figure 14)(USFWS 2005, ILBT 2013). The Recovery Outline (USFWS 2005 p.12) provides recommended preliminary recovery actions to encourage implementation and to make positive progress toward recovery of the lynx prior to development of a recovery plan. Recovery of the lynx will be achieved when conditions have been attained that will allow lynx populations to persist long-term within each of the identified core areas (USFWS 2005 p.11).

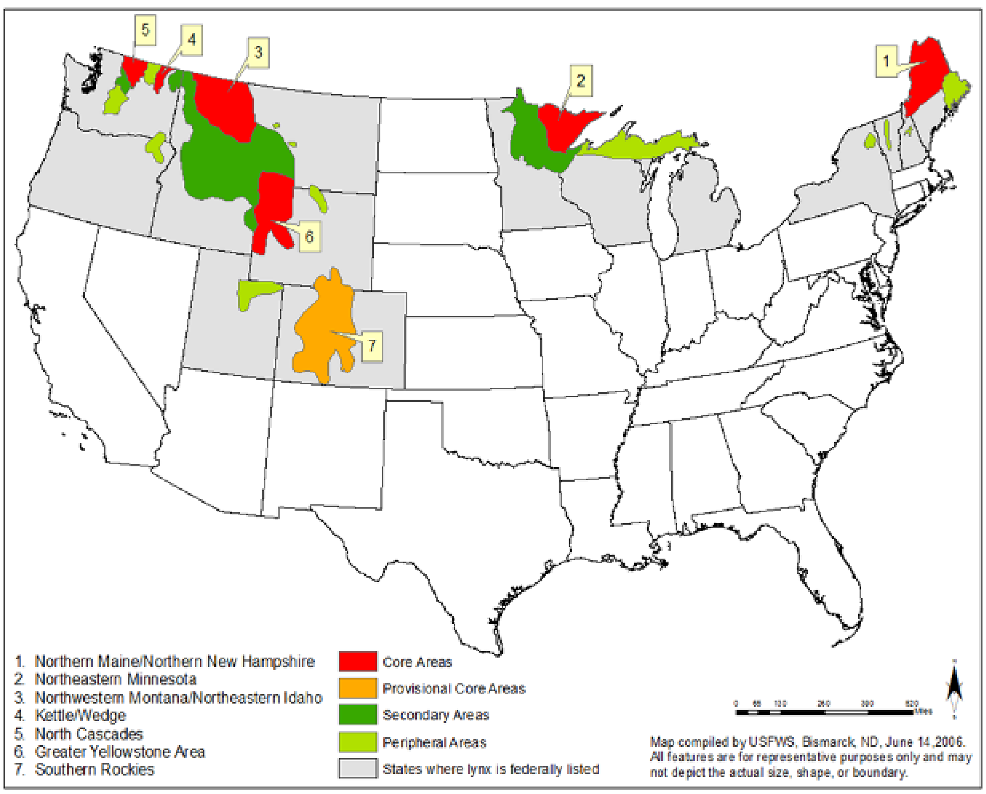


Figure 14. Areas identified as core, secondary, and peripheral as depicted in the Canada Lynx Recovery Outline (USFWS 2005; Figure 3.1 in ILBT 2013 p.37).

The LCAS (ILBT 2013) provides a conservation strategy and conservation measures intended to apply to lynx habitat on federal lands. The conservation measures were developed and designed to consider the most current knowledge relevant to lynx and snowshoe hares and basic principles for maintaining or restoring native ecological processes and patterns. To aid with prioritization, separate objectives and conservation measures apply to core areas and secondary/peripheral areas.

Lynx habitat and occurrence areas are defined as (ILBT 2013 p.3):

1) Core areas include "strong evidence of long-term persistence of lynx populations, including both historical records of lynx occurrence over time, and recent (within the past 20 years) evidence of presence and reproduction. A core area contains large, connected patches of boreal forest, encompassing at least 1,250 km^2 (480 mi^2). The term boreal forest is used here to include the true boreal forest, which is a zone extending south of the arctic tundra, as well as the southern transitional regions as described by Agee (2000) for the northeastern and Great Lakes regions (eastern hardwoods and temperate and boreal conifers) and the western United States (subalpine forests)."
2) Secondary areas include "historical records of lynx presence, but fewer than in core areas, and no recent documentation of presence or reproduction; or where there were historical records of lynx, but current status is unknown due to lack of recent surveys".
3) Peripheral areas include "sporadic historical records of lynx, which generally correspond to cyclic population highs in Canada, and no evidence of reproduction. Because boreal forest in peripheral areas occurs in small and more isolated patches (such as an isolated mountain range), these areas are considered to be incapable of supporting self-sustaining populations of lynx".

RECOVERY OUTLINE (USFWS 2005 p. 11-14)

Objective 1: Retain adequate habitat of sufficient quality to support the long-term persistence of lynx populations within each of the identified core areas.
Objective 2: Ensure that sufficient habitat is available to accommodate the long-term persistence of immigration and emigration between each core area and adjacent populations in Canada or secondary areas in the United States.
Objective 3: Ensure that habitat in secondary areas remains available for continued occupancy by lynx.
Objective 4: Ensure that threats have been addressed so that lynx populations will persist in the contiguous United States for at least the next 100 years.

<u>Recovery Actions Needed to Attain Objectives</u>

1. Establish management commitments in core areas that will provide for adequate quality and quantity of habitat such that there is a reasonable expectation that persistent lynx populations can be supported in each of the core areas for at least the next 100 years.
   1.1. On major Federal land ownerships within each core area, establish and implement long term guidance whose adequacy to conserve lynx has been verified in a biological opinion.

1.2. On non-Federal lands in the core areas, develop and implement best management practices and long-term management agreements for lynx with key State, private and/or Tribal forest managers.

2. Maintain baseline inventories of lynx habitat in each core area, monitoring changes in structure and the distribution of habitat components.
3. Monitor lynx use in lynx analysis units or other appropriate management unit at least once every 10 years to determine distribution and occupancy within the core area.
4. Identify habitat facilitating movement between each core area and lynx populations in Canada.
   4.1. Develop and implement long-term management commitments with key Canadian, United States Federal, State, Tribal, and private forest landowners to conserve these habitats.
   4.2. Develop agreements with appropriate Canadian wildlife authorities to survey lynx populations in Provinces adjacent to core areas and closely monitor the effects of lynx harvest to ensure lynx populations in southern Canada persist.
5. Ensure that habitat in secondary areas remains available for occupancy by lynx.
   5.1. Conduct surveys to determine whether any of the unsurveyed secondary areas support lynx populations that have not been recently documented. Based on results, adjust core and secondary area designations as appropriate.
   5.2. Conduct research to determine the role of secondary areas in ensuring the persistence of lynx in both the contiguous United States and individual core areas. Based on results, adjust recovery objectives and criteria as appropriate.
   5.3. In secondary areas, monitor amount and condition of habitat and conduct surveys (at least once every 10 years during population peaks) to document occurrence of lynx.
   5.4. Identify and implement management efforts as necessary to provide lynx habitat in secondary areas. Use the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) as habitat management guidance in secondary areas.
   5.5. Determine whether dispersal occurs between core areas and secondary areas and develop and implement management agreements with key landowners to conserve these habitats if necessary.
6. Identify population and habitat limiting factors for lynx in the contiguous United States.
   6.1. Continue and complete studies necessary to gather basic information on the ecological requirements, distribution, population size and trends in each of the core areas and as possible for secondary areas.
   6.2. Identify the risk to lynx populations posed by forest management techniques and human induced mortality from factors such as roads, trapping and hunting. Address these factors as necessary to ensure the long-term persistence of lynx populations in core areas.
   6.3. Continue and complete studies to assess the role of potential competitors (bobcat, coyotes) and predators (fisher, mountain lions) in limiting persistence of lynx populations in core areas; if determined to be limiting factors address as necessary.
   6.4. Research the role hybridization between lynx and bobcats may have in limiting the persistence of lynx populations in core areas; if determined to be a limiting factor address as appropriate.
   6.5. Monitor the effects of climate change on boreal forest habitat in each of the core areas. Modify the delineation of core areas and adjust management strategies if necessary.

7. Develop a post-delisting monitoring plan that will be in place and ready for implementation prior to delisting to ensure the continuing effectiveness of the recommended recovery actions and allow for adaptive management, as necessary.

The LCAS was first released in 2000 to provide a consistent and effective approach to conserve lynx and assist with Section 7 consultation under the ESA on federal lands in the contiguous United States. The 3rd edition of the LCAS was released in 2013 and integrated the concepts that were put forward in the 2005 recovery outline with substantial new science and expertise relative to lynx ecology and responses to management, particularly in the contiguous United States, since the initial release (ILBT 2013 p.2).

LCAS CONSERVATION MEASURES

The conservation measures listed in the LCAS (ILBT 2013 p.87-95) for core and secondary/peripheral habitat are as follows:

Conservation Measures – Core

1) Conservation measures for vegetation management
   a) Provide a mosaic that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story coniferous stands to produce the desired snowshoe hare density within each Lynx Analysis Unit (LAU).
   b) Use fire and mechanical vegetation treatments as tools to maintain a mosaic of lynx habitat, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes.
   c) Design vegetation management to develop and retain dense horizontal cover. Focus treatments in areas that have the potential to improve snowshoe hare habitat by developing dense horizontal cover in areas where it is presently lacking. In areas of young, dense conifers resulting from fire, timber harvest or other disturbance, do not reduce stem density through thinning until the stand no longer provides low, live limbs within the reach of hares during winter (e.g., self-pruning processes in the stem exclusion structural stage have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack). If studies are completed that demonstrate that thinning can be used to extend the duration of time that snowshoe hare habitat is available (e.g., by maintaining low limbs), then earlier thinning could be considered.
   d) Retain mature multi-story conifer stands that have the capability to provide dense horizontal cover. If portions of these stands currently lack dense horizontal cover, focus vegetation management practices (such as group selection harvest) in those areas to increase understory density and improve snowshoe hare habitat.
   e) To maintain the amount and distribution of lynx foraging habitat over time, manage so that no more than 30% of the lynx habitat in an LAU is in an early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30% of the lynx habitat in an LAU is in early stand initiation

structural stage or has been silviculturally treated to remove horizontal cover (e.g., clearcuts, seed tree harvest, precommercial thinning, or understory removal), no further increase as a result of vegetation management projects should occur on federal lands.

f) Recognizing that natural disturbances and forest management of private lands also will occur, management-induced change of lynx habitat on federal lands that creates the early stand initiation structural stage or silviculturally treated to remove horizontal cover should not exceed 15% of lynx habitat on federal lands within a LAU over a 10-year period.
g) 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 et al. 1999, Blackwell et al. 2003, Gray and Daniels 2006).
h) Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape.
i) In aspen stands, maintain native plant species diversity including conifers.
j) Recruit a high density of stems, generally greater than 4,600/ha (1,862/ac), of conifers, hardwoods, and shrubs, including species that are preferred by hares.
k) Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.
l) When designing fuels reduction projects, where possible retain patches of untreated areas of dense horizontal cover within treated areas.

2) Conservation measures for wildland fire management:
   a) Maintain fire as an ecological process in lynx habitat, where small populations are not at risk of extirpation due to habitat loss. Evaluate whether fire suppression, forest type conversions, and other management practices have altered fire regimes and the functioning of ecosystems.
   b) Consider the use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process or to maintain specific lynx and/or prey species habitat components.
   c) As federal fire management plans are developed or revised, integrate lynx habitat management objectives into the plans. Prepare plans for areas that are large enough to encompass large historical fire events. Collaborate across management boundaries to develop approaches that are complementary and that simulate natural disturbance patterns where possible.
   d) Design burn prescriptions to promote response by shrub and tree species that are favored by snowshoe hare.

3) Conservation measures to minimize habitat fragmentation:
   a) Emphasize land uses that promote or retain conservation of contiguous blocks of lynx habitat.
   b) Maintain a mosaic of vegetation and features such as riparian areas, forest stringers, unburned inclusions or forested ridges to provide habitat connectivity within and between LAUs.
   c) Identify linkage areas where needed to maintain connectivity of lynx populations and habitat. Factors such as topographic and vegetation features and local knowledge of lynx movement patterns should be considered. Retain lynx habitat and linkage areas in public ownership and acquire land to secure linkage areas where needed and possible. On private lands in proximity to federal lands, agencies should strive to work with landowners to develop conservation easements, explore potential for land exchanges or acquisitions, or identify other opportunities to maintain or facilitate lynx movement.
   d) Minimize large-scale developments that would substantially increase habitat fragmentation, reduce snowshoe hare populations, or introduce new sources of mortality.
   e) Give special attention to the design of highway improvements such as new road alignments, adding traffic lanes, installing Jersey or Texas barriers, or other modifications that increase highway capacity or speed. Upgrading unpaved roads should be avoided in lynx habitat, if the result would be increased traffic speeds and volumes or a substantial increase in associated human activity or development. Crossing structures or other techniques could be used to minimize or offset impacts.
4) Conservation measures for recreation management:
   a) Manage winter recreation activities within LAUs such that lynx habitat connectivity is maintained or improved where needed.
   b) To minimize habitat loss, concentrate recreational activities within existing developed and high winter use areas, rather than developing new sites and facilities in lynx habitat. On federal lands in areas with low levels of recreation currently, consider limiting the future development or expansion of developed winter recreation sites or concentrated winter use areas.
   c) Direct recreational activities and facilities away from identified linkage areas.
   d) Consider not expanding designated over-the-snow routes or designated play areas in lynx habitat, unless the designation serves to consolidate use.
5) Conservation measures for minerals and energy development:
   a) To minimize loss of lynx habitat resulting from minerals and energy development, locate facilities and roads outside of lynx habitat and linkage areas where possible. Minimize the footprint of developments within lynx habitat.
   b) Use existing roads and utility corridors to the fullest extent possible for all activities involving exploration and development.
   c) If upgrading existing access roads, design the roads to the minimum standard needed.
   d) To the extent possible, restrict public access on roads that were built or used for mineral and energy exploration and development in lynx habitat.
   e) Encourage remote monitoring to reduce need for and frequency of site visits in lynx habitat.
   f) Develop reclamation plans for abandoned mine lands to fully rehabilitate and restore as nearly as possible to original contours and native vegetation as habitat for lynx.
6) Conservation measure for forest/backcountry roads and trails: Avoid forest/backcountry road

reconstruction or upgrades that substantially increase traffic volume and speed. If traffic volume and speed are of concern, incorporate appropriate mitigation such as traffic calming measures in the project design.

7) Conservation measure for livestock grazing: Manage livestock grazing within riparian areas and willow cars [wet woodlands] in lynx habitat to maintain conditions that support snowshoe hares by maintaining a preponderance of mid or late-seral stages.

Conservation Measures – Secondary/Peripheral Areas

The conservation measures are intended to provide a greater degree of flexibility for management activities as compared with the core areas. The focus of management is on providing a mosaic of forest structure to support snowshoe hare prey resources for individual lynx that infrequently may move through or reside temporarily in the area. Landscape connectivity should be maintained to allow for lynx movement and dispersal.

1) Conservation measures for vegetation management:
   a) Provide a mosaic of forest structure that includes dense early-successional coniferous and mixed coniferous-deciduous stands, along with a component of mature multi-story conifer stands. Flexibility in the amounts and arrangement of various successional stages is acceptable, provided that a mosaic can be sustained. Vegetation treatments should be designed with consideration of historical landscape patterns and disturbance processes.
   b) Design timber harvest, planting, and thinning to include some representation of young densely-stocked regenerating stands in the mosaic for snowshoe hare production areas.

STATUS OF CRITICAL HABITAT

On September 12, 2014, the USFWS finalized a revised designated critical habitat (79 FR 54782) for the Canada lynx. The designation included approximately 38,954 square miles (mi2) (100,891square kilometers (km2)) of critical habitat in five units in the States of Idaho, Maine, Minnesota, Montana, Washington, and Wyoming. Within Washington, critical habitat only occurs in North Central Washington. No critical habitat was identified on the Colville National Forest or on adjacent lands therefore critical habitat is not further addressed in this Opinion.

EVIRONMENTAL BASELINE

A general environmental baseline description, applicable to all listed, proposed, or candidate species was previously described and is incorporated here by reference. The following discussion provides a more specific environmental baseline for lynx.

Lynx are considered a species of greatest conservation need in the state of Washington (Stinson 2001). Lynx occurrence, currently and historically, has been documented in the northeastern corner of the state (McKelvey et al. 2000). Stinson (2001) stated that the highest lynx harvest in Washington was from Ferry County (Kettle-Wedge Core Area). Lynx were present and reproducing in the Kettle Mountains through the 1970s (Stinson 2001), but subsequently were likely over-trapped. The Colville National Forest completed a three-year hair-snagging survey in 2011 to determine if a lynx population remained in the Kettle Range. No lynx were documented. Currently only occasional tracks or individuals are observed with no evidence of reproduction in northeastern Washington (Koehler et al. 2008, WDFW and USFS 2011, report on file with Colville National Forest,as referenced in BA). Recently, (summer of 2016) a photo of a lynx was captured on a remote camera while surveys were being conducted in the Kettle Range (D. Thornton, pers. comm.). There are currently no estimates of the number of lynx that may be

present within the planning area but available evidence suggests that the number is quite small, and the number of lynx detections are too few to represent a resident population (Lewis 2016).

The current condition of habitat within the 13 Kettle-Wedge Core Area LAUs is summarized in Table 12. Six of the northern-most LAUs were influenced by the 2015 Stickpin Fire, resulting in a temporary reduction in the quality of the habitat for lynx.

Table 12. The lynx analysis units (LAUs) within the Kettle-Wedge Core Area and a summary of the habitat quality within each LAU (Table 25 in BA; based on Lyons et al. in prep.).

Lynx Analysis Unit	Size in Acres	Proportion of LAU in Low Quality Habitat	Proportion of LAU in Moderate Quality Habitat	Proportion of LAU in High Quality Habitat
North Kettle*	15,974	38%	37%	25%
Long Alec*	15,058	79%	13%	8%
East Deer*	8,230	58%	30%	12%
North Boulder*	13,659	56%	29%	15%
Lambert*	19,095	36%	33%	31%
Indian*	15,560	56%	26%	19%
U.S.	16,237	23%	36%	41%
Deadman	21,934	27%	36%	37%
North Sherman	18,108	19%	35%	47%
West Sherman	16,819	27%	42%	31%
South Sherman	21,737	26%	41%	33%
Hall Creek	35,567	26%	35%	39%
Johns Mountain	25,824	16%	40%	45%

The CNF applied the management guidance recommended in the Lynx Conservation Assessment and Strategy (ILBT 2013) as the basis for the development of the management direction for lynx in the revised Colville Forest Plan. On the Colville National Forest, the Kettle-Wedge area is identified as a Core Area for lynx, the Selkirk Mountains as Secondary Area, and the Okanogan Highlands (west of the Kettle Mountains) as Peripheral Area (USFWS 2005, ILBT 2013). No critical habitat was designated for lynx on the Colville National Forest (USFWS 2009) (Figure 15).

Lynx Analysis Units (LAUs) are intended to facilitate analysis and monitoring of the effects of management actions on lynx habitat (ILBT 2013). Current LAU boundaries approximate the size of a female lynx home range and contain year-round habitat components within Core Areas only. LAUs are a tool to guide management that will support a reproductive population of lynx in core areas, and are not designated in secondary or peripheral areas (ILBT 2013). There are 37 LAUs that have been identified on the Colville National Forest, and 13 within the Kettle-Wedge Core Area (Figure 15).

Border Patrol activities on the Forest have the potential to cause disturbance through use of roads or trails that are normally closed to motorized use. The exact extent or amount of the impact over the life of the CNF Plan is difficult to predict because many factors could influence Border Patrol activities.

Colville National Forest-Forest Plan Revision Prefered Alternative Lynx Analysis Units

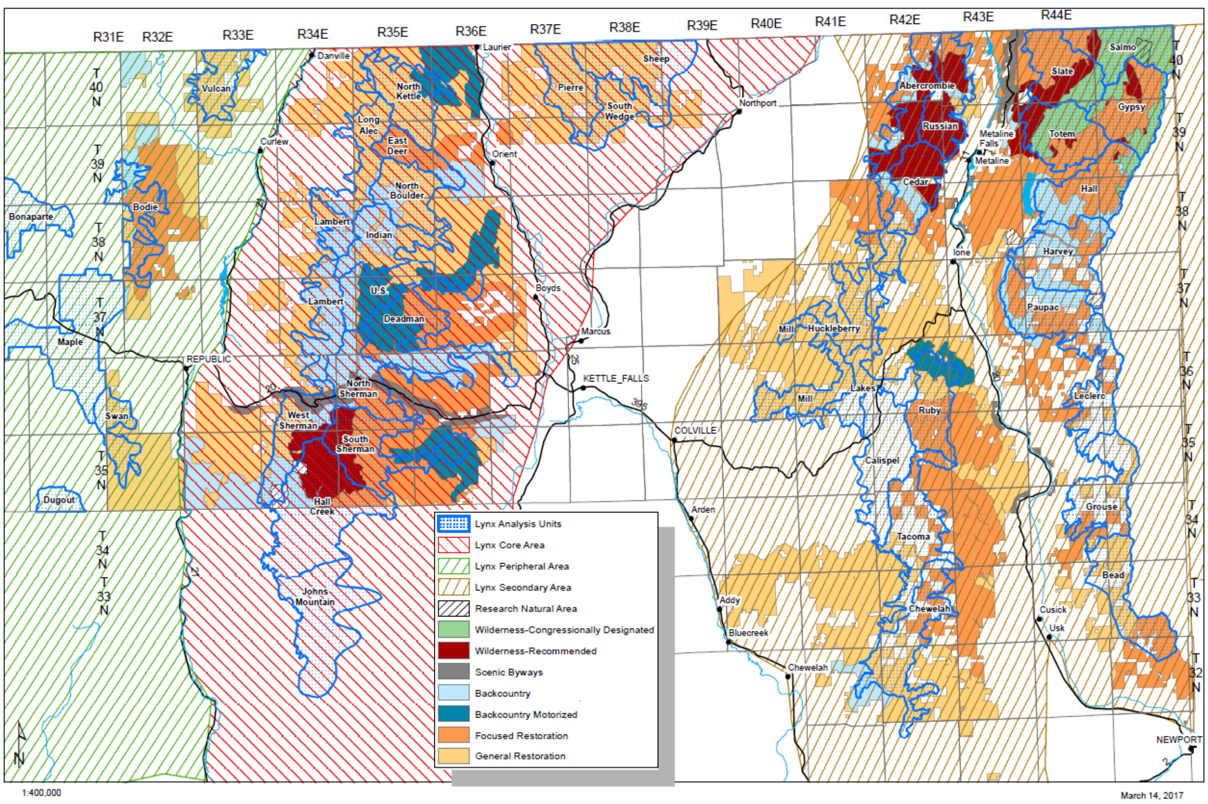


Figure 15. CNF Plan MAs and LAUs.

Conservation Role of the Action Area

In 2005 the USFWS developed a detailed recovery outline that identified objectives and recovery actions that would serve as interim guidance until approval of a formal recovery plan. The outline stratified lynx habitat into core, secondary and peripheral areas based on lynx occupancy, reproduction, and use as documented by historical and current records (USFWS 2005). Six core areas were identified in the lower 48 states to indicate areas where long-term persistence of lynx had been documented and are important for lynx recovery (USFWS 2005, ILBT 2013).

The LCAS (ILBT 2013 p.87-95) includes conservation measures intended to apply to lynx habitat on federal lands in order to address anthropogenic influences. Lynx Analysis Units (LAUs) are intended to facilitate analysis and monitoring of the effects of federal management actions on lynx habitats. As shown in Figure 14, some of the LAUs on the forest are in core areas, some are in secondary habitats, and some are in peripheral habitats. Core areas are the areas with the strongest long-term evidence of the persistence of lynx populations supported by a sufficient quality and quantity of habitat. The recovery outline recommends focusing lynx conservation efforts on core areas to ensure the continued persistence of lynx in the contiguous United States. Secondary areas and peripheral areas may contribute to lynx persistence by enabling successful dispersal and recolonization of core areas, but their role in sustaining lynx populations remains unknown (USFWS 2005, ILBT 2013 p.36).

EFFECTS OF THE ACTION

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

As stated earlier in the Opinion, the CNF Plan is a Federal action that provides a framework for the development of future CNF actions that will be authorized, funded, or carried out at a later time within the next 15 years. The overall goal of this section 7 consultation process is to evaluate the CNF Plan for its consistency with the conservation of listed species.

The LCAS lists stressors and threats that affect lynx at the population level (climate change, vegetation management, wildland fire and fragmentation of habitat) and those that affect individual lynx (incidental trapping, recreation, minerals and energy exploration and development, illegal shooting, forest/backcountry roads and trails, and domestic livestock grazing (ILBT 2013). Below, we discuss the general effects of the CNF Plan on the lynx. Appendix B provides a list of the expectations in the Lynx Recovery Outline (USFWS 2005), and the LCAS (ILBT 2013), and how the CNF Plan addresses the applicable expectations in those strategies.

Beneficial Effects of the MAs

In Chapter 2, Forest-wide Direction, Wildlife Habitats, the CNF Plan states the following:

> Canada Lynx: The Canada Lynx Conservation Assessment and Strategy (2013 version) was used to develop management direction. The Colville National Forest includes a core area (the Kettle-Wedge) that is important for the recovery of Canada lynx in Washington. The Forest does not have any designated critical habitat for Canada lynx. Habitat conditions (e.g., current habitat compared to Desired Conditions) are appropriately assessed at the LAU scale. There are 13 LAUs within the Kettle-Wedge Core Area. Core areas are defined by the USFWS as areas with the strongest long-term evidence of the persistence of lynx populations over time within the contiguous United States.

Lynx Core Areas, Secondary Areas, Peripheral areas, and LAUs occur within most, if not all MAs. Therefore, in addition to the management direction for MAs, there will also be additional management direction for lynx. LAUs can be adjusted in the future, through the following guideline.

> *FW-GDL-WL-10. Canada Lynx – Kettle-Wedge Core Area - LAU adjustment*
> Lynx analysis unit boundaries should be adjusted based on scientific literature and coordination with the US Fish and Wildlife Service.

The proposed action describes the additional Desired Conditions, Objectives, Standards, and Guidelines within the core area on the Kettle Crest, or in LAUs, and/or in identified lynx habitat. The lynx management direction ensures that the CNF Plan is consistent with the expectations of the LCAS.

Vegetation Management Effects, including Restoration, Climate Change, Fire

The status of the species section described that vegetation management can result in the following stressors for lynx: removal of snow shoe hare habitat, removal of large woody debris and denning habitat through harvest or prescribed fire. However, the degree of negative effects can be minimized through use of un-even aged management, or other harvest and management techniques. The following management direction in the CNF Plan provides conservation for the lynx, its habitat, or its prey in the Kettle-Wedge Lynx Core Area:

> *FW-STD-WL-02. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area*
> Management projects shall not reduce horizontal cover (snowshoe hare habitat) in late-closed structure Subalpine fir/Lodgepole or Spruce/Subalpine fir vegetation types unless: (1) the subalpine fir/lodgepole pine or spruce/ subalpine fir vegetation types exceed Desired Conditions (historical range of variability) for late-closed structure, (2) the projects are within 200 feet of administrative sites, dwellings, out buildings, recreation sites and special use permit areas, including infrastructure within permitted ski area boundaries; or (3) for research studies or genetic tree test evaluating genetically improved reforestation stock. Lynx analysis units are used to measure changes to lynx habitat.

> *FW-STD-WL-03. Canada Lynx – Rate of Change within the Kettle-Wedge Lynx Core Area*
> Do not change more than 15 percent of lynx habitat within any single lynx analysis unit to an unsuitable condition in any 10-year period.

> *FW-STD-WL-05. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area*
> When conducting vegetation management of coniferous vegetation, do not reduce the suitability of lynx habitat within a lynx analysis unit below 70 percent of the area that is capable of providing suitable lynx habitat (subalpine fir associated forest types).

FW-STD-WL-06. Canada Lynx – Tree Stem Densities in the Kettle-Wedge Lynx Core Area
Retain a minimum of 20 percent in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types within a lynx analysis unit through mechanical tree removal or prescribed burning, except within 500 feet of structures (i.e., administrative sites, dwellings, out buildings), developed recreation sites and special use permit areas (including infrastructure within permitted ski area boundaries), and along major highways and powerline corridors.

FW-GDL-WL-05. Canada Lynx – Vegetation Management within the Kettle-Wedge Core Area
Vegetation management activities in lynx analysis units should be focused in areas of poor snowshoe hare habitat (poorly developed understories that lack horizontal cover between 3 and 10 feet from the ground) to recruit understories that support dense, horizontal cover.

FW-GDL-WL-06. Canada Lynx – Alternative Prey within the Kettle-Wedge Core Area
Habitat for alternate prey species, primarily red squirrel, should be available in each lynx analysis unit by providing cone bearing late, closed structure conifer forests with coarse woody debris consistent with Desired Conditions for structure FW-DC-VEG-03, and snags and downed wood FW-DC-VEG-04.

FW-GDL-WL-09. Canada Lynx – Habitat Connectivity within the Kettle-Wedge Core Area
Large, permanent openings (generally greater than 300 feet wide with less than 10 percent overstory canopy) should not be created in prey habitat within lynx analysis units. When temporary openings (resulting from vegetation management treatments) are proposed, adequate forested habitat should be retained between these openings and natural openings to contribute to habitat connectivity.

FW-OBJ-WL-02. Canada Lynx Habitat Restoration
During the expected 15 years of plan implementation, restore an average of 100 acres per year of snowshoe hare and/or lynx habitat within the lynx analysis units located in the Kettle-Wedge core area.

The following vegetation management direction applies in areas outside the Kettle-Wedge Core area:

FW-DC-VEG-03. Forest Structure
Forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to aesthetic settings, particularly along scenic byways and highways.

Forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. Table 14 in the BA contains desired conditions for each vegetation type.

FW-GDL-WL-03. Unique Habitats
Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

FW-DC-WL-04. Habitat Components for Canada Lynx
Forest successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel and denning components) with landscape pattern that is consistent with the historical range of variability (per FW-DC-VEG-03 and Table 5 [in CNF Plan])

Additional vegetation management direction that is not specific to lynx, but will contribute to its habitat and management, includes:

FW-DC-VEG-01. Plant Species Composition
Native species and native plant communities are the desired dominant vegetation. National Forest System lands contribute to the diversity, species composition, and structural diversity of native upland plant communities. The full range of potential natural vegetation is maintained on the Forest where it supports plant and animal diversity including pollinators and other invertebrates, and robust ecological function.

FW-DC-VEG-05. Biological Legacies
Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem.

FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.

Vegetation management activities (e.g., timber harvest, prescribed fire) affect the distribution of lynx habitat components, can fragment habitats, and create sources of disturbance (ILBT 2013). As a result, the ILBT (2013) identified risk factors associated with vegetation management and developed conservation measures to address the risk factors. The conservation measures for vegetation management apply to lynx core areas and include using the historic range of variability to mimic the pattern and scale of natural disturbances and connectivity across the landscape, while considering the future range climate change (ILBT 2013). A conservation measure focused on the restoration of disturbance regimes in dry forests that occur in close proximity to lynx habitat to reduce the risk of uncharacteristically severe and frequent fires reaching lynx habitat. Finally, conservation measures were recommended that limit the amount of vegetation management and the rate of habitat change (e.g., acres treated/decade) within lynx analysis units. The implementation of the CNF Plan includes management direction to manage habitat for Canada lynx toward desired conditions that are based on the historic range of variability (HRV). This means that habitats would be managed so that the amount of habitat, patch sizes, and spatial arrangement would mimic conditions under which Canada lynx evolved (Agee 2000). These CNF Plan components would provide foraging, denning, and travel habitat components for lynx, while reducing the potential of habitat loss and fragmentation from uncharacteristically severe wildfires, a key threat to lynx habitat (Lewis 2016). The vegetation management and lynx specific DCs, OBJs, GDs, and STDs described above will result in maintenance and restoration of habitat conditions for lynx. They will ensure consistency with the LCAS.

The WDFW analyzed the effects of climate change on lynx in Washington, and determined they were highly vulnerable (WDFW 2015, Appx C p26). They determined lynx would be exposed to increased temperatures, reduced snowpack, earlier snowmelt, altered fire regimes, and increased insect and forest disease outbreaks. The WDFW (2015, Appx C p26) noted the following: “Lynx exhibit sensitivity to warming temperatures, decreased snowpack and earlier snowmelt, and altered fire regimes. Lynx are reliant on consistent snowpack during winter months for hunting, which provides them a competitive advantage over other predators. Lynx are usually considered hare specialists; increasingly variable timing of the arrival and melting periods of snowpack may lead to local extirpations of Snowshoe Hares, potentially affecting Lynx survivorship and recruitment. However, Lynx have been known to switch prey items when hares are limited. Altered fire regimes, insect and disease outbreaks that reduce mature stands, early seral-stage coniferous stands and/or dense understory cover further increases the sensitivity of this species.”

The WDFW analysis above is similar to assessments of effects to lynx from climate change in the LCAS (Interagency Lynx Biology Team (ILBT 2013). They expected: 1) an upward shift in elevation or latitudinal distribution of lynx and prey, 2) a decrease in the amount of habitat and population size from reduced snow persistence and increased disturbance events (e.g., fires), 3) changes in demographic rates, such as survival and reproduction, and 4) changes in predator-prey relationships. Lynx habitat can benefit from frequent low intensity fires, and historically fire played an important role in maintaining the mosaic of habitat that supports both the lynx and the snowshoe hare. But large hot fires as a result of increased temperatures and earlier spring melt can make large swaths of lynx habitat inhospitable in the short-term.

The CNF Plan will respond to climate change through the following Desired Conditions, Guidelines, and Monitoring expectations:

FW-DC-WR-14. Resiliency to Climate Change
Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin scale is used for Forest planning and 5th field watershed scale is used for project planning.

MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)
… Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest.

MA-DC-RW-04. Wildlife (recommended wilderness)
Recommended wilderness contributes to preserving natural behaviors and processes that sustain native wildlife populations.

MA-DC-BC-02. Habitat (backcountry)
The areas provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).

FW-DC-WL-03. Habitat Conditions for all Surrogate Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

MON-VEG-01
To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

Management direction to respond to climate change includes restoration of landscape-scale disturbance regimes to better mimic natural patterns and processes (Spies et al. 2010, Gaines et al. 2012), and maintaining or restoring habitat connectivity to allow Canada lynx to adjust their ranges to changing conditions (Heller and Zavaleta 2009, ILBT 2013, Squires et al. 2013). As described above, there is management direction in the CNF Plan to implement these climate change adaptations through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats.

Climate change may also result in increased insects and disease, and affect forage (snowshoe hares) and cover for lynx. The CNF Plan will address insects and disease through the following Desired Conditions, Objectives, and Standards:

> *FW-DC-IPM-01. Integrated Pest Management*
> Unwanted plant, animal (vertebrate and invertebrate) and pathogen species are prevented, suppressed, contained, controlled or eradicated. Native insects and plant and animal disease pathogens exist at endemic levels. Forests are managed for resilience to pests and pathogens…pest response plans are prepared, or existing plans reviewed…to facilitate rapid response to new pest outbreaks and infestations.
>
> *FW-DC-VEG-02. Insects and Diseases*
> Native insects, diseases, fungi, bacteria, and viruses engage in their natural (endemic) role in contributing to ecosystem processes…. Landscapes provide a patchwork of varied structural, compositional, and successional stages that ensure the continuation of these processes.
> *FW-OBJ-IPM-01. Integrated Pest Management*
> Damaging plant, animal, insect and plant and animal disease pest outbreaks are prevented, suppressed, contained, controlled or eradicated in a timely manner in accordance with proactive pest response plans. New outbreaks are addressed within one year of detection through the life of the plan.
>
> *FW-STD-IPM-01. Integrated Pest Management*
> Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest.... Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species.

The management direction above will help to minimize or decrease large-scale disease and insect outbreaks, and therefore conserve habitat for lynx and its prey.

Large severe fires may result from climate change, coupled with impacts from historic fire suppression. The CNF Plan provides the following management direction to address fire:

> *MA-GDL-KCRA-03. Fire (Kettle Crest Recreation Area)*
> Use of planned and management of unplanned fire ignitions may be authorized. Fire should be allowed to play its natural ecological role in the semi-primitive non-motorized and semi-primitive motorized recreation opportunity spectrum classes of the KCRA. The preferred strategy for managing unplanned fires is to manage for the benefit of resources. A full suppression strategy may be used where or when a fire:
> 1) has a high potential to spread outside national forest boundaries, or into areas with extensive recreation or administrative developments;

2) is not meeting resource objectives; or
3) would adversely affect the long-term recovery of ESA listed species.

MA-GDL-BC-05. Fire (Backcountry)
Wildland fire should generally be allowed to play its natural role of influencing natural processes and scenic values. Trail infrastructure should be protected. Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role.

MA-STD-RW-05. Fire (Recommended Wilderness)
Objective(s) and strategies for all unplanned ignitions shall be identified at the time of the fire. Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact suppression tactics).
Use planned ignitions only in situations that meet all of the following criteria:
1) There is an unnatural buildup of fuel.
2) The treatment would increase the probability of accepting naturally occurring fire.
3) Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness.

Wildland fire management may diminish, enhance, or sustain the density and distribution of snowshoe hare prey resources and lynx habitat, depending on the design and implementation of programs and actions (ILBT 2013). Although lynx are highly mobile and capable dispersers, connectivity between blocks of habitat to support populations and promote genetic exchange is important (ILBT 2013). Uncharacteristically large wildfires and timber harvest have affected lynx habitat across the landscape, thereby influencing the distribution and movement of lynx in Washington (Koehler et al. 2008). Management direction in the CNF Plan addresses fire and ameliorates, but does not avoid, future adverse effects.

National Forest Access System Effects, including Roads, OHV trails

Although forest roads (i.e. gravel surface, low levels of traffic) in general do not tend to negatively influence lynx, forest roads can become sources of lynx mortality at high traffic volumes and speeds (ILBT 2013).

The influence that road and trails can have on lynx resource selection varies by study area and by the behavior being evaluated. In Montana and Washington, forest roads with low vehicular or snowmobile traffic had little effect on lynx seasonal resource selection patterns (McKelvey et al. 2000b, Squires et al. 2010). However, in Maine, Fuller et al. (2007) found that roads and their associated edges were selected against within home ranges. Squires et al. (2008) reported that lynx denned further away from roads when compared to random expectation. They attributed the observed avoidance of roads as a function of the correlation of roads and landscape patterns; fewer roads were located in denning habitat and higher road densities occurred where there were managed forest stands, which lynx generally avoided (Squires et al. 2010).

The CNF Plan addresses roads and access in lynx core habitat through the following guideline:

> *FW-GDL-WL-08. Canada Lynx – Transportation System within the Kettle-Wedge Core Area*
> Road reconstruction that results in increased traffic speed and volume should be avoided within lynx analysis units. New permanent roads should not be located on forested ridge-tops, saddles, close to forest stringers or in other areas important for habitat connectivity.

The conservation measures for forest roads in lynx core areas include avoiding road reconstruction or upgrades that occur in lynx habitat that would result in increased traffic speeds or volumes (ILBT 2013). These measures would reduce the potential for vehicular traffic to result in a source of mortality to lynx. The CNF Plan includes management direction to limit road reconstruction and upgrades in lynx habitat that would increase traffic volume or speed. This would reduce the potential for lynx mortality associated with vehicle-collisions.

Significant changes to road speeds could have future adverse effects on lynx; however, the guideline above makes future mortality or injury from vehicles on roads less likely to occur.

Livestock Grazing Effects

The status of the species explained that while livestock grazing may not have direct effects on lynx, over grazing in riparian areas can adversely affect snow shoe hare.

> *FW-GDL-LG-01. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments*
> If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey.

While livestock grazing may affect snowshoe hare, the ILBT determined that these effects would likely be localized. In addition, the CNF Plan includes management direction including direction that minimizes the effects of grazing on riparian areas. The bull trout discussion of livestock grazing (p.140-141) lists the CNF Plan components that minimize effects within RMAs. These would also minimize effects to snowshoe hare.

Recreation Effects, especially Winter Recreation

Winter recreation can influence how lynx use habitats (ILBT 2013). To minimize the potential of negative effects from winter recreation, the ILBT (2013) developed conservation measures to reduce effects. Conservation measures for winter recreation in lynx core areas included reducing effects on habitat connectivity and discouraging expansion of over-the-snow routes that may influence lynx habitat use (ILBT 2013). Based on this, the CNF Plan included management direction that limits over-the-snow winter recreational activities in lynx habitat:

FW-STD-WL-04. Canada Lynx – Groomed and Designated Winter Routes within the Kettle-Wedge Lynx Core Area
Allow no net increase in groomed or designated over-the-snow routes into lynx habitat at the lynx analysis unit scale. Access to non-recreation uses, such as mineral and energy exploration and development sites, will be comprised of designated routes or designated over-the-snow routes. This does not apply to areas within permitted ski area boundaries, winter logging, trails that are rerouted for public safety, or to accessing private in-holdings.

FW-GDL-WL-07. Canada Lynx – Recreation and Administrative Facilities within the Kettle-Wedge Core Area
Expansion or new construction of recreation facilities and administrative facilities within a lynx analysis unit should be located in or adjacent to existing areas of development, rather than creating new developed recreation or administrative sites. Recreation developments and operations should be managed so as not to interfere with lynx movement and maintain the effectiveness of lynx habitat.

The management direction above minimizes effects of recreation in lynx core areas. However, recreation use may increase even on designated routes, inside and outside of lynx core areas, and depending on site specifics and lynx distribution in the future, some recreation activities may result in future adverse effects.

Lands and Special Uses Effects

Lands and Special Uses includes land exchanges, acquisition, or leases to maintain, restore, and enhance plant, wildlife, and riparian resources; special uses include permitting activities other timber, minerals, and grazing of livestock (grazing was previously addressed above).

Depending on the site specifics, Lands and Special Uses could result in loss of habitat, increased fragmentation, or loss of connectivity for the lynx. The CNF Plan includes management direction to address the effects of Lands and Special Uses actions:

FW-DC-LSU-01. Lands and Special Uses
Achieve a land ownership pattern and right-of-way acquisition pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land.

FW-STD-LSU-01. Land Acquisition, Conveyance, and Exchange
The Forest has a consolidated land ownership pattern that contributes to ecosystem resilience, allows reasonable public and/or Forest Service administrative access where suitable, and improves land management efficiencies. There is a downward trend in the number of isolated, non-Federal inholdings that occur within the proclaimed Forest boundaries. Congressionally designated areas lack private inholdings.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

Impacts may result from habitat loss through infrastructure development and disturbance (ILBT 2013). There is limited information on the effects to lynx from most of the actions addressed under Lands and Special Uses. It is reasonable to assume that the actions would have similar effects to those discussed under recreation, above. Depending on site specifics and lynx distribution in the future, some lands and special use actions/activities may result in future adverse effects including disturbance, fragmentation, or habitat loss.

Monitoring

In addition to the CNF Plan components described above, there are vegetation, species, and habitat monitoring questions to be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

MON-FLS-01-02: Canada lynx: changes in lynx habitat as a result of moving towards the desired conditions for vegetation through providing a mosaic of lynx habitat with landscape pattern that is consistent with the historical range of variability

MON-WL-01: Have management activities met plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions?

The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects to Lynx:

Actions implemented under the CNF Plan may result in positive and negative effects to snow shoe hare and lynx habitat, and denning habitat. Actions may cause lynx disturbance, displacement, habitat fragmentation, loss of cover, and increased human access that may result in indirect mortality of lynx. Effects include the following:

- The Colville National Forest includes a core area (the Kettle-Wedge) that is important for the recovery of Canada lynx in Washington. There are 13 LAUs within the Kettle-Wedge Core Area. The proposed action describes the additional Desired Conditions, Objectives, Standards, and Guidelines within the Kettle-Wedge core area, and/or in identified lynx habitat. The lynx management direction ensures that the CNF Plan is consistent with the expectations of the LCAS.

- Vegetation management can result in the following stressors for lynx: removal of snow shoe hare habitat, removal of large woody debris and denning habitat through harvest or prescribed fire. However, negative effects can be minimized through use of un-even aged management, or other harvest and management techniques. The CNF Plan includes management direction that provides conservation for the lynx, its habitat, and its prey in the Kettle-Wedge Lynx Core Area.

  Vegetation management activities (e.g., timber harvest, prescribed fire) affect the distribution of lynx habitat components, can fragment habitats, and create sources of disturbance (ILBT 2013). The implementation of the CNF Plan includes management direction to manage habitat for Canada lynx toward desired conditions that are based on the HRV. This means that habitats would be managed so that the amount of habitat, patch sizes, and spatial arrangement would mimic conditions under which Canada lynx evolved (Agee 2000). These plan components would provide foraging, denning, and travel habitat components for lynx, while reducing the potential of habitat loss and fragmentation from uncharacteristically severe wildfires, a key threat to lynx habitat (Lewis 2016). The vegetation management and lynx specific management direction will result inmaintenance and restoration of habitat conditions for lynx and ensure consistency with the LCAS.

- Climate change effects to lynx include an upward shift in elevation or latitudinal distribution of lynx and prey, a decrease in the amount of habitat and population size from reduced snow persistence and increased disturbance events (e.g., fires), changes in demographic rates, such as survival and reproduction, and changes in predator-prey relationships. There is management direction in the CNF Plan to respond to climate change through dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats.

- Climate change may also result in increased insects and disease, and resultant tree loss can affect forage (snowshoe hares) and cover for lynx. The CNF Plan management direction will help to minimize or decrease large-scale disease and insect outbreaks, and therefore conserve habitat for lynx and its prey.

- Lynx habitat can benefit from frequent low intensity fires, and historically fire played an important role in maintaining the mosaic of habitat that supports both the lynx and the snowshoe hare. Climate change in the future is likely to result in reduced snowpack, earlier snow melt, an upward shift in distribution of lynx and prey, changes in predator and prey interactions, increased large scale fires, and increased forest insects and disease. The increased large scale fires may have some positive habitat benefits. But large hot fires, as a result of increased temperatures and earlier spring melt, can make large swaths of lynx habitat inhospitable in the short-term. Wildland fire management may diminish, enhance, or sustain the density and distribution of snowshoe hare prey resources and lynx habitat, depending on the design and implementation of programs and actions (ILBT

2013). Management direction in the CNF Plan addresses planned and unplanned fire and ameliorates, but does not avoid, future adverse effects.

- Although forest roads (i.e. gravel surface, low levels of traffic) in general do not tend to negatively influence lynx, forest roads can become sources of lynx mortality at high traffic volumes and speeds (ILBT 2013). The CNF Plan includes management direction to limit road reconstruction and upgrades in lynx habitat that would increase traffic volume or speed. This would reduce the potential for lynx mortality associated with vehicle-collisions. Significant changes to road speeds could have future adverse effects on lynx; however, the management direction makes future mortality or injury from vehicles on roads less likely to occur.

- While livestock grazing may not have direct effects on lynx, over-grazing in riparian areas can adversely affect snowshoe hare habitat. In addition, the CNF Plan includes management direction including direction that minimizes the effects of grazing on riparian areas in lynx habitat, in addition to other components of the ARCS.

- Winter recreation can influence how lynx use habitats (ILBT 2013). The CNF Plan included management direction that limits over-the-snow winter recreational activities in lynx habitat and minimizes effects in lynx core areas. However, recreation use may increase even on designated routes, inside and outside of lynx core areas, and depending on site specifics and lynx distribution in the future, some recreation activities may result in future adverse effects.

- Depending on the site specifics, Lands and Special Uses could result in loss of habitat, increased fragmentation, or loss of connectivity for the lynx. The CNF Plan includes management direction to address the effects of Lands and Special Uses actions. There is limited information on the effects to lynx from most of the actions addressed under Lands and Special Uses. Depending on site specifics and lynx distribution in the future, some lands and special uses actions activities may result in future adverse effects including disturbance, fragmentation, or habitat loss.

The CNF Plan provides management direction to conserve lynx, its habitat, and its prey, and minimize the effects of future actions. Furthermore, as displayed in Appendix B, the CNF Plan will ensure consistency with the LCAS and the Lynx Recovery Outline (USFWS 2005).

Step down consultations would be required in the future for any actions that result in effects to the lynx. There may be adverse effects from future actions, depending on site specifics, distribution of lynx, and whether exposure of individuals is likely.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Past, present, and reasonably foreseeable future non-federal actions that affect lynx habitat include timber harvest and fuels reduction, recreation, human development, and grazing on private and state lands. In Canada, timber harvesting, oil and gas development, coal mining, and the proliferation of human access associated with these industries, have and would continue to affect lynx habitat. Legal trapping occurs north of the Forest in Canada and could reduce the potential for lynx to disperse into the CNF.

Grazing has occurred and would continue to take place on off-forest lands, potentially impacting deciduous or riparian habitats for lynx prey species.

Fuels reduction projects are possible on all land ownerships, in particular where they are near residences. These can be done in such a way that they restore wildlife habitat that has been affected by fire exclusion.

Recreation is likely to increase on all land ownerships due to increasing demands from the public. This would increase human disturbance and result in areas with relatively low human disturbance on NFS lands becoming more important to lynx and other wildlife.

INTEGRATION AND SYNTHESIS OF EFFECTS

The CNF Plan would provide management direction to address the direct and indirect effects of forest management activities on the recovery of lynx. The direct and indirect effects that the CNF Plan direction addresses include desired conditions for vegetation management to provide lynx habitat components (foraging, denning, travel), components to limit the effects of winter recreation on lynx habitat connectivity and habitat use, direction that limits speed on forest roads to reduce the risk of mortality to lynx from vehicle collisions, and standards and guidelines to improve conditions in riparian areas that provide habitat for snowshoe hares, a primary food resource for lynx. As displayed in Appendix B, the CNF Plan incorporates management direction that ensures consistency with the LCAS (ILBT 2013), and contributes to the expectations of the Recovery Outline (USFWS 2005). While there may be future effects to the lynx from management actions, the desired conditions, objectives, and standards and guidelines in the CNF Plan should prevent any long-term adverse effects so that management activities will not appreciably reduce the likelihood of survival and recovery of the lynx in the wild.

CONCLUSION

After reviewing the current status of the lynx, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the USFWS's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the lynx.

WESTERN YELLOW-BILLED CUCKOO CHAPTER
STATUS OF SPECIES

This section presents information about the regulatory, biological and ecological status of the western yellow-billed cuckoo (*Coccyzus americanis*) that provides context for evaluating the significance of probable effects caused by the proposed action. For additional information on the current status of the Western DPS of the yellow-billed cuckoo, including details on the listing history, the distribution, morphological description, habitat and life history, and the reasons for decline and threats to the survival of the species, see the proposed and final listing notices for the Western DPS of the yellow-billed cuckoo (79 FR 19860-19861; 79 FR 59991-60038).

Taxonomy and Species Description

Adult yellow-billed cuckoos have moderate to heavy bills, somewhat elongated bodies and a narrow yellow ring of colored bare skin around the eye. The plumage is grayish-brown above and white below, with reddish primary flight feathers. The tail feathers are boldly patterned with black and white below. They are a medium-sized bird about 12 in (30 cm) in length, and about 2 oz. (60 g) in weight. Males and females differ slightly; the males have a slightly smaller body size, smaller bill, and the white portions of the tail tend to form distinct oval spots. In females the white spots are less distinct and tend to be connected (Hughes 2015).

Morphologically, the yellow-billed cuckoos throughout the western continental United States and Mexico are generally larger than individuals in the eastern United States, with significantly longer wings, longer tails, and longer and deeper bills (Franzreb and Laymon 1993, pp. 17, 19). Birds with these characteristics occupy the Western DPS and the USFWS refers to them as the "western yellow-billed cuckoo" (WYBC)

Listing Status

The Western DPS of the yellow-billed cuckoo was listed as a threatened species on October 2, 2014 (79 FR 59992). There is currently no recovery plan for WYBC. Critical habitat was proposed on August 15, 2014 (79 FR 71374) for the states of Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah, and Wyoming No WYBC critical habitat was proposed for Washington. A final rule for designating critical habitat for the yellow-billed cuckoo was not published at the time this Opinion was signed.

The WDFW status report recommends listing at the state level be "endangered." However, they are currently on WDFW's list of Priority Habitats and Species (PHS) and are therefore afforded some, but likely limited, conservation attention.

Life History

<u>Migration</u>

Migration timing is similar throughout the range of the western DPS (Hughes 2015). However, WYBC in the west arrive on the breeding grounds 4 to 8 weeks later than eastern yellow-billed cuckoos at similar latitudes (Franzreb and Laymon 1993, p. 24; Hughes 2015). Western yellow-billed cuckoos reach their breeding range later than most other migratory breeders (Rosenberg et al. 1982, p. 262). Fall departures of WYBCs are usually in late August to mid-September, 2-3 weeks earlier than eastern birds which depart in late September to early October (Hughes 2015). Stragglers may linger in the West until November. Birds are known to migrate in both small and large groups and migration occurs mainly at night (Wiles and Kalasz 2016). The arrival of birds and the timing of nesting may be associated with short-term abundance of prey. Limited data indicate that adults and nestlings can return to the same or nearby nesting sites in successive years, though year-to-year movement between potential breeding areas also occurs (Laymon 1998, p. 4; Laymon and Williams 2001, p. 9). It is likely that WYBCs return to sites of previous successful breeding, but if the conditions are not suitable that year they move to other potential breeding sites (FR 78, No. 192, p. 61633).

Large variation exists among individual home range sizes, with males having significantly larger home ranges than females (Halterman, 2009). In the Southwest and California, breeding home ranges average 16-82 ha (39-203 acres) (Halterman 2009, Sechrist et al. 2009, 2013, McNeil et al. 2013), but may be as small as 4 ha (10 acres) where habitat is restricted (Laymon 1998). Sechrist et al. (2013) reported average daily travel distances of 786 m.

<u>Breeding Behavior and Season</u>

The breeding season varies regionally with availability of preferred food (large insects, but also small invertebrates such as tree frogs). Western populations breed June through August, with peak nesting between mid-July to early August. However, nesting can begin as early as late May and extend into late August (Hughes 2015). WYBCs begin pair formation soon after their arrival from spring migration. Up to three broods may be raised if there is sufficient prey base (Laymon et al. 1997, p. 11; Halterman 2009, p. 77). WYBCs may breed at multiple disjunct locations in the same year (FR 78, No. 192, p. 61632). Some individuals also roam widely (several hundred miles); apparently assessing food resources before selecting a nest site (Sechrist et al. 2012, pp. 8-9). The species is considered loosely territorial. Although territories are not defended, nests are regularly spaced and may be built as close as 60 m from those of neighboring pairs (Laymon 1998). About 70% of pairs are monogamous, while remaining pairs have a helper bird that assists in feeding the chicks (Laymon 1998). Helpers are believed to be younger unrelated males. Courtship behavior between the breeding pair members often involves the male approaching the female with a food item or twig, which is then given to her during copulation (Hendricks 1975, Laymon 1998).

Unlike many species of cuckoos, WYBCs typically build their own nests and care for their own young. Both sexes participate in building the nest, which is a loose platform of twigs lined with a few leaves or other finer materials (Halterman 2009, Hughes 2015). The main structure

usually takes 1-2 days to assemble, but is often supplemented with additional material for several days after the first egg is laid (Johnson et al. 2008, Halterman 2009, Hughes 2015). Nests are typically placed 1-9 m off the ground in a deciduous tree or large shrub, and concealed by foliage (Laymon 1980, 1998, McNeil et al. 2013, Hughes 2015). The nest, which averages about 21 cm in diameter, is built on horizontal branches away from the main trunk, but some are placed in the forks or crotches of trunks or major limbs (Wiles and Kalasz 2016).
In years of high insect abundance, WYBC lay larger clutches (3-5 eggs rather than two), a larger percentage of eggs produce fledged young, and they breed multiple times (2-3 nesting attempts rather than one) (Laymon et al. 1997, pp. 6-7). The incubation period for the western yellow-billed cuckoo is 9 to 11 days, and young leave the nest at 7 to 9 days old. Western birds occasionally conduct communal nesting in which two breeding pairs lay their eggs in a shared nest and care for the young (Laymon 1998).

WYBC produce one brood in most years, but may successfully rear two or even three broods in years with abundant prey resources (Laymon et al. 1997). These additional broods may be produced with either the same mate or a new male (Halterman 2009). The presence of helper birds may enhance the ability of pairs to raise multiple broods (Laymon 1998).

The entire period from egg laying to fledging is one of the shortest among all bird species and extends only about 17–21 days, with incubation lasting 9–12 days and chicks departing the nest at 5–9 days of age (Laymon 1998, Johnson et al. 2008, Hughes 2015). Incubation begins after the first egg is laid, resulting in asynchronous hatching and nests with chicks of different ages (Laymon 1998). Nestlings are altricial (i.e., naked and helpless at hatching), but rapidly develop (Laymon 1998). Males conduct the majority of parental care, doing most incubation and provisioning of chicks and all care of fledglings (Halterman 2009). Helper males also assist with feeding of nestlings. Females typically stop tending the brood several days before fledging occurs (Halterman 2009), which may allow them to start another nest. WYBC may terminate incubation of the youngest egg or practice infanticide by removing the youngest chick if food resources are limited or to induce females to re-nest sooner (Hamilton and Hamilton 1965, Laymon et al. 1997, Halterman 2009).

Care of fledglings lasts 2–3 weeks after departure from the nest (Johnson et al. 2008, Halterman 2009). Initially, young are able to move about only by climbing through the canopy vegetation, but they become capable of flight at about three weeks of age (Laymon 1998, Hughes 2015). Yellow-billed cuckoos occasionally lay their eggs in the nests of other Yellow-billed cuckoos as well as other species, a behavior known as brood parasitism (Hughes 2015). This behavior apparently has not been reported among western birds.

Relatively little information is available on the breeding biology of WYBC in Washington. Ten of the 11 state records of nests with eggs were made between 16 June and 18 July. There is also a record of a nest with 2 slightly incubated eggs on 1 June, indicating that nesting was sometimes initiated as early as late May. The only report of juveniles was made on 18 July (Wiles and Kalasz 2016). Clutch size averaged 3.0 eggs (n = 11), with a range of 1–4 eggs. Getty (1916) published the only known photograph of a cuckoo nest in Washington. Nests were generally placed 1–4 m off the ground in fir or willow trees on horizontal branches near or against the trunks (Wiles and Kalasz 2016). The use of firs as nesting sites is a significant difference from the sites selected by western cuckoos in other parts of their range.

Prey

Yellow-billed cuckoos forage primarily by gleaning insects from vegetation (Hughes 2015). They specialize on relatively large invertebrate prey, including caterpillars (*Lepidoptera* sp.), katydids (*Tettigoniidae* sp.), cicadas (*Cicadidae* sp.), and grasshoppers (*Caelifera* sp.) (Laymon et al. 1997; Hamilton and Hamilton 1965). Fruit, berries, small lizards, frogs, and bird eggs and nestlings are also eaten, but in smaller amounts (Wiles and Kalasz 2016). Prey species composition varies geographically. WYBC food availability is largely influenced by the health, density, and species of vegetation. Desiccated riparian sites produce fewer suitable insects than healthy moist sites. Their breeding season may be timed to coincide with outbreaks of insect species, particularly tent caterpillars (Hughes 2015, 66 FR 38611) or cicadas (Johnson et al. 2008). In Arizona, fledging occurred at the peak emergence of cicadas (Rosenberg et al. 1982). Three feeding records exist for Washington and include a bird with multiple caterpillar remains in its stomach, another seen giving its mate a "large green worm" during courtship, and a collected specimen whose stomach was packed with tent caterpillars (*Malacosoma* sp.; Wiles and Kalasz 2016).

While foraging, the species often employs a "sit and wait" strategy in which it perches inconspicuously and watches nearby vegetation for moving prey (Hughes 2015). Prey are commonly taken from foliage and stems by gleaning, either while perched or hovering. Birds also hunt for prey by hopping from branch to branch or by walking or running along limbs. Prey are secured more infrequently by aerial flycatching, or by hopping pursuit and capture on the ground.

Habitat

Breeding Habitat

WYBC are believed to be more sensitive to habitat loss than other riparian obligate species because of specific factors that influence successful nesting. Most successful nesting territories have a combination of dense willow understory where the nest is placed and a cottonwood overstory that is used for foraging. At the landscape level, the available information suggests the WYBC requires large tracts of willow-cottonwood or mesquite forest or woodland for their nesting season habitat. Habitat can be relatively dense, contiguous stands, irregularly shaped mosaics of dense vegetation with open areas, or narrow and linear.

The WYBC nests almost exclusively in low to moderate elevation multi –layered riparian woodlands that are 50 acres or larger (FR 78, No. 192, p. 61633). Within the boundaries of the DPS (see Figure 2 at 78 FR 61631), these riparian areas are located from southern British Columbia, Canada, to southern Sinaloa, Mexico, and may occur from sea level to 7,000 ft. (2,154 m) (or slightly higher in western Colorado, Utah, and Wyoming) in elevation. Riparian habitats selected are generally along low-gradient (surface slope less than 3 percent) rivers and streams, and in open riverine valleys that provide wide floodplain conditions (greater than 325 ft. (100 m). The dense riparian woodlands used are primarily composed of cottonwood (*Populus fremontii*), willow (*Salix* spp.), and mesquite (*Prosopis* spp.), along riparian corridors in otherwise arid areas (Laymon and Halterman 1989 pp. 274-275, Hughes 2015, Habitat and Breeding sections).

Dense undergrowth may be an important factor in selection of nest sites. Optimal breeding habitat contains groves with dense canopy closure and well-foliaged branches for nest building with nearby foraging areas consisting of a mixture of cottonwoods, willows, or mesquite with a high volume of healthy foliage (78 FR 61633). In addition to the dense nesting grove, western yellow-billed cuckoos need adequate foraging areas near the nest. In the arid West, suitable nesting conditions are usually found in cottonwood-willow riparian associations along water courses.

Throughout the WYBC range, a large majority of nests are placed in willow trees, but alder (*Alnus* spp.), cottonwood, mesquite, walnut (*Juglans* spp.), box elder, sycamore, netleaf hackberry (*Celtis laevigata* var. *reticulata*), soapberry (*Sapindus saponaria*), fir, and tamarisk are also used (Hughes 2015, Breeding and Habitat sections). They construct an unkempt stick nest on a horizontal limb in a tree or large shrub. Nest height ranges from 4 feet (ft.) to (rarely) 100 ft., but most are typically below 30 ft. (Hughes 2015). Canopy cover directly above the nest and in the vicinity of the nest is dense. Humid conditions created by surface and subsurface moisture appear to be important habitat parameters for western yellow-billed cuckoo. The species has been observed as being restricted to nesting in moist riparian habitat in the arid West because of humidity requirements for successful hatching and rearing of young (Hamilton and Hamilton 1965, p. 426; Gaines and Laymon 1984, p. 75; Hughes 2015, Breeding section).

WYBC have evolved larger eggs and thicker eggshells; larger eggs and thicker shells help cope with potentially higher egg water loss (Ar et al. 1974, p. 157; Rahn and Ar 1974, p. 150-151), which would be expected to occur in the hotter, dryer conditions where the western DPS is found. A study on the South Fork Kern River showed that lower temperatures and higher humidity were found at nest sites when compared to areas along the riparian forest edge or outside the forest (Launer et al. 1990, pp. 6-7). Recent research on the lower Colorado River has confirmed that western yellow-billed cuckoo nest sites had significantly higher daytime relative humidity (6-13 percent higher) and significantly lower daytime temperatures (2-4^{o} F [1-2^{o} C] lower) than average forested sites (McNeil et al. 2013, pp. 104-106).

Foraging Habitat

Little is known about the foraging and migrating habitat of the WYBC. A high foliage volume of cottonwoods appeared important for foraging in a study done along the Colorado River (Rosenberg et al. 1991, pp. 203-204). Foraging areas can be less dense or patchy than nesting requirements with lower levels of canopy cover and often have a high proportion of cottonwoods in the canopy.

During movements between nesting attempts, WYBC are found at riparian sites with small groves or strips of trees, sometimes less than 10 ac (4 ha) in extent (Laymon and Halterman

1989, pp. 273-274). These stopover and foraging sites can be similar to breeding sites, but are smaller, narrower, and lack understory vegetation when compared to nesting sites.

Migratory Habitat

WYBC are found in a variety of vegetation types during migration, including coastal scrub, secondary growth woodland, hedgerows, humid lowland forests, and forest edges. During migration they may also use smaller riparian patches than those in which they typically nest (FR 78, No. 192, p. 61632).

Populations, Distribution, Trend

The WYBC is a member of the avian family Cuculidae and is a Neotropical migrant bird that winters in South America and breeds in North America. The breeding range of the entire species formerly included most of North America from southeastern and western Canada (southern Ontario and Quebec and southwestern British Colombia) to the Greater Antilles and northern Mexico (Hughes 2015, Distribution section). Yellow-billed cuckoos spend the winter in South America, east of the Andes, primarily south of the Amazon Basin in southern Brazil, Paraguay, Uruguay, eastern Bolivia, and northern Argentina (Hughes 2015). The species as a whole winters in woody vegetation bordering fresh water in the lowlands to 1,500 m (4,921 ft.), including dense scrub, deciduous broadleaf forest, gallery forest, secondary forest, sub-humid and scrub forest, and arid and semiarid forest edges (Hughes 2015). Wintering habitat of the WYBC is poorly known.

Based on historical accounts, the WYBC was formerly widespread and locally common in California and Arizona, more narrowly distributed but locally common in New Mexico, Oregon, and Washington and uncommon along the western front of the Rocky Mountains north to British Columbia (Hughes 2015). Breeding is not currently known to occur in Washington, Oregon, and British Columbia (Campbell et al. 1990, Marshall 2003, Tweit 2005) although, standardized protocol surveys have not been completed in all potential habitat. The WYBC is now very rare in scattered drainages in western Colorado, Idaho, Nevada, and Utah, with single, nonbreeding birds most likely to occur (66 FR 38611). The largest remaining breeding areas are in southern and central California, Arizona, along the Rio Grande in New Mexico, and in northwestern Mexico (Hughes 2015). The current breeding population is low, with estimates of approximately 350 to 495 pairs north of the Mexican border and another 330 to 530 pairs in Mexico for a total of 680 to 1,025 breeding pairs (78 FR 61642). The current low population is believed to be several orders of magnitude below its historical size (USFWS 2013).

WYBCs are extremely rare in Washington; between 1950 and 2000 there were 12 observations. Eight of these occurred in eastern Washington, mostly near the Cascades (WDFW 2012). Since then a single bird was observed on the Little Pend Oreille National Wildlife Refuge in 2012, and there was one observation near Mazama, Washington, in 2015.

Threats/Stressors

Habitat loss, Degradation, and Altered Hydrology

The greatest factor leading to the decline of WYBC has been loss of habitat in its breeding range (USFWS 2013). Its affinity for riparian habitats was particularly impactful as streamside areas in the West have been severely altered by dams and their associated impoundments, flood control practices, commercial and residential development, changes in farming and ranching practices, and nonnative plant invasions. There has been a 90–99% loss of habitat in the core of the species' historical range in California, Arizona, and New Mexico (USFWS 2013). Human activities have broadly impacted riparian zones in Washington as well, with at least 70% of these habitats in lowlands lost through different types of conversion (Canning and Stevens 1989, Knutson and Naef 1997). Losses have been highest in heavily urbanized areas reaching nearly 100% in some locations. Because most historical cuckoo occurrences in Washington were in riparian areas, it is assumed that human-caused losses and alteration of these habitats were a major factor in the decline of cuckoos in Washington.

Riparian habitats not permanently lost through human development have experienced long-term impacts in other ways. Altered hydrology of riverine systems from channelization through the installation of levees and other hardened structures further impacted the habitat by making systems less dynamic. This allowed access to riverbanks for farming and grazing, and prevented the regeneration of preferred vegetation and habitat with a complex structure through natural flooding processes (USFWS 2013). Construction of dams and reservoirs has also changed river flow patterns important to the maintenance of riparian systems.

Efforts to restore riparian habitats within the recent breeding range of the western DPS have in some cases failed to result in population increases of cuckoos (e.g., Dettling et al. 2015). This suggests that non-habitat-related factors may be involved in the population's decline or are limiting its recovery.

Pesticide Use

The preferred habitats of WYBC are often in close proximity to agricultural activities, directly and indirectly exposing the birds to the effects of pesticide use. In countries south of the U.S., the species experiences exposure to harmful pesticides (e.g., DDT) that could result in mortality or have carryover physiological effects on breeding birds (Laymon and Halterman 1987, USFWS 2013). Pesticide spraying (including use of the bacteria *Bacillus thuringiensis*) in the breeding range can reduce invertebrate abundance, possibly causing lower food availability for cuckoos during the nesting period and perhaps resulting in lower productivity and smaller populations over time (USFWS 2013). No studies have yet shown population level effects of pesticide use on the species, although the threat is large enough that it continues to warrant concern (USFWS 2013).

Climate Change

Climate change is expected to have an overall negative effect throughout the range of the WYBC (Post et al. 2009, USFWS 2013). In the Pacific Northwest, it is predicted that there will be changes in year-round precipitation and run-off patterns and warmer, drier summers, leading to lower stream levels and increased fire risk that could reduce the amount and quality of habitat for cuckoos (USFWS 2013). These climate change scenarios could also negatively impact the timing of emergence of important food resources (e.g., invertebrates) such that a mismatch could develop between when food is available and when it is critically needed during the nesting season (USFWS 2013). Nevertheless, there remains reasonable uncertainty with regard to the overall impact that climate change may have on the species. Washington could perhaps play a role in providing climate refugia for this species if climate change makes conditions in the Southwest increasingly inhospitable (Friggins and Finch 2015) and populations there seek suitable conditions to the north.

Recovery Needs/ Conservation Strategies

Other than the federal threatened listing in 2014, no federal conservation actions have been specifically directed at WYBC in Washington. A federal recovery plan has not yet been prepared for the western DPS.

WDFW has not yet developed specific PHS management recommendations for cuckoos in Washington. The species is included in Washington's riparian plan (Knutson and Naef 1997), which includes the following recommendations for protection of cuckoo habitat:

- Do not remove riparian vegetation, avoid bank stabilization and channelization projects, and exclude livestock from areas used by cuckoos.
- Do not use insecticides near riparian areas occupied by cuckoos.

Both recommendations, however, are contingent upon identification of areas used by WYBC. Despite the lack of specificity in these recommendations, the overall riparian plan and its management recommendations should be beneficial to WYBC habitat. Similarly, the many efforts to conserve and recover riparian habitats to assist with salmon recovery in Washington should also result in improved habitat conditions for WYBC.

STATUS OF CRITICAL HABITAT

Critical habitat was proposed on August 15, 2014 (79 FR 48548). A final rule for designating critical habitat for the yellow-billed cuckoo was not published at the time this Opinion was signed. No critical habitat was proposed on the CNF or on adjacent lands; therefore, critical habitat is not further addressed in this Opinion.

ENVIRONMENTAL BASELINE

In the 1800s and early 1900s, yellow-billed cuckoos were locally common in Washington, occurring on both sides of the Cascade Mountains and throughout the Puget Sound lowlands (WDFW 2012). The last confirmed breeding records in Washington are from the 1930s. WYBC are now extremely rare in Washington, with only 12 observed between 1950 and 2000 (WDFW 2012). The WYBC has experienced a major decline in its breeding range since the 1800s and is now extirpated throughout most of its historical range in the western US. This decline has been attributed to habitat loss and pesticide use (Gaines and Laymon 1984, Laymon and Halterman 1987, Iten et al. 2001).

There have been no sightings or evidence of WYBC on the CNF, although there was one sighting adjacent on the Little Pend Oreille National Wildlife Refuge during the breeding season in 2012. There are few contiguous blocks of riparian wetlands large enough to support a breeding population of WYBC on the CNF. However, in 2017, the CNF developed a map displaying potential yellow-billed cuckoo habitat based on the following criteria: riparian woodlands 50 acres or larger in size, over 300 feet wide and dominated by cottonwoods and willows (WDFW 2012; BA 2017) (Figure 16). These wetlands were identified based on a size criterion and not vegetative type, therefore many of these riparian areas may not be suitable nesting habitat for WYBC due to a lack of cottonwoods or willows. However, areas like Sheep Creek in the Wedge, South Fork Sherman Creek, and Woodward Meadows may have suitable habitat for nesting based on vegetation and size.

In summary, there are no known breeding WYBC on the CNF; however, there is potential habitat.

Conservation Role of the Action Area

The CNF and surrounding areas may have supported WYBC in the past. Currently, the conservation role is to conserve potential habitat to support the species if distribution and population trends increase. As stated earlier, Washington, including areas withpotential habitat on the CNF, could play a future role in providing climate refugia for the species if climate change makes conditions in the Southwest increasingly inhospitable (Friggins and Finch 2015) and populations there seek suitable conditions to the north.

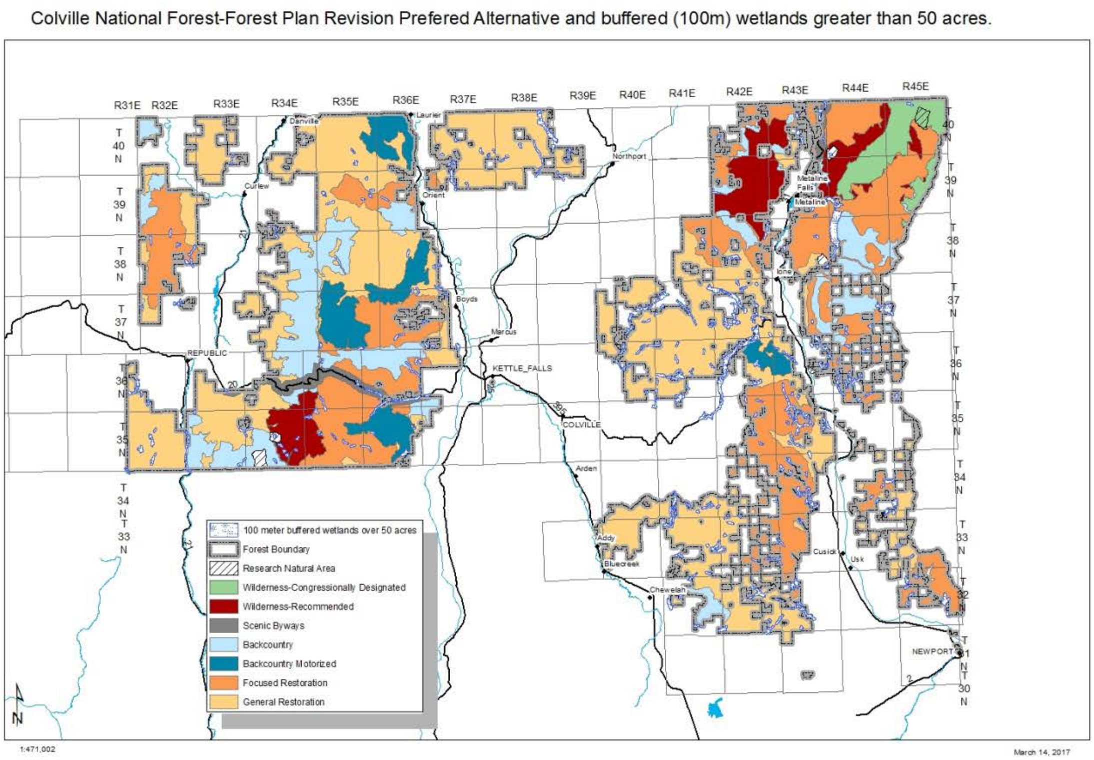


Figure 16. CNF Riparian areas greater than 50 acres in size.

EFFECTS OF THE ACTION ON SPECIES

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

As stated earlier in the Opinion, the CNF Plan is a Federal action that provides a framework for the development of future CNF actions that will be authorized, funded, or carried out at a later time within the next 15 years. The overall goal of this section 7 consultation process is to evaluate the CNF Plan for its consistency with the conservation of listed species.

Appendix B provides a list of recommended conservation strategies (Wiles and Kalasz 2017; Knutson and Naef 1997; Honeycutt, *in litt.* 2017) for western yellow-billed cuckoo (*Coccyzus americanus*), and how the CNF Plan addresses the applicable expectations. Below, we discuss the general effects of the CNF Plan on the WYBC.

The forest activities that directly influence the quality and availability of habitat for riparian dependent species such as the yellow-billed cuckoo include management of roads, recreation sites, and vegetation treatments that occur within riparian habitats.

Effects of the MAs and ARCS

Yellow-billed cuckoo typically breed in riparian areas 50 acres or more in size dominated by cottonwood and alder. There are few areas of this size and vegetative criteria on the CNF (Figure 15); however, other riparian areas may support foraging habitat. Large riparian areas identified as potential WYBC habitat on the CNF are found within the following MAs: Focused Restoration, General Restoration, and Riparian Management Areas. These management areas will result in management that conserves the WYBC habitat.

Focused Restoration MA
The management emphasis is to restore ecological integrity and ecosystem function at the landscape scale using both active management (mechanical treatment and prescribed fire) and passive management (natural processes including disturbances and succession), to restore management natural processes and improve resiliency, while emphasizing important fish and wildlife habitats. Focused Restoration areas are defined by the key watersheds, and grizzly bear and caribou recovery areas not included in Backcountry and Backcountry Motorized management areas. Important desired habitat conditions for aquatic, plant, and wildlife species are found in these areas. Specific desired conditions and standards are described under the proposed action section of the Opinion.

General Restoration MA
The MA emphasis is to focus on enhancing ecological integrity and ecosystem function at the landscape scale using active management (mechanical treatment and prescribed fire) to restore natural processes and improve resiliency. The desired conditions are: a natural appearing landscape that contributes to the variety of native plant communities and the composition, structure, and patterns for vegetative systems, aquatic, plant, and wildlife habitats. Wildlife habitat is expected to be lower for species that are sensitive to human activities and disturbance. Specific desired conditions and standards are described under the proposed action section of the Opinion.

Riparian MA
Riparian zones are the inter-faces between terrestrial and aquatic ecosystems. Found adjacent to streams, rivers, lakes and wetlands, riparian zones provide a transitional zone between terrestrial and aquatic components of the landscape (Gregory et al. 1991). RMAs include wetlands greater than one acre. Specifically RMAs consist of the body of water or wetland and the area to the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or the extent of unstable and potentially 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 wetland greater than one acre or the maximum pool elevation of constructed ponds and reservoirs, whichever is greatest. Although riparian zones occupy a small part of the overall CNF land base; they support a diverse vegetation community not found in the upland areas. Riparian zones provide important foraging, cover, travel corridors, and nesting habitat for birds, small and large mammals, reptiles, and amphibians. Healthy riparian zones with an abundance of trees and other native woody species and forbs provide for channel and floodplain stability and integrity.

While there has been no evidence of WYBC presence on the CNF, recovery efforts may increase the likelihood of WYBC in the future. However, if they are found to be present, exposure to management activities within the MAs listed above could occur and have the following effects:

- Implementation of the CNF Plan and associated MAs will conserve riparian habitats that the WYBC rely on for nesting and foraging.
- WYBC may use less desirable habitat for migration. Increasing the amount of large wetland complexes on the CNF or quality of smaller riparian patches may induce the bird to use the CNF.
- WYBC would be expected to only use riparian areas that are sufficient in size and desired plant assemblages for nesting and foraging. Any changes to these riparian areas, especially large areas may result in future adverse effects if WYBC were found to be present on the CNF.

Vegetation Management Effects, including Restoration, Climate Change, and Fire

WYBC are dependent on riparian areas for nesting, foraging and migration. Management direction for watersheds and riparian habitats is consolidated into one consistent set of plan components that applies to the entire Colville National Forest. Standards and Guidelines would limit management activities that are allowed to occur within riparian habitats.

- The Plan includes greater riparian management area widths along intermittent streams, lakes, and ponds than in the areas previously covered by the INFISH forest plan amendment (USFS 1998; BA p. 231).
- According to the BA, the implementation of the Plan would reduce the effects of roads on riparian habitat within 10 watersheds in the short-term (<20 years based on Objectives). In the longer-term (<50 years) the Plan would result in road densities of equal to or less than 1 miles/square mile on 23 percent of the Forest, and equal to or less than 2 miles/square mile on 48 percent of the Forest.

The following management direction in the CNF Plan provides conservation for WYBC and riparian habitat:

> *FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity*
> National Forest System lands contribute to uninterrupted physical and biological processes within and between watersheds. Floodplains, groundwater-dependent systems, upslope areas, headwater tributaries, and intact habitat refugia provide vertical, horizontal, and drainage network connections. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-dependent, and many terrestrial species of plants and animals. Subbasin scale is used for Forest planning, and watershed or subwatershed scale is used for project planning.

FW-DC-WR-03. Self-Sustaining Native and Aquatic and Riparian-Dependent Species
National Forest System lands contribute to habitat and ecological conditions that are capable of supporting self-sustaining populations of native aquatic and riparian-dependent plant and animal species. Subbasin scale is used for Forest planning and watershed or subwatershed scale is used for project planning.

FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat
National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning.

FW-DC-WR-05. Water Quality
National Forest System lands contribute to water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality is within the range that maintains the biological, physical, and chemical integrity and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities, and meets appropriate Washington State water quality standards. Subbasin scale is used for forest planning and watershed or subwatershed scale is used for project planning.

FW-DC-WR-07. In-stream Flows
National Forest System lands contribute to in-stream flows and groundwater sufficient to create and sustain riparian, aquatic, and wetland habitats, retain patterns of sediment, temperature, nutrient, and wood routing, and provide for (permitted or certificated) consumptive uses. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows functions in concert with local geology, valley types, soils and geomorphology. Subbasin scale is used for Forest planning and watershed or subwatershed scale is used for project planning.

FW-DC-WR-11. Native Plant Communities
National Forest System lands contribute to the species composition and structural diversity of native plant communities in riparian management areas (including wetlands). These contribute to adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration; and supply amounts and distributions of coarse woody debris and fine particulate organic matter sufficient to sustain physical complexity and stability. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.

FW-DC-WR-12. Aquatic Invasive and Non-Native Species
Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native species for critical resources. Subbasin scale is used for Forest planning. Watershed or subwatershed scale is used for project planning.

FW-DC-WR-18. Key Watershed Integrity
Key watersheds have high watershed integrity and contribute to resilient aquatic and riparian ecosystems.

FW-DC-WR-19. Focus and Priority Watershed Network
Focus and priority watersheds contribute to the sustainability of aquatic and riparian systems and species and provide resilient, productive habitat and high water quality.

FW-OBJ-WR-05. Key Watershed Restoration Prioritization
Management in key watersheds focuses on restoration or preservation of watershed, aquatic, and riparian function and recovery of threatened and endangered species. Improve watershed condition class in key watersheds that are a priority for restoration within 15 years of forest plan implementation. Key watersheds that are a priority for restoration include:

> East Branch LeClerc Creek, West Branch LeClerc Creek, Deadman Creek, Barnaby Creek, Harvey Creek, North Fork Deadman Creek, North Fork Sullivan Creek, Sullivan Creek, Ruby Creek, Tonata Creek, Upper Sherman Creek, and South Fork Sherman Creek subwatersheds.

Additional key watersheds that are a priority for restoration will be identified, as appropriate, through the life of the plan through the WCF process.

FW-STD-WR-01. Properly Functioning Watersheds
When aquatic and riparian desired conditions are being achieved and watersheds are "functioning properly", projects shall maintain those conditions. When aquatic and riparian desired conditions are not yet achieved or watersheds have impaired function or are "functioning-at-risk" 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 be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

MA-STD-RMA-01. Aquatic and Riparian Conditions
Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When RMAs are properly functioning and aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. When RMAs have impaired function or are functioning-at-risk or if aquatic and riparian desired conditions are not yet being achieved and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions. Short-term adverse effects from project activities may be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of RMA desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

MA-STD-RMA-03. Personal Fuelwood Cutting
Personal fuelwood cutting shall not be authorized within riparian management areas or source areas for large woody debris.

MA-STD-RMA-04. Timber Harvest and Thinning
Timber harvest and other silvicultural practices can occur in riparian management areas only as necessary to attain desired conditions for aquatic and riparian resources. Vegetation in riparian management areas will not be subject to scheduled timber harvest.

MA-STD-RMA-12. Wildland Fire and Fuels Management - Minimum Impact Suppression Tactics
Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas.

MA-GDL-RMA-16. Wildland Fire and Fuels Management – Temporary Fire Facilities
Temporary fire facilities (e.g., incident bases, camps, staging areas, helispots, and other centers) for incident activities should be located outside riparian management areas. When no practical alternative exists, all appropriate measures to maintain, restore, or enhance aquatic and riparian-dependent resources should be used.

MA-GDL-RMA-17. Water Drafting Sites
Water drafting sites should be located and managed to minimize adverse effects on stream channel stability and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.

These vegetation management and riparian-specific DCs, GDs, and STDs will result in maintenance and restoration of habitat conditions for WYBC. These DCs, GDs, and STDs would limit management activities that are allowed to occur within riparian habitats. However, exposure to management activities within the MAs listed above could occur and have the following effects:

- Because of the ARCS, including management direction for RMAs and Key Watersheds, it is unlikely that most future timber management or restoration actions would have an adverse effect on riparian habitats.
- Fire management or control activities could result in loss of habitat, whether purposeful or accidental.

As stated previously in the Status of the Species, pesticide spraying (including use of the bacteria *Bacillus thuringiensis*) in the breeding range can reduce invertebrate abundance, possibly causing lower food availability for WYBC during the nesting period and perhaps resulting in lower productivity and smaller populations over time (USFWS 2013). This relationship is poorly understood; however, the CNF Plan emphasizes the reduction or elimination of the use of pesticides on riparian areas.

The CNF Plan will address herbicide/pesticide use through the following DCs, GDs, STDs and Monitoring expectations:

FW-GDL-WR-05. Chemical Fire Suppression
Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by riparian and aquatic-dependent threatened, endangered, proposed, candidate, or sensitive species, or their habitats.

FW-STD-IPM-02. Pesticide Use and Risk Assessment
Pesticides (including herbicides) may be considered, as appropriate, within all management areas, to respond to native and invasive pests as part of an integrated pest management plan. Minimize use of formulations or tank mixes involving plausible harm to human health, soil organisms, water quality, non-target plants, non-target animals (including invertebrates), amphibians or fish. Use best available science in pesticide risk assessments to inform decisions about pesticide use.

FW-GDL-IPM-01. Minimize Reliance on Pesticides
Pest management should be planned and conducted to minimize reliance on pesticides by using a combination of effective treatment options and treating pest outbreaks in a timely manner.

MA-STD-RMA-02. Chemical Application
Apply herbicides, insecticides, piscicides and other toxicants, other chemicals, and biological agents only to maintain, protect, or enhance aquatic and riparian resources and/or native plant communities.

Adverse effects to WYBC may occur from future actions that require herbicide treatment of riparian/aquatic pests or invasive plants. However, there may be beneficial effects from the long term maintenance of native plant assemblages.

- Application of chemicals such as herbicide and pesticide can reduce invertebrate abundance, possibly causing lower food availability for WYBC during the nesting period and perhaps resulting in lower productivity and smaller populations over time (USFWS 2013).

- While the CNF will implement an Integrated Pest Management Program, the CNF Plan however does emphasize the reduction or elimination of the use of chemicals in riparian and aquatic habitats. The use of herbicide, pesticide, and other toxicants will only be used if there is an overall benefit to aquatic and riparian habitats.

Response to Climate Change

Riparian habitats are considered vulnerable to the anticipated effects of climate change (Lawler et al. 2014). The primary effect that is anticipated from climate change is the loss of habitat and reduced connectivity of riparian habitats due to altered hydrologic and disturbance (fire) regimes (Lawler et al. 2014). Climate change is expected to have an overall negative effect throughout the range of the Yellow-billed Cuckoo (Post et al. 2009, USFWS 2013). Loss of habitat could result from a change in flow regimes. The dynamic-landscape restoration approach that is emphasized in the Plan would result in landscapes, including disturbance regimes, that are more resilient to climate change through the application of strategically located restoration treatments in priority locations. In addition, emphasis of the Plan in reducing the negative effects of roads on riparian habitats would help to make them more resilient to disturbances.

The CNF Plan will address climate change through the following DCs, GDs, STDs and Monitoring expectations:

> *FW-DC-WR-14. Resiliency to Climate Change*
> Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin is scale is used for Forest planning and 5th field watershed scale is used for project planning.
>
> *FW-DC-WL-03. Habitat Conditions for all Surrogate Species*
> Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.
>
> *FW-GDL-WL-04. Federally Listed Species*
> Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.
>
> *MON-VEG-01*
> To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

As described above, there is management direction in the CNF Plan to implement these climate change adaptations through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats. Given that loss and degradation of riparian habitats are the primary factor in the decline of WYBC, management actions that restore and increase resiliency of riparian habitats could have potential positive effects on the conservation of WYBC. Currently there are no known WYBC on the CNF; however, by restoring and protecting riparian habitats, use of these habitats by WYBC could be more likely. Washington may become a refugia for species in the Southwest, if climate change results in significant loss of riparian areas there.

Forest activities that could influence the quality and availability of habitat for riparian dependent species such as the yellow-billed cuckoo include management of roads, recreation sites, and vegetation treatments that occur within riparian habitats.

- Altered hydrology and channelization of riverine systems associated with the building and maintenance associated with roads and recreation sites could further impact the habitat by making systems less dynamic and may result in future adverse effects.

- The DCs, GDs, and STDs implemented by the CNF Plan would limit management activities that are allowed to occur within riparian habitats and potentially contribute to the conservation of habitat for WYBCs.

National Forest Access System Effects, including roads, OHV trails, Dispersed Recreation

The loss of habitat is the greatest factor leading to the decline of WYBC (USFWS 2013). Riparian habitats not permanently lost through human development have experienced long-term impacts in other ways than development and urbanization. Altered hydrology of riverine systems from channelization by disturbance from activities associated with road use and recreation, construction, and maintenance create impact the habitat by making systems less dynamic. This use can prevent the regeneration of preferred vegetation and create habitat lacking complex structure processes (USFWS 2013). These activities potentially reduce the effectiveness and connectivity of riparian habitat and can disturb sensitive soils, causing increased sediment delivery to streams. The CNF Plan ARCS has been developed to maintain and restore healthy watersheds, riparian areas and stream channels that are resilient to natural disturbance. The ARCS, with a more comprehensive set of desired conditions, standards and guidelines and objectives than included in INFISH, is expected to be more effective at restoring ecologically healthy watersheds, riparian and aquatic habitats.

> *FW-DC-WR-05. Water Quality*
> National Forest System lands contribute to water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality is within the range that maintains the biological, physical, and chemical integrity and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities, and meets appropriate Washington State water quality standards. Subbasin scale is used for forest planning and 5th field watershed or subwatershed scale is used for project planning.
>
> *MA-DC-RMA-04. Roads*
> Roads located in or draining to riparian management areas do not present a substantial risk to soil or hydrologic function. Roads do not disrupt riparian and aquatic function.
>
> *FW-STD-WR-05 Construction of New Roads, Trails and Developed Recreation Sites*
> New roads and trails will be designed to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over land drainage features. New roads, trails and developed recreation sites will integrate features, such as, but not limited to, rocked stream

crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

FW-GDL-WR-04. Hydrologic Function of Roads, Trails, and Developed Recreation Sites
Roads and trails should be maintained to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over-land drainage features. Roads and trails should integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.

MA-STD-RMA-06. Road and Trail Construction and Maintenance
No sidecasting or placement of fill in riparian management areas, except where needed to construct or replace stream crossings. Snowplowing activities shall not allow runoff from roads and trails in locations where it could deliver sediment to streams.

MA-GDL-RMA-03. Landings, Skid Trails, Decking, and Temporary Roads
Landings, designated skid trails, staging or decking should not occur in riparian management areas, unless there are no other reasonable alternatives, in which case they should:

- Be of minimum size
- Be located outside the active floodplain
- Minimize effects to large wood, bank integrity, temperature, and sediment levels
- Not result in unnatural modification of flow paths
- Impacted site(s) to be reclaimed as soon as practicable.

Existing infrastructure may be reused with intent of removal and restoration of riparian function as soon as practicable.

Road construction and maintenance activities can cause adverse effects to WYBC; however, the CNF Plan desired conditions, standards and guidelines will greatly reduce the potential for long-term adverse effects.

Lands and Special Uses, including Livestock Grazing and Mining

WYBC are dependent on riparian areas for nesting, foraging and migration. Management direction for watersheds and riparian habitats is consolidated into one consistent set of plan components that applies to the entire Colville National Forest. The following Standards and Guidelines would limit management activities that are allowed to occur within riparian habitats:

MA-STD-RMA-16. Lands and Special Uses Authorizations
Authorizations for all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation,

or improvement of those conditions and processes. These authorizations include, but are not limited to, water diversion or transmission facilities (e.g., pipelines, ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals.

MA-STD-RMA-17. Hydroelectric - New Support Facilities
Locate new support facilities outside of riparian management areas. Support facilities include any facilities or improvements (workshops, housing, switchyards, staging areas, transmission lines, etc.) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation, or enhancement measures.

MA-GDL-RMA-21. Hydroelectric – Existing Support Facilities
Existing support facilities that are located within riparian management areas should be operated, maintained, or removed to restore or enhance aquatic and riparian-dependent resources.

MA-STD-RMA-18. Mineral Operations in RMAs
For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian-dependent resources affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service has limited discretionary authorities. In those cases, project effects shall be minimized and shall not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities.

MA-STD-RMA-19. Operating Plans for Existing Activities
Work with operators to adjust their mineral operations to minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects.

MA-STD-RMA-22. Leasable Exploration and Development
Consent decisions to allow mineral leasing will provide Bureau of Land Management (BLM) stipulations for lease management. Once leased, the Forest will actively coordinate and consult with BLM regarding lease exploration and development activities. In consultation with the BLM, the Forest will recommend BMPs and mitigation as Conditions of Approval to support attainment and maintenance of aquatic and riparian desired conditions.

MA-STD-RMA-23. Saleable Minerals
Prohibit saleable mineral activities such as sand and gravel mining and extraction within RMAs unless no alternatives exist and if the action(s) will not retard or prevent attainment of aquatic and riparian desired conditions.

MA-STD-RMA-24. Inspection and monitoring of mineral plans, leases, and permits
Conduct inspections, monitor, and annually review required monitoring for mineral plans, leases, and permits. Evaluate inspection and monitoring results and require mitigations for mineral plans, leases, and permits as needed to eliminate impacts that retard or prevent attainment of aquatic and riparian desired conditions.

FW-STD-WR-07. Hydroelectric and Other Water Development Authorizations in Key Watersheds
Hydroelectric and other water development authorizations shall include requirements for in-stream 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

FW-DC-LG-02. Economic and Social Contributions
Rangelands and forestlands provide forage for use by both livestock and wildlife. Grazing continues to be a viable use of vegetation on the Forest. Availability of lands identified as suited for this use contributes to providing animal products, economic diversity, open space, and promotes cultural values and a traditional local life style. Allotments are generally grazed on an annual basis.

Consistent with sustaining other resource desired conditions, a viable level of forage is available for use under a grazing permit system where use generally occurs on an annual basis generally between June and October. Riparian and upland areas within allotments reflect ecological conditions supporting the desired conditions, including those described in the Wildlife, Aquatic and Riparian, Soil, and Vegetation Desired Conditions.

FW-GDL-LG-01. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments
If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey.

FW-DC-MIN-02. Reclamation and Extraction
Approved mining operations include concurrent, interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats; and scenic integrity objectives.

Lands and Special Uses activities can cause adverse effects to WYBC; however, the CNF Plan desired DCs, GDs, and STDs will greatly reduce the potential for long-term adverse effects.

Al-Chokhachy et al. (2010) found the presence of cattle in watersheds sampled across the interior Columbia Basin and the Missouri River Basin often resulted in degraded physical aquatic habitat conditions, especially where grazing occurred in watersheds with high road densities.

MA-DC-RMA-03. Livestock Grazing
Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment.

FW-OBJ-WR-07. Key Watershed Range Infrastructure Improvements
Improve hydrologic and aquatic function through range infrastructure improvements, including riparian fencing, movement and improvement of watering troughs, and other acceptable treatments over 240 acres within 15 years of plan implementation.

MA-STD-RMA-09. Management of Livestock Grazing to Attain Desired Conditions
Manage livestock grazing to move toward aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing management. If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures.

MA-STD-RMA-10. Recreational and Permitted Grazing Management-Livestock Handling, Management, and Water Facilities
New and replaced livestock handling and/or management facilities and livestock trailing, salting, and bedding are prohibited in riparian management areas unless they do not prevent or retard attainment of aquatic and riparian desired conditions, inherently must be located in an RMA, or are needed for resource protection.

MA-STD-RMA-11. Permitted Grazing Management -- Allotment Management Planning
During allotment management planning, negative impacts to water quality and aquatic and riparian function from existing livestock handling or management facilities located within riparian management areas shall be minimized to allow conditions to move toward the desired condition.

MA-GDL-RMA-11 - Annual Grazing Use Indicators establishes livestock use indicators for stubble height, utilization of deep-rooted herbaceous vegetation, streambank alteration, and utilization of woody browse as starting points for managing grazing depending upon the ecological condition of riparian and aquatic habitat. These are described in detail in the Riparian Management Areas section of the proposed action on p.24.

MA-GDL-RMA-12. Recreational and Permitted Grazing Management – Livestock Handling Activities Livestock trailing, bedding, loading, and other handling activities should be avoided in riparian management areas, except for those that inherently must occur in a riparian management area.

The potential effects of livestock grazing on WYBC include soil compaction; alteration or removal of riparian vegetation that provides cover, a food source and stabilizes stream banks; altered channel morphology including channel widening and increased bank instability. There are a total of 58 grazing allotments on the forest, where 42 currently have permitted use and 16 are in a vacant status. Future adverse effects from grazing may still occur, however the CNF Plan includes Standards and Guideline specifically developed to prevent or minimize the potential adverse effects grazing can have on riparian habitat.

As stated above, loss of habitat is the primary threat to WYBC (USFWS 2013). The potential adverse effects of grazing to riparian habitats include:

- Soil erosion and sediment delivery to streams; soil compaction; alteration or removal of riparian vegetation that provides shade, cover, food source and stabilizes stream banks.
- Livestock grazing can degrade riparian habitat affecting altered channel morphology including channel widening, increased bank instability and loss of undercut banks.

Monitoring

In addition to the CNF Plan components described above, there are aquatic and terrestrial habitat monitoring questions to be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

> *MON-WTS-01:* Are management actions contributing to improved watershed condition class within focus, key, and priority watersheds, and other watersheds identified for restoration?
>
> *MON-WTS-02:* Are management actions reducing road impacts to watershed and aquatic habitat function and water quality within all watersheds across the Forest? Within Key, Focus, and Priority Watersheds?
>
> *MON-WTS-03:* Are management actions improving key riparian processes within Riparian Management Areas?
>
> MON-WTS-04: Are water resources and RMA standards, guidelines, and best management practices (BMPs) being implemented at project sites? Are standards, guidelines, and BMPs effective at achieving desired conditions?
>
> *MON-AQH-01:* Are management activities across the Forest contributing to the viability of riparian and wetland-dependent TES and surrogate species?
>
> *MON-AQH-02:* Are management actions improving conditions within Riparian Management Areas where livestock grazing is permitted?
>
> *MON-AQH-03:* Are management actions preventing the spread of aquatic invasive species?

MON-WL-01: Have management activities met plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions

MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects to Western Yellow-billed Cuckoo:

The CNF Plan ensures continued commitments to managing riparian and aquatic habitat that may benefit the WYBC. Implementation of the CNF Plan and MAs Standards and Guidelines should reduce potential population-level adverse effects and will conserve, restore, and increase resiliency of riparian habitats that the WYBC rely on for nesting and foraging. Management direction for watersheds and riparian habitats will minimize effects to the WYBC in the following ways:

- Implementation of the CNF Plan and MAs will conserve riparian habitats that the WYBC rely on for nesting and foraging.
- The Plan includes greater riparian management area widths along intermittent streams, lakes, and ponds than in the areas previously covered by the INFISH forest plan amendment (BA p. 231).
- According to the BA, the implementation of the Plan would reduce the effects of roads on riparian habitat within 10 watersheds in the short-term (<20 years based on Objectives). In the longer-term (<50 years) the Plan would result in road densities of equal to or less than 1 miles/square mile on 23 percent of the Forest, and equal to or less than 2 miles/square mile on 48 percent of the Forest.
- Because of the ARCS, including management direction for RMAs and Key Watersheds, it is unlikely that most future timber management or restoration actions would have an adverse effect on riparian habitats.
- While the CNF will implement an Integrated Pest Management Program, the CNF Plan however does emphasize the reduction or elimination of the use of chemicals in riparian and aquatic habitats. The use of herbicide, pesticide, and other toxicants will only be used if there is an overall benefit to aquatic and riparian habitats.
- The Standards and Guidelines implemented by the CNF Plan would limit management activities that are allowed to occur within riparian habitats and potentially contribute to the conservation of habitat for WYBCs.
- There are a total of 58 grazing allotments on the forest, where 42 currently have permitted use and 16 are in a vacant status. Future adverse effects from grazing may still occur; however, the CNF Plan includes Standards and Guidelines specifically developed to prevent or minimize the potential adverse effects grazing can have on riparian habitat.
- Appendix B provides a list of recommended conservation strategies (Wiles and Kalasz 2017; Knutson and Naef 1997; Honeycutt 2017) for western yellow-billed cuckoo and how the CNF Plan addresses the applicable conservation and recovery expectations.

There may be adverse effects from future actions, such as forest management of fire, vegetation treatments, construction and building of roads, grazing, other activities that impact riparian habitat. These activities may have adverse effects that include, but aren't limited to the following activities:

- WYBC would be expected to only use riparian areas that are sufficient in size and desired plant assemblages for nesting and foraging. They may use less desirable habitat for migration. Increasing the amount of large wetland complexes on the CNF or quality of smaller riparian patches may induce the bird to use the CNF. Any changes to these riparian areas, especially large areas, may result in future adverse effects if WYBC were found to be present on the CNF.
- Fire management or control activities could result in loss of habitat, whether purposeful or accidental.
- Application of chemicals such as herbicide and pesticide can reduce invertebrate abundance, possibly causing lower food availability for WYBC during the nesting period and perhaps resulting in lower productivity and smaller populations over time (USFWS 2013).
- Altered hydrology and channelization of riverine systems associated with the building and maintenance associated with roads and recreation sites could further impact the habitat by making systems less dynamic and may result in future adverse effects.
- Road construction and maintenance activities can cause adverse effects to WYBC; however, the CNF Plan desired conditions, standards and guidelines will greatly reduce the potential for long-term adverse effects.
- Land management activities can cause adverse effects to WYBC; however the CNF Plan desired conditions, standards and guidelines will greatly reduce the potential for long-term adverse effects.
- The potential effects of livestock grazing on WYBC include soil compaction; alteration or removal of riparian vegetation that provides cover, a food source and stabilizes stream banks; altered channel morphology including channel widening and increased bank instability.

Step-down consultations would be required in the future for any actions that result in effects to the WYBC. Effect determinations for future actions may also depend on the population distribution of WYBC at the time, and whether exposure of individuals is likely.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Recreation is likely to increase on all land ownerships due to increasing demands from the public, many of those activities are focused on or near riparian areas and can result in disturbance of WYBC, loss and/or degradation of riparian habitat, and other effects.

There are several entities in and near the action area that are working on improvement of aquatic habitat and water, that will benefit WYBC. Some of the major activities that are ongoing or have been recently completed are:

- Tributary Habitat Restoration, Enhancement, and Passage
- Road abandonment and bank stabilization (Kalispel Natural Resources Department)
- Riparian fencing and planting (WDFW)
- Tributary passage and screening (Kalispel Natural Resources Department, City of Ione)
- Temperature TMDL implementation for the Pend Oreille River (WDOE and stakeholders)

INTEGRATION AND SYNTHESIS OF EFFECTS

The WYBC was designated as a distinct population segment by the USFWS in 2013 and was classified as a threatened species under the federal Endangered Species Act in 2014. The population, which is migratory and overwinters in South America, formerly nested across much of the western United States, southern British Columbia, and northwestern Mexico. In the western U.S., nesting is strongly associated with large, wide patches (usually exceeding 40 ha in size) of low to mid-elevation riparian habitat dominated by cottonwoods, willows, and a mix of other species. Washington birds also nested in brushy habitats and fir forests.

The population size and breeding range of WYBC have greatly declined during the past century, with only 680 to 1,025 breeding pairs estimated to remain. Since the 1950s, there have been just 20 documented sightings of WYBCs in Washington. Sixteen of the 20 records occurred in eastern Washington. All or nearly all of the birds recorded since the 1950s were very likely non-breeding vagrants or migrants, indicating that cuckoos are now functionally extirpated in the state. There has not been a documented sighting of a WYBC on the CNF.

The greatest threat to WYBC, including those that breed, or may breed in Washington, has been the loss or degradation of riparian habitats caused by dam construction, flood control practices, commercial and residential development, changes in farming and ranching practices, and nonnative plant invasions. Agricultural pesticide use, which may affect prey abundance as well as the birds' health, is a potential additional threat. Over the 15-year duration of the CNF Plan, it is possible that conservation efforts will increase the population, making use of the CNF more likely.

The CNF plan has management areas that will ensure management of the required riparian areas supporting habitat for the yellow-billed cuckoo, and minimizes effects from timber harvest, road maintenance and creation, and recreation. The CNF Plan includes desired conditions, objectives, guidelines, standards, and monitoring expectations that will ensure that yellow-billed cuckoo is managed as expected in the WDFW Draft Status Report (WDFW 2017). Appendix B compares the expectations of the WDFW Draft Status Report and conservation recommendations, to the commitments of the Forest in the CNF Plan. The Forest is doing what is expected in the most current conservation strategies to manage for riparian habitat used by yellow-billed cuckoo.

Based on these commitments, the USFWS determines that implementation of the CNF Plan will not result in any significant decreases in the number, distribution, or reproduction of WYBC as a result of implementation of the CNF Plan. While there may be future effects to the species from management actions, the standards and guidelines in the CNF Plan should prevent any long-term population level adverse effects and conserve potential nesting habitat.

CONCLUSION

After reviewing the current status of the western yellow-billed cuckoo, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the USFWS's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the western yellow-billed cuckoo.

CONFERENCE OPINION

The Description of the Proposed Action, Conservation Measures, Action Area, General Environmental Baseline, and Analytical Framework from the preceding biological opinion are incorporated into this conference opinion by reference. Note that the southern mountain caribou DPS is a proposed species. However the discussion of this conference species was addressed previously along with the currently listed Southern Selkirk subpopulation.

WOLVERINE CHAPTER
STATUS OF SPECIES, WOLVERINE

Taxonomy and Species Description

Wolverines (*Gulo gulo*) are the largest terrestrial member of the mustelid family. Adult males typically weigh 12-18 kilograms (26-40 pounds) and adult females weigh 8-12 kilograms (17-26 pounds)(Banci 1994). Wolverines are distinguished from other members of the mustelid family by their relatively large size. Their pelage is dark brown with a pale stripe along its side, from head to tail, and a light-colored facemask. They are highly adapted to deep snow and cold conditions with their wide body, short powerful legs, and relatively large feet.

The wolverine has a Holarctic (habitats found in the northern continents) distribution, including northern portions of Europe, Asia, and North America. The currently accepted taxonomy classifies wolverines worldwide as a single species, *Gulo gulo*, with two subspecies. Old World wolverines are found in the Nordic countries of Europe, Russia, and Siberia and are part of the subspecies *Gulo gulo gulo*. New World wolverines occur in North America and are known as *Gulo gulo luscus*, the North American wolverine (Kurten and Rausch 1959, Pasitschniak-Arts and Lariviere 1995).

The historical distribution of wolverine in the contiguous United States has been difficult to reconstruct. However, Aubry et al. (2007) conducted a recent assessment of historical wolverine records (1801-1960) to determine factors that influenced wolverine distribution in the contiguous US. They found that the historical range was discontinuous in the Pacific states (Aubry et al. 2007). A similar pattern was found in the Rocky Mountains, with a relatively continuous distribution in Idaho, Montana, and Wyoming, but with substantial gaps in southwestern Wyoming and northwestern Colorado (Aubry et al. 2007). Schwartz et al. (2007) found that the wolverine in California were isolated from other populations in North America for >2000 years. Wolverine populations in Colorado and Utah may also have been isolated to some degree (Aubry et al. 2007). The Great Lakes region probably represented the southern extent of wolverine distribution in eastern North America prior to European settlement (de Vos 1964, Aubry et al. 2007).

The current distribution of wolverine in the contiguous United States has contracted substantially compared to the 1900s (Aubry et al. 2007). Currently, wolverines appear to be distributed as functioning populations in two regions in the contiguous United States: the North Cascades in Washington, and the northern Rocky Mountains in Idaho, Montana, and Wyoming. Wolverines were likely extirpated, or nearly so, from the entire contiguous United States in the first half of the 20th Century (Aubry et al. 2007; USFWS 2011). The available evidence suggests that, in the second half of the 20th Century and continuing into the present time, wolverine populations have expanded in the North Cascades and the northern Rocky Mountains, but that populations have not been reestablished in the Sierra Nevada Range or the southern Rocky Mountains.

Listing Status

The North American wolverine is proposed as a threatened species under the Endangered Species Act of 1973, as amended (81 FR 71670-71671). The proposed listing applies to the distinct population segment of wolverine (*Gulo gulo luscus*) in the contiguous United States. On February 4, 2013, the USFWS published a proposed rule to list the DPS of wolverine occurring in the contiguous United States as threatened (78 FR 7864). The USFWS also published a February 4, 2013, proposed rule to establish a nonessential experimental population (NEP) area for the North American wolverine in the Southern Rocky Mountains of Colorado, northern New Mexico, and southern Wyoming (78 FR 7864). On October 31, 2013, the USFWS reopened the comment period on the proposed listing rule for an additional 30 days (78 FR 65248). On August 13, 2014, the USFWS withdrew the proposed rule to list the DPS of the North American wolverine and the proposed NEP designation (79 FR 47552) based on their conclusion that the factors affecting the DPS as identified in the proposed rule were not as significant as believed at the time of the proposed rule's publication in 2013. In October 2014 three complaints were filed in the District Court challenging the withdrawal of the proposal to list the North American wolverine DPS. As a result of a court order, the August 13, 2014, withdrawal was vacated and remanded to the USFWS for further consideration consistent with the order. In effect, the court's action returned the process to the proposed rule stage, and the status of the wolverine under the Act was effectively reverted to that of a proposed species. Therefore, on October 18, 2016 the USFWS notified the public that they reopened the comment period on the February 4, 2013, proposed rule to list the DPS of wolverine occurring in the contiguous United States as threatened (81 FR 71670-71671). The USFWS also announced they were initiating an entirely new status review (81 FR 71670-71671).

Life History

In North America, wolverines occur in a wide variety of alpine, boreal, and arctic habitats, including boreal forests, tundra, and western mountains throughout Alaska and Canada. In the contiguous US, habitats used by wolverines include high-elevation alpine portions of Washington, Idaho, Montana, Wyoming, California, and Colorado (Wilson 1982, Hash 1987, Banci 1994, Pasitschniak-Arts and Lariviere 1995, Aubry et al. 2007, Moriarity et al. 2009, Inman et al. 2009). Wolverines do not appear to specialize on specific vegetation types, but rather select areas that are cold and receive enough winter precipitation to reliably maintain deep persistent snow late into the spring season (Copeland et al. 2010). The requirement of cold, snowy conditions means that in the southern portion of the wolverine's range they are restricted to high elevations while at more northerly latitudes, wolverines are present at lower elevations (Copeland et al. 2010).

Wolverines require large home ranges and the availability of food is likely a primary factor that determines female wolverine movements and home range size (Hornocker and Hash 1981, Banci 1994). Male wolverine movements and home ranges are likely linked to the presence of active female home ranges and breeding opportunities (Copeland 1996). Wolverines travel long distances over rough terrain and deep snow, with adult males generally traveling longer distances than adult females (Hornocker and Hash 1981, Banci 1994, Copeland and Yates 2006, Moriarity et al. 2009, Inman et al. 2009, Inman et al. 2012). Home ranges of wolverines are large and vary greatly in size depending on geographic location, food availability, and the gender and age of the animal. Average home sizes for adult male wolverines in the contiguous US range from 496 km^2 (193 mi^2) to 1522 km^2 (588mi^2), and females from 141 km^2 (55 mi^2) to 384 km^2 (148 mi^2) (Copeland 1996, Copeland and Yates 2006, Inman et al. 2012). The home ranges sizes of wolverines are large relative to their body size compared to other mammals. This may indicate that wolverines need to range considerable distances to consume the amount of calories need to meet their life-history requirements (Inman et al. 2012).

Female wolverines are generally 2-4 years old before they have their first litter, and produce average litter sizes of 1-2 kits (Persson et al. 2006). While wolverines are capable of producing litters every year, pregnant females commonly resorb or abort litters prior to giving birth if they are not in adequate condition to support their kits (Magoun 1985, Copeland 1996, Inman 2012). It is likely that in many places within the wolverine's range, it takes two years of foraging for a female to store enough energy to successfully reproduce (Persson 2005). The actual rates of reproduction in wolverines are among the lowest known for mammals (Persson 2005).

Breeding generally occurs from late spring to early fall (Magoun and Valkenburg 1983). Females undergo delayed implantation until the following winter or spring when active gestation lasts from 30-40 days (Rausch and Pearson 1972). Kits are born from mid-February to late March in a natal den. Natal dens are excavated in snow, generally >1.5 meters (5 feet) deep because this provides security for the kits and buffers cold temperatures (Pulliainen 1968, Copeland 1996, Magoun and Copeland 1998, Copeland et al. 2010, Inman et al. 2012). Natal dens are generally located by female wolverines to reduce exposure to predation and disturbance from humans (Banci 1994). Natal dens in the contiguous US are generally associated with alpine or subalpine cirques with large rocks or downed logs (Copeland 1996, Inman et al. 2012). Natal dens are typically used until late April or early May (Magoun and Copeland 1998, Inman et al. 2012), after which, females may move kits to multiple secondary (maternal) dens during the month of May. After natal and maternal dens, wolverines may use rendezvous sites through early July. These sites are generally associated with natural cavities formed by large boulders, downed logs, and snow (Inman et al. 2012).

Habitat

Wolverine year-round habitat use takes place almost entirely within areas with deep persistent spring snow (Aubry et al. 2007, Copeland et al. 2010). In the western US, these areas are characterized by high elevations alpine areas, and in cirque basins and avalanches chutes that have food sources such as marmots, voles, and carrion (Hornocker and Hash 1981, Copeland 1996, Magoun and Copeland 1998, Copeland et al. 2007, Inman et al. 2012).

Mean seasonal elevations used by wolverines in the northern Rocky Mountains and the North Cascades vary between 1400 and 2600 meters (4,592 and 8528 feet) depending on location, but are always relatively high on mountain slopes (Hornocker and Hash 1981, Copeland et al. 2007, Aubry et al. 2007, Inman et al. 2012). In the contiguous US, valley bottom habitats seem to be only used during dispersal movements and not for foraging or reproduction (Inman et al. 2009). Wolverine dens are generally located in alpine or subalpine habitats and rarely, or never, den in lower elevation forested habitats (Magoun and Copeland 1998).

Populations, Distribution, Trend

Wolverines naturally occur in low densities with reported ranges from one animal per 65 km^2 (25 mi^2) to one animal per 337 km^2 (130 mi^2) (Hornocker and Hash 1981, Hash 1987, Copeland 1996, Copeland and Yates 2006, Squires et al. 2007). No systematic population census exists over the range of wolverines in the contiguous US, so current population level and trends are not known with certainty. Based on current knowledge of habitat and wolverine densities from several study areas, the USFWS estimated 250-300 individual wolverines in the contiguous United States (78 FR 7868). The majority of the wolverine population occurs in the Rocky Mountains and North Cascades (Aubry et al. 2007), and one known individual each in the Sierra Nevada (McKelvey et al. 2008, Moriarty et al. 2009) and southern Rocky Mountains (Inman et al. 2009). Spatial patterns in historical records from Montana indicate that wolverines had been extirpated from the state by the early 1900s (Newby and Wright 1955), but began to recolonize the area from the north in the early 1930s (Newby and McDougal 1964). During the last several decades, wolverines have recolonized the Cascade Range in northern Washington and southern British Columbia, and are continuing to expand their range southward (Aubry et al. 2014, McKelvey et al. 2014).

Until Aubry and others (2014) began their trapping studies in 2005, wolverines had never been studied in the northern Cascades, due partly to their low densities and extremely limited access into the unroaded wilderness areas where they occur during all periods of the year. Their findings indicate that the wolverines in the northern Cascades appear to be part of a larger population that includes portions of British Columbia, and possibly Alberta. Trapping studies from 2011-2014 have captured up to a high of 8 total wolverine in a single season from the North Cascades near the Cascade Crest on the Methow Valley Ranger District of the Okanogan-Wenatchee National Forest (Aubry et al. 2014). Nine winter field seasons have resulted in 13 different wolverines captured in Washington on 33 occasions and yielded valuable information including the location of the first reproductive dens documented in the region. Telemetry information from the studies show an overlap in adult male and female activity areas, likely indicating reproductive pairs in the northern Cascades. Telemetry information has also shown that activity areas for multiple animals were located primarily in Washington, demonstrating there is a resident population of wolverines in the state. Aubry and others also found that most of the telemetry locations in their study fell within areas having snow cover that persisted into late spring, indicating that a bioclimate model is effective for delineating potential wolverine habitat in the northern Cascades.

Threats

Dispersed Recreation

The types of dispersed recreation that occurs in wolverine habitat include snowmobiling, heli-skiing, hiking, biking, off- and on-road motorized use, hunting, fishing, and other uses. In some locations, there is extensive overlap between winter recreational activities and modeled wolverine denning habitat (Heinemeyer and Copeland 1999, Heinemeyer et al. 2001, Heinemeyer 2012). Krebs et al. (2007) conducted a study of wolverine habitat use in an area used extensively for recreation during the winter. They found male wolverine habitat use to be negatively associated with helicopter skiing and female wolverine habitat use to be negatively associated with helicopter and backcountry skiing. More extensive research on the effects of dispersed recreation on denning, foraging, or survival have not been completed (Banci 1994).

Most roads in wolverine habitat are low-traffic volume dirt or gravel roads used for local access or for land management activities. Krebs et al. (2007) found that female wolverine habitat use was negatively associated with roaded areas. May et al. (2006) found that wolverine natal dens were located away from roads and that this had a positive influence on successful reproduction.

Infrastructure Development

Infrastructure includes all residential, industrial, and governmental developments such as building, houses, oil and gas wells, and ski areas. Wolverines are capable of long-distance movements through variable and anthropogenically altered terrain, crossing numerous transportation corridors (Moriarty et al. 2009, Inman et al. 2009). Wolverines are able to successfully disperse between habitats, despite the level of development that is currently taking place in the current range in the western United States (Copeland 1996, Copeland and Yates 2006, Pakila et al. 2007, Schwartz et al. 2009, Inman et al. 2012). Dispersal between populations is needed to avoid further reduction in genetic diversity; however, there is no evidence that human development and associated activities are preventing wolverine movements between suitable habitat patches (78 FR 7879).

Transportation Corridors

Transportation corridors are places where transportation infrastructure (roads, railways, etc.) is concentrated together. Transportation corridors may affect wolverines if located within habitat or between habitat patches. Transportation corridors can result in direct loss of habitat and direct mortality due to collisions with vehicles (Pakila et al. 2007). Major highways have been shown to disrupt wolverine movements and may be avoided or partially avoided (Austin 1998). Wolverines have been documented crossing major highways while making exploratory or dispersal movements (Landa et al. 1998, Pakila et al. 2007, Inman et al. 2009). Development of transportation corridors in linkage areas may inhibit wolverine movements between habitat patches, potentially reducing connectivity among habitat islands. However, the extent to which avoidance of highways may affect wolverine vital rates or life history has not been well studied.

Land 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 (78 FR 7879). Krebs et al. (2007) found that female wolverine habitat use was negatively associated with recently logged areas. However, much of the high elevation habitats typically used by wolverines are not generally suitable for timber production, are in roadless condition, or protected in wilderness areas (78 FR 7879).

Trapping

Trapping has been the primary cause of wolverine mortality (Banci 1994, Krebs et al. 2004, Lofroth and Ott 2007, Squires et al. 2007). Wolverines are especially vulnerable to trapping and predator reduction due to their habit of ranging widely in search of carrion, low densities, and low reproductive rates (Copeland 1996, Krebs et al. 2004, Lofroth and Ott 2007, Squires et al. 2007).

Despite the impacts of trapping on wolverine in the past, trapping is no longer a threat within most of the wolverine range in the contiguous US. Montana is the only state where wolverine trapping is still legal. Before 2004, average wolverine harvest in Montana was 10.5 wolverines/year. Due to the results reported in Squires et al. (2007), the Montana Department of Fish, Wildlife and Park adopted new regulations to reduce impacts to subpopulations of wolverines.

Another potential source of mortality may come from incidental trapping where wolverines are caught in traps targeted for other species. While the number of wolverine mortalities from incidental trapping per year may be low (78 FR 7882), when considered cumulatively with other threat factors, it may contribute to population declines, but there is little supporting information (USFWS 2011).

Disease or Predation

Limited information is currently available on potential effects of disease on wild wolverine populations. Wolverines are sometimes killed by wolves (*Canis lupus*), black bears (*Ursus americanus*), and mountain lion (*Felis concolor*) (Burkholder 1962, Hornocker and Hash 1981, Copeland 1996, Inman et al. 2009). Wolverines are also likely vulnerable to predation while at reproductive dens though so few dens are known in North America that is it uncertain what the impact of this is on their population.

Inadequate Regulatory Mechanisms

Approximately 94 percent of the estimated wolverine habitat (based on Copeland et al. 2010, Inman et al. 2012) currently occupied by wolverine populations in the contiguous US is federally owned and managed, mostly by the U.S. Forest Service (78 FR 7882). Several existing Federal or State regulatory mechanisms protect wolverine from disturbance and from overutilization from harvesting, such as: The Wilderness Act, National Environmental Policy Act, National Forest Management Act, National Park Service Organic Act, and State Laws and Regulations. However, the primary threat with the greatest severity and magnitude of impact to the species is loss of habitat due to continuing climate warming. The existing regulatory mechanisms currently in place at the national level were not designed to address the threat to wolverine habitat from climate change (78 FR 7883).

Climate Change

Wolverine habitat is projected to decrease in area and become more fragmented in the future as a result of climate changes that result in increasing temperatures, earlier spring snowmelt, and loss of deep, persistent, spring snowpack (McKelvey et al. 2011). These climate change impacts are expected to have direct and indirect effects to wolverine populations in the contiguous US, including reducing the number of wolverines that can be supported by available habitat, and reducing the ability of wolverines to travel between habitat patches (McKelvey et al. 2011). This will likely make it more difficult for subpopulations to recolonize areas were wolverines have been extirpated or to supplement the genetics or demographics of adjacent subpopulations (78 FR 7877).

It may appear contradictory that wolverine populations are expanding their distribution southward in the contiguous US and reclaiming portions of their former range at a time when global warming is reducing the amount and connectivity of wolverine habitat (McKelvey et al. 2011). However, recolonization of the western US by wolverines is occurring at much larger spatial scales and more rapidly than habitat losses from global warming (McKelvey et al. 2014). Predictive modeling indicates that relatively large (>1000 km2) islands of spring snow cover may persist in British Columbia, northern Washington, northwestern Montana, the Greater Yellowstone area, and portions of Colorado (McKelvey et al. 2011).

Synergistic Interactions Between Threat Factors

The wolverine in the western contiguous US faces one primary threat that is likely to drive its conservation status in the future: habitat change and loss due to climate change (78 FR 7885). Other factors, though not as severe or geographically extensive as potential effects of climate change, when considered in the context of climate change, become threats due to the cumulative effects they are likely to have on wolverine populations (78 FR 7885). While wolverines may not be sensitive to habitat changes from fire, black carbon depositions on snow could accelerate melting.

Recovery Needs/Conservation Strategies

To date there is no recovery plan, designated critical habitat, or federal conservation strategy for the wolverine in the western contiguous US. The state of Washington included the wolverine in its 2015 State Wildlife Action Plan (WDFW 2015), and according to the report, there are three stressors that need action in order to conserve wolverine in the state (numbers do not reflect priority) (Table 13).

The USFWS Candidate Species Assessment listed several threats to the wolverine: habitat and range loss due to climate change, high intensity human use and disturbance, habitat loss or displacement from infrastructure development or transportation corridors, and barriers to connectivity from transportation corridors or human disturbance. Appendix B lists the key conservation concerns, and compares them to the contributions of the CNF Plan.

Table 13. Actions to conserve Wolverine (WDFW 2015).

	Stressor	Description	Action Needed	Level of Investment
1	Resource information collection needs	Information on abundance, distribution, movements, and reproduction is lacking for the central and southern Cascades, and northeastern Washington.	Initiate or extend current monitoring activities into the central Cascades (especially north and south of the I-90 corridor) and the southern Cascades. Surveys in northeastern Washington would also be valuable.	Current insufficient
2	Habitat loss or fragmentation	Barriers or impediments to movement across Interstate 90 in the central Washington Cascades may impede demographic support from north to south and may have prevented the establishment of a breeding population in the south Cascades.	Continue surveys specifically to detect wolverine passage, and continue development of passage structures and habitat corridors to facilitate successful crossings.	Current insufficient
3	Climate change and severe weather	Loss of denning habitat and foraging habitat due to climate change.	Improve or maintain access to unoccupied denning and foraging habitat in the south Cascades (as identified in item 2 above).	Current insufficient

ENVIRONMENTAL BASELINE

A general environmental baseline description, applicable to all listed, proposed, or candidate species was previously described and is incorporated here by reference. The following discussion provides a more specific environmental baseline for the wolverine.
Wolverines have been documented to occur in northeastern Washington, both historically and more recently (Aubry et al. 2014). Besides the individuals trapped from the Okanogan-Wenatchee National Forest, a few documented sightings of wolverines exist from the Newport-Sullivan Lake Ranger Districts, mainly from high elevation areas like the Salmo-Priest Wilderness. In addition, potential habitat has been identified in northeastern Washington and in adjacent Canadian provinces (Aubry et al. 2007, LoFroth and Krebs 2007, Gaines et al. 2017)(Figure 17). As discussed above, Aubry et al. 2014 have now demonstrated there is a resident population of wolverine in WA.

Gaines and others (2017) completed a viability assessment for a wide-range of focal species in northeastern Washington, including wolverine, to establish baseline conditions and inform forest plan revision. Their viability assessment considered the current condition of vegetation, potential denning habitat, and the impacts of roads and winter recreation routes on their habitat. They evaluated habitat conditions within nineteen 5^{th-}field watersheds and determined that all of the watersheds had a moderate habitat quality rating for wolverine. They found that the current viability outcome scores were considerably lower than those estimated for historical conditions (pre-settlement), largely due to the prevalence of roads. They made the following recommendations that were incorporated into the plan components of the revised Colville Forest Plan:

- Reduce road densities to increase the amount of source habitats for wolverine (Raphael et al. 2001, Wisdom et al. 2000) in the planning area.
- Limit recreational activities in potential and known denning habitat during the periods when dens are occupied (Banci 1994, Raphael et al. 2001).

In 2013 and 2014, the CNF contracted with Tim Layser, Wildlife Biologist with the Selkirk Conservation Alliance, to conduct winter aerial surveys on the east zone of the Forest. He located no wolverines or sign (tracks, dens) on high ridge systems in Pend Oreille County during that survey (M. Borysewicz, USFS, in litt., 2017).

Border Patrol activities on the Forest have the potential to cause wolverine disturbance through use of roads or trails that are normally closed to motorized use. The exact extent or amount of the impact over the life of the plan is difficult to predict because many factors could influence Border Patrol activities.

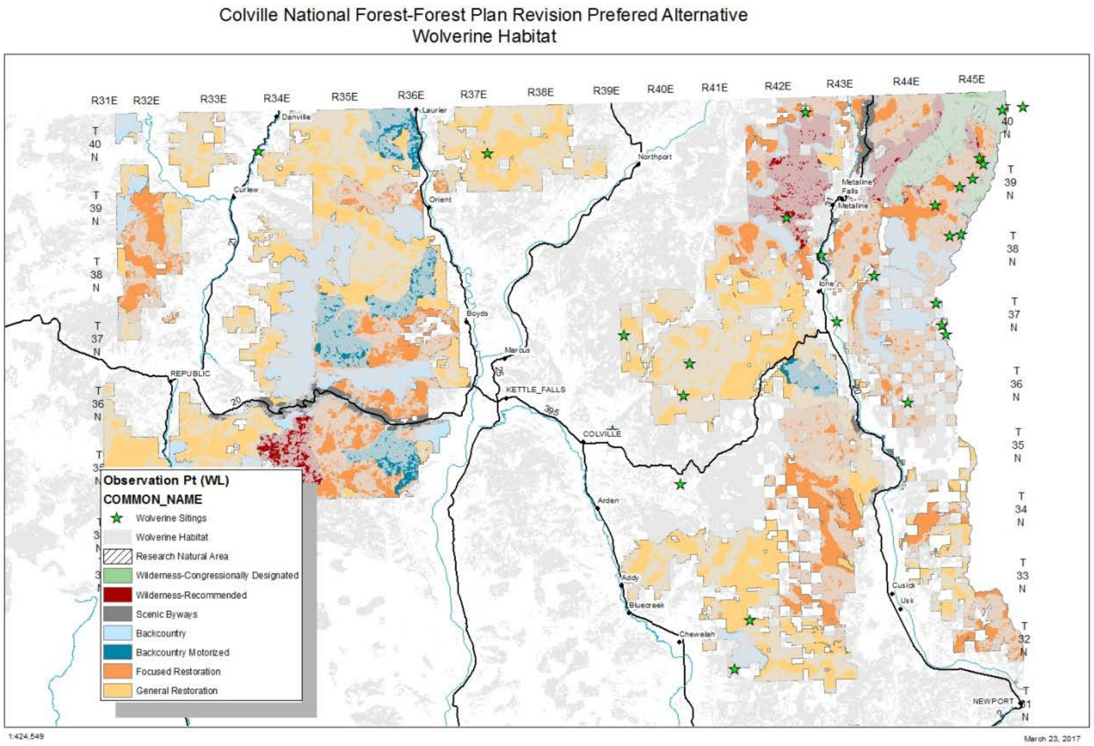


Figure 17. Potential Wolverine Habitat and Wolverine Observation Points. (Dates for the sightings were not available).

Conservation Role of the Action Area

The wolverine is a habitat generalist in regards to foraging and movement, but it requires a late spring snowpack for denning. Therefore, high elevation cold habitats are key for its conservation, along with limited human disturbance. The CNF supports high elevation cold habitats, and has a history of wolverine sightings, therefore they should manage those areas to support wolverine use.

EFFECTS OF THE ACTION ON WOLVERINE

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

As stated earlier in the Opinion, the CNF Plan is a Federal action that provides a framework for the development of future CNF actions that will be authorized, funded, or carried out at a later time within the next 15 years. The overall goal of this section 7 consultation and conferencing process is to evaluate the CNF Plan for its consistency with the conservation of listed (and proposed and candidate) species.

Since wolverine is a proposed species, we are conferencing on the species as if it was listed, as requested by the CNF. For more detail on the expectations if the wolverine is listed, see the Reinitiation Notice at the end of the Opinion.

Appendix B provides a matrix comparing conservation needs of the wolverine, and how the CNF Plan is anticipated to address those needs. Below, we discuss the general effects of the CNF Plan on the wolverine.

Effects of the MAs

The wolverine requires space for its large home range, and high elevation habitats with late spring snow packs. Most wolverine sightings on the Forest are east of the Pend Oreille River, generally on and near the hydrologic boundary between the Pend Oreille River and Priest Lake Watersheds. However, wolverine may use habitats throughout the Forest, and outside of the Pend Oreille River. While the wolverine is a habitat generalist for foraging, it is a specialist in high elevation cold habitats.

The MAs that provide habitats with limited human use include: Congressionally Designated Wilderness, Recommended Wilderness, Backcountry, and Research Natural Areas. In the Pend Oreille River subbasin those four MAs make up 26% of the Forest, and in the CNF as a whole they make up 21% of the Forest (Table 1). Wolverine may also use other MAs in the forest for dispersal or foraging, but the more isolated and/or higher elevation habitats are most important.

Management within grizzly bear management units and caribou recovery zones also provides wolverine habitat east of the Pend Oreille River. Lynx management also contributes to wolverine habitat throughout higher elevations of forest within Lynx Analysis Units (LAUs), in particular within the Kettle Range core area.

Wolverines are expected to be most sensitive to human use in high elevation areas with late spring snow. Changes to winter recreation or other activities in likely or known wolverine denning habitat during their season of use may result in future adverse effects.

Vegetation Management Effects, including restoration, climate change, fire, and insects and disease

Few effects to wolverines from land management actions such as timber harvest and prescribed fire have been documented (78 FR 7879). Wolverines in British Columbia used recently logged areas in the summer and moose winter ranges for foraging (Krebs et al. 2007, pp. 2189– 2190). Males did not appear to be influenced strongly by the presence of roadless areas (Krebs et al. 2007, pp. 2189–2190). In Idaho, wolverines used recently burned areas despite the loss of canopy cover (Copeland 1996, p. 124). 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. While insects, disease, and large fires may increase in the future, the resultant effects on vegetation are not expected to adversely affect the wolverine.

There are no specific minimization measures for wolverine related to vegetation management, restoration, insects, and disease. Other than the need for high elevation and late spring snow, they are not tied to a particular forest type. The high elevation rugged habitat with late spring snow is often unsuited for management actions such as timber harvest. The following desired conditions should maintain wolverine habitat:

> *FW-DC-VEG-01. Plant Species Composition*
> Native species and native plant communities are the desired dominant vegetation.... The full range of potential natural vegetation is maintained on the Forest where it supports plant and animal diversity….
> *FW-DC-VEG-03. Forest Structure*
> Forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to aesthetic settings, particularly along scenic byways and highways.
>
> Forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. Table 14 [in CNF Plan] contains desired conditions for each vegetation type.
>
> *FW-DC-VEG-05. Biological Legacies*
> Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem.
>
> *FW-DC-WL-03. Habitat Conditions for all Surrogate Species*
> Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.
> *FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species*
> Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.

Wolverine would be expected to be most sensitive to human use in high elevation areas with late spring snow. Changes to winter recreation or other management activities in likely or known wolverine denning habitat during their season of use may result in future adverse effects, including disturbance or displacement.

Wolverines depend on deep snow that persists into late spring both for successful reproduction and for year-round habitat, and deep snow must be maintained through the denning period for wolverines to successfully live and reproduce (78 FR 7874-7875). Reduction of this habitat feature would reduce wolverine habitat, particularly if habitat reduction involved increasing fragmentation. Climate change affects wolverines through three primary mechanisms (78 FR 7875): (1) Reduced snowpack and earlier spring runoff, which would reduce suitable habitat for wolverine denning; (2) increase in summer temperatures beyond the physiological tolerance of wolverines; and (3) ecosystem changes due to increased temperatures, which would move lower elevation ecosystems to higher elevations, thereby eliminating high-elevation ecosystems on which wolverines depend and increasing competitive interactions with species that currently inhabit lower elevations. These mechanisms could tend to push the narrow elevation band that wolverines use into higher elevation. Due to the conical structure of mountains, this upward shift would result in reduced overall suitable habitat for wolverines.

Wolverine habitat is projected to decrease in area and become more fragmented in the future as a result of climate change that results in increasing temperatures, earlier spring snowmelt, and loss of deep, persistent, spring snowpack (McKelvey et al. 2011). These climate change impacts are expected to have direct and indirect effects to wolverine populations in the contiguous US, including reducing the number of wolverines that can be supported by available habitat, and reducing the ability of wolverines to travel between habitat patches (McKelvey et al. 2011). This will likely make it more difficult for subpopulations to recolonize areas were wolverines have been extirpated or to supplement the genetics or demographics of adjacent subpopulations. As high elevation late spring snow areas decrease, the wolverine may become more vulnerable to disturbance or displacement from human activities.

The WDFW analyzed the effects of climate change on wolverine in Washington, and determined they were moderately to highly vulnerable (WDFW 2015, Appx C pC-32). They determined wolverine would be exposed to increased temperatures and reduced snowpack. The WDFW (2015, Appx C p. C-32) noted the following: “Wolverines exhibit sensitivity to temperature and declines in snowpack. Wolverines are obligatorily associated with persistent spring snow cover, which provides critical thermal advantages such as predator refugia for denning females and young, preventing competition with other scavengers, and important prey caching/refrigeration areas.”

The CNF Plan will respond to climate change through the following Desired Conditions, Guidelines, and Monitoring expectations:

> *FW-DC-WR-14. Resiliency to Climate Change*
> Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin scale is used for Forest planning and 5th field watershed scale is used for project planning.
>
> *MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)*
> … Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e., grizzly bear) and species found primarily in these habitats. Habitat conditions

within these management areas contribute to wildlife movement within and across the Forest.

MA-DC-RW-04. Wildlife (recommended wilderness)
Recommended wilderness contributes to preserving natural behaviors and processes that sustain native wildlife populations.

MA-DC-BC-02. Habitat (backcountry)
The areas provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).

FW-DC-WL-03. Habitat Conditions for all Surrogate Species
Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

MON-VEG-01
To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

As described above, there is management direction in the CNF Plan to respond to climate change through the emphasis on dynamic-landscape restoration, and the restoration of conditions that would enhance connectivity of habitats. While the CNF cannot, by itself, address the snowmelt and loss of deep persistent spring snowpack, they can manage for a diversity of vegetation that may help maintain connectivity between remaining patches of preferred habitat.

National Forest Access System Effects, including roads, OHV trails

Motorized recreation and the use of forest roads may influence the habitat use and populations of wolverines. These potential effects include displacement from key habitats, disturbance during critical periods, and an increased risk of mortality. The effects of motorized recreation and roads can occur during the non-winter period or during the winter period when snowmobiling or ski-trail grooming occurs.

The implementation of the CNF Plan would reduce the negative effects of roads on wolverine habitat in 10 watersheds in the short-term (<20 years based on Objectives). In the longer-term the CNF Plan would move road densities towards equal to or less than 1 miles/square mile on 23 percent of the Forest, and equal to or less than 2 miles/square mile on 48 percent of the Forest.

The remainder of the Forest would remain unroaded. Habitat effectiveness (as affected by roads) for wolverines would be improved from a current low to moderate level of habitat effectiveness in 26 watersheds to a moderate level of habitat effectiveness in 17 watersheds and a high level of habitat effectiveness in 9 watersheds as Desired Conditions for road access are achieved.

The sensitivity of wolverine to the effects of climate change was considered to be high (CCSD 2013). An important climate change adaptation that has been recommended for wolverine is to reduce the negative effects of non-climate related stressors such as the effects of roads (and trails) on habitat (Gaines et al. 2012, Lawler et al. 2014). By reducing the negative effects of roads, habitats can become more resilient to the effects of climate change, and habitat connectivity can be restored allowing wolverines to adjust their ranges as conditions change. The implementation of the Plan includes management direction to make substantial improvement to habitat effectiveness for wolverines by reducing road impacts and densities. Overall, the CNF Plan would provide greater habitat effectiveness for wolverines than the current forest plan. The CNF Plan would improve habitat conditions for wolverines, whose habitats are influenced by roads and motorized trails.

The CNF Plan will address transportation corridors and access through the following Desired Conditions, Standards, and Guidelines:

> *MA-DC-FR-02. Habitat (focused restoration areas)*
> These areas contribute important habitat for plant, wildlife, and aquatic species that benefit from areas with relatively low road density and high habitat effectiveness (e.g., relatively low level of human disturbances). …
>
> *FW-DC-WL-10. Risk Factors for all Surrogate Species*
> Risk factors (e.g., roads, uncharacteristic wildfire, unregulated livestock use, introduced species, invasive species, disturbance during critical time periods, etc.) for all surrogate species are reduced to contribute to the viability of surrogate species and associated species..
>
> *FW-STD-WL-07. Grizzly Bear Recovery Area -Road Densities*
> Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal actions shall not result in a net increase in open or total road densities above the levels in [Table 2, in proposed action and grizzly bear discussion]. Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in).
>
> *FW-GDL-WL-01. Hiding Cover for Wildlife*
> Where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to created openings. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments.

Adverse effects to wolverine may occur from future changes to road use, or development of roads or OHV trails in high elevation habitats. These effects will be ameliorated somewhat by management areas and by management commitments for other species, including grizzly bear, lynx, and woodland caribou.

Recreation, including Dispersed Recreation and Winter Recreation

Sources of human disturbance to wolverines have been speculated to include winter and summer recreation (78 FR 7877). These activities sometimes occur within or immediately adjacent to wolverine home ranges, such as in alpine or boreal forest environments at high elevations on mountain slopes. They can also occur in a broader range of habitats that are occasionally used by wolverines during dispersal or exploratory movements—habitats that are not suitable for the establishment of home ranges and reproduction but may be used nonetheless.
Little is known about the behavioral responses of individual wolverines to human presence, or about the species' ability to tolerate and adapt to repeated human disturbance. Some speculate that disturbance may reduce the wolverine's ability to complete essential life-history activities, such as foraging, breeding, maternal care, routine travel, and dispersal (Packila et al. 2007, pp. 105–110). However, wolverines have been documented to persist and reproduce in areas with high levels of human use and disturbance including developed alpine ski areas and areas with motorized use of snowmobiles (Heinenmeyer 2012, entire). This suggests that wolverines can survive and reproduce in areas that experience human use and disturbance. How, or whether, effects of disturbance extend from individuals to subpopulations and populations, through affecting vital rates (e.g., reproduction, survival, emigration, and immigration) and gene flow remains unknown at this time.

The CNF Plan will address human recreation and disturbance through the following Desired Conditions, Standards, and Guidelines:

> *MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)*
> … Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with <u>little human disturbance</u> are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest.
>
> *MA-DC-RW-02. Retention of Wilderness Characteristics (recommended wilderness)*
> Visitor use does not reduce the quality of wilderness character (untramelled, undeveloped, natural, outstanding opportunities for solitude or a primitive and unconfined type of recreation) or other features of value associated with the existing condition identified in the forest plan wilderness evaluations.
>
> *MA-DC-BC-02. Habitat (backcountry)*
> These areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness).

FW-GDL-WL-03. Unique Habitats
Limited Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

The Selkirk Mountains Woodland Caribou Recovery Area contains much of the best quality den habitat for wolverines on the Forest. The following management framework related to winter recreation in caribou habitat is directly applicable to maintaining seclusion for wolverines during the denning period.

FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation
Winter recreation is managed so that woodland caribou are not displaced from suitable habitat and the caribou can make full use of existing habitat in the recovery area.

FW-STD-WL-11. Woodland Caribou and Snowmobiles
Restrict over-the-snow vehicle use to designated routes within the Selkirk Mountain Woodland caribou recovery area. [These routes avoid high elevation ridges and glacial cirque basins].

MON-FLS-01-04
Woodland caribou: management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable habitat within the caribou recovery area.

Wolverine would be expected to be most sensitive to human use in high elevation areas with late spring snow. Changes to winter recreation or other management activities in likely or known wolverine denning habitat during their season of use may result in future adverse effects, including disturbance or displacement. If snowpack declines during the 15-year duration of the CNF Plan, snow-dependent recreation and potential wolverine denning habitat may become more concentrated in a smaller area, making adverse effects more likely.

Lands and Special Uses, including Livestock Grazing and Mining

Few effects to wolverines from land management actions such as grazing have been documented (78 FR 7879). Because wolverine habitat is generally inhospitable to dense human use and development, and most wolverine habitat is also federally managed in ways that must consider environmental impacts, wolverines are somewhat insulated from impacts of human disturbances from industry, agriculture, or infrastructure development (78 FR 7877). In addition to recreation discussed previously, sources of human disturbance to wolverines may include housing and industrial development, road corridors, and extractive industry, such as logging or mining. These human activities and developments sometimes occur within or immediately adjacent to wolverine home ranges, such as in alpine or boreal forest environments at high elevations on mountain slopes. Specific reactions of wolverine to these types of disturbance are likely similar to those described above under recreation.

Wolverine habitat is characterized primarily by spring snowpack, but also by the absence of human presence and development (Hornocker and Hash 1981 p. 1299; Banci 1994, p. 114; Landa et al. 1998, p. 448; Rowland et al. 2003 p. 101; Copeland 1996, pp. 124–127; Krebs et al. 2007, pp. 2187–2190). This negative association with human presence is sometimes interpreted as active avoidance of human disturbance, but it may simply reflect the wolverine's preference for cold, snowy, and high elevation habitat that humans avoid. In the contiguous United States, wolverine habitat is typically associated with high elevation (e.g., 2,100 m to 2,600 m (6,888 ft to 8,528 ft)) subalpine forests that comprise the Hudsonian Life Zone (weather similar to that found in northern Canada), environments not typically used by people for housing, industry, agriculture, or transportation. However, a variety of activities associated with extractive industry, such as logging and mining, as well as recreational activities in both summer and winter are located in a small amount of occupied wolverine habitat.

The CNF Plan will address infrastructure development through the following Desired Conditions, Standards, and Guidelines:

> *MA-DC-WCD-02. Human Developments (Congressionally designated wilderness)*
> …Wilderness is undeveloped except for those facilities deemed necessary for administration of the area as wilderness or essential for accommodating provisional uses…
>
> *MA-STD-RW-01. Existing and Proposed Uses (recommended wilderness)*
> Management actions must maintain the wilderness characteristics of the recommended wilderness areas that were identified in the 2009 wilderness evaluations for the Abercrombie Hooknose, Salmo-Priest Adjacent, and Bald Snow recommended wilderness areas prior to designation or release from wilderness consideration by Congress.
>
> *MA-DC-BC-04. Developments and Improvements (backcountry)*
> Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters (see direction under Administrative and Recreation Sites Management Area) as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments.
>
> *FW-GDL-WL-03. Unique Habitats*
> Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

Most lands and special uses and infrastructure development consistent with the CNF Plan would not be of the scale to result in increased mortality or impaired movements. Transportation corridors are places where transportation infrastructure (roads, railways, etc.) is concentrated together. Transportation corridors may affect wolverines if located within habitat or between habitat patches. Transportation corridors can result in direct loss of habitat and direct mortality due to collisions with vehicles (Pakila et al. 2007).

Wolverine would be expected to be most sensitive to human presence in high elevation areas with late spring snow. Changes to winter recreation or other management activities in likely or known wolverine denning habitat during their season of use may result in future adverse effects, including disturbance or displacement.

Adverse effects may occur from large scale actions, or from actions that increase human use densities or increase likelihood of collisions with wolverine.

Monitoring

In addition to the CNF Plan components described above, there are species and habitat monitoring questions to be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

MON-WL-01: Have management activities met plan objectives and maintained or improved habitat to achieve desired terrestrial habitat conditions

Additional monitoring questions specifically listed for lynx, woodland caribou, and grizzly bear will also contribute to wolverine habitat monitoring. Those are described under Monitoring for each of those species.

The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects

The implementation of the CNF Plan is expected to contribute to the maintenance and restoration of habitat for wolverines. Implementation of the CNF Plan would affect the wolverine in the following ways:

- The CNF Plan MAs that emphasize provide habitats with limited human use include: Congressionally Designated Wilderness, Recommended Wilderness, Backcountry, and Research Natural Areas. In the Pend Oreille River subbasin those four MAs make up 26% of the Forest, and in the CNF as a whole they make up 21% of the Forest (Table 1). Wolverine may also use other MAs in the forest for dispersal or foraging, but the more isolated and/or higher elevation habitats are most important.

- Management within grizzly bear management units and caribou recovery zones also provides wolverine habitat east of the Pend Oreille River. Lynx management also contributes to wolverine habitat throughout higher elevations of forest within Lynx Analysis Units (LAUs), in particular within the Kettle Range core area.

- Wolverine would be expected to be most sensitive to human use in high elevation areas with late spring snow. Changes to winter recreation or other management activities in likely or known wolverine denning habitat during their season of use may result in future adverse effects, including disturbance or displacement. If snowpack declines, snow-dependent recreation and potential wolverine denning habitat may become more concentrated in a smaller area, making adverse effects more likely.

- 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. While insects, disease, and large fires may increase in the future, the resultant effects on vegetation are not expected to adversely affect the wolverine.

- Climate change effects to wolverines include reduced snowpack and reduced suitable habitat for wolverine denning, increased in summer temperatures beyond the physiological tolerance of wolverines, and eliminating or reducing high-elevation ecosystems on which wolverines depend The CNF Plan responds to climate change through managing for resilience and historic range of variability.

- Adverse effects to wolverine may occur from future changes to road use, or development of roads or OHV trails in high elevation habitats. These effects will be ameliorated somewhat by management areas and by management commitments for other species, including grizzly bear, lynx, and woodland caribou.

- Most lands and special uses and infrastructure development consistent with the CNF Plan would not be of the scale to result in increased mortality or impaired movements.

Adverse effects may occur from large scale actions, or from actions that increase human use densities or increase likelihood of collisions with wolverine.

- CNF Plan direction addresses the main applicable threats to the wolverine as displayed in Appendix B.

CUMULATIVE EFFECTS

Past, present, and reasonably foreseeable future non-federal actions that affect wolverine habitat include timber harvest and fuels reduction, recreation, human development, and grazing on private and state lands. Grazing is reasonably certain to continue on off-forest lands, potentially impacting deciduous or riparian habitats for wolverine prey species. Fuels reduction projects are possible on all land ownerships, in particular where they are near residences. These can be done in such a way that they restore wildlife habitat that has been affected by fire exclusion, potentially improving the forage base for wolverine. Recreation is likely to increase on non-federal lands due to increasing demands from the public. This would increase human disturbance and result in areas with relatively low human disturbance on NFS lands becoming more important to wolverine. Development on non-federal lands may negatively impact connectivity for wolverine between high elevation habitat patches.

Transportation corridors can result in direct loss of habitat and direct mortality due to collisions with vehicles (Pakila et al. 2007). Major highways have been shown to disrupt wolverine movements and may be avoided or partially avoided (Austin 1998). Wolverines have been documented crossing major highways while making exploratory or dispersal movements (Landa et al. 1998, Pakila et al. 2007, Inman et al. 2009). The extent to which avoidance of highways may affect wolverine vital rates or life history has not been well studied.

INTEGRATION AND SYNTHESIS OF EFFECTS

Wolverines likely occur in low densities on the CNF, with most of the sightings occurring near the divide separating the Pend Oreille River watershed from the Priest Lake watershed. Wolverines are tied to high elevation and late spring snow packs for denning and reproduction. The most imminent threats to the wolverine are likely low densities, changing snow pack due to climate change, human use and disturbance, infrastructure development, and access and transportation corridors. The CNF Plan addresses those threats as displayed in Appendix B.

The implementation of the CNF Plan will contribute to the maintenance and restoration of habitat for wolverines. The CNF Plan includes MAs that support maintenance of high elevation habitats with minimal human use. The plan addresses climate change through development of resilient habitats. The CNF plan includes management direction to reduce the impact of roads, and recreation impacts on habitat effectiveness for wolverines. Management direction for grizzly bear, woodland caribou, and lynx also results in management benefits to the wolverine, especially since grizzly bear and caribou management units occur in areas where most of the wolverine sightings on the CNF have occurred.

There is no recovery plan for the wolverine at this point. However, Appendix B displays the primary stressors and threats to the wolverine, compared to the contributions of the CNF Plan. The management direction in the CNF Plan addresses the main threats and stressors to the wolverine. While there may be future effects to the wolverine from management actions, the standards and guidelines in the CNF Plan should prevent any significant long-term adverse effects so that management activities will not appreciably reduce the likelihood of survival and recovery of the wolverine in the wild.

CONCLUSION

After reviewing the current status of the wolverine, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the USFWS's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the wolverine. No critical habitat has been designated for this species; therefore none will be affected.

The wolverine is a proposed species. See the Reinitiation Notice regarding future confirmation of this conference opinion as a biological opinion.

WHITEBARK PINE CHAPTER
STATUS OF SPECIES, WHITEBARK PINE

Taxonomy and Species description

Whitebark pine *(Pinus albicaulis* Engelm.) is a 5-needled conifer species placed in the subgenus *Strobus,* which also includes other 5-needled white pines. This subgenus is further divided into two sections (*Strobus* and *Parrya*), and under section *Strobus*, into two subsections (*Cembrae* and *Strobi*). The traditional taxonomic classifications placed whitebark pine in the subsection *Cembrae* with four other Eurasian stone pines (Critchfield and Little 1966, p. 5; Lanner 1990, p. 19, all as referenced in 76 FR 42631). However, recent phylogenetic studies (Liston et al. 1999, 2007; Syring et al. 2005, 2007, as cited in Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 2010, p. 4, all as referenced in 76 FR 42631) resulted in merging subsection *Cembrae* and subsection *Strobi* into one subsection *Strobus*. No taxonomic subspecies or varieties of whitebark pine are recognized (COSEWIC 2010, p. 6, as referenced in 76 FR 42631).

Whitebark pine is typically 5 to 20 meters (m) (16 to 66 feet (ft)) tall with a rounded or irregularly spreading crown shape. On higher density conifer sites, whitebark pine tends to grow as tall, single-stemmed trees, whereas on open, more exposed sites, it tends to have multiple stems (McCaughey and Tomback 2001, pp. 113–114, as referenced in 76 FR 42631). Above tree line, it grows in a krummholz form (stunted, shrub-like growth) (Arno and Hoff 1989, p. 6, all as referenced in 76 FR 42631). This pine is monoecious, (both male pollen and female seed cones are on the same tree). Its characteristic dark brown to purple seed cones are 5 to 8 centimeters (cm) (2 to 3 inches (in.)) long and grow at the outer ends of upper branches (Hosie 1969, p. 42, as referenced in 76 FR 42631).

Listing Status

Whitebark pine is currently a federal candidate for listing (76 FR 42631). Listing as a threatened or endangered species is warranted, but precluded by higher priority actions.

On January 13, 2017, the USFWS started an in-depth review of the best available scientific and commercial information called a Species Status Assessment. This process is ongoing.

Life History

Stone pines (so-called for their stone-like seeds) include five species worldwide, and whitebark pine is the only stone pine that occurs in North America (McCaughey and Schmidt 2001 p. 30, as referenced in 76 FR 42631). Characteristics of stone pines include five needles per cluster, indehiscent seed cones (scales remain essentially closed at maturity) that stay on the tree, and wingless seeds that remain fixed to the cone and cannot be dislodged by the wind. Because whitebark pine seeds cannot be wind-disseminated, primary seed dispersal occurs almost exclusively by Clark's nutcrackers (*Nucifraga columbiana*) in the avian family Corvidae (whose members include ravens, crows, and jays) (Lanner 1996 p. 7; Schwandt 2006 p. 2, all as referenced in 76 FR 42631). Consequently, Clark's nutcrackers facilitate whitebark pine regeneration and influence its distribution and population structure through their seed caching activities (Tomback et al. 1990 p. 118, all as referenced in 76 FR 42631).

Whitebark pine trees are capable of producing seed cones at 20–30 years of age, although large cone crops usually are not produced until 60–80 years (Krugman and Jenkinson 1974, as cited in McCaughey and Tomback 2001, p. 109, all as referenced in 76 FR 42631). Therefore, the generation time of whitebark pine is approximately 60 years (COSEWIC 2010, p. v, as referenced in 76 FR 42631). Like many other species of pines, whitebark pine exhibits masting, in which populations synchronize their seed production and provide varying amounts from year to year. During years with high seed production, typically once every 3–5 years in whitebark pine (McCaughey and Tomback 2001 p. 110), seed consumers are satiated, resulting in excess seeds that escape predation (Lorenz et al. 2008 pp. 3–4, all as referenced in 76 FR 42631). Whitebark pine seed predators are numerous and include more than 20 species of vertebrates including Clark's nutcracker (*Nucifraga columbiana*), pine squirrels (*Tamiasciurus spp*.), grizzly bears (*Ursus arctos*), black bears (*Ursus americanus*), Steller's Jay (*Cyanocitta stelleri*), and Pine Grosbeak (*Pinicola enucleator*) (Lorenz et al. 2008 p. 3, as referenced in 76 FR 42631). Seed predation plays a major role in whitebark pine population dynamics, as seed predators largely determine the fate of seeds. However, whitebark pine has co-evolved with seed predators and has several adaptations, like masting, that has allowed the species to persist despite heavy seed predation (Lorenz et al. 2008 p. 3–4, as referenced in 76 FR 42631).

Seeds not retrieved by Clark's nutcrackers or other seed predators are subsequently available for germination when conditions are favorable (McCaughey and Tomback 2001 p. 111, as referenced in 76 FR 42631). In years with low seed production, most seeds are predated and, therefore, unavailable for germination (Lorenz et al. 2008 p. 4, as referenced in 76 FR 42631). A single nutcracker can cache up to an estimated 98,000 whitebark pine seeds during good seed crop years (Hutchins and Lanner 1982 p. 196, as referenced in 76 FR 42631). They may bury seeds near parent trees or travel up to 22 kilometers (km) (14 miles (mi)) away at varying elevations. Cache sites have been found to occur on forest floors, above treeline, in rocky outcrops, meadow edges, clearcuts, and burned areas (Tomback et al. 1990 p. 120, as referenced in 76 FR 42631). Whitebark pine seedlings have highly variable survival rates; seedlings originating from nutcracker caches ranged from 56 percent survival over the first year to 25 percent survival by the fourth year (Tomback 1982 p. 451, as referenced in 76 FR 42631).

While whitebark pine is almost exclusively dependent upon Clark's nutcracker for seed dispersal, the reverse is not true as Clark's nutcracker forage on seeds from numerous species of pine. The frequency of nutcracker occurrence and probability of seed dispersal from a whitebark pine forest is strongly associated with the number of available cones. A threshold of 1,000 cones per hectare (ha) (2.47 acres (ac)) is needed for a high likelihood of seed dispersal by nutcrackers, and this level of cone production occurs in forests with a live basal area (the volume of wood occurring in a given area) greater than 5 square meters (m) per ha (McKinney et al. 2009 p. 603, as referenced in 76 FR 42631). For an adult Clark's nutcracker to survive a subalpine winter (accounting for those seeds consumed by rodents and those fed to juvenile nutcrackers), it would need to cache seeds from 767 to 2,130 cones (McKinney et al. 2009 p. 605, as referenced in 76 FR 42631). Clark's nutcrackers are able to assess cone crops, and if there are insufficient seeds to cache, they will emigrate in order to survive (McKinney *et al.* 2009 p. 599, as referenced in 76 FR 42631).

Habitat

Whitebark pine grows at the highest elevations of any western tree species (Kral 1993, Arno and Hoff 1990, all as referenced in USDA 2008). In Oregon and Washington, it occurs mainly at elevations of 1,600 m to 2,800 m (5,249 ft to 9,186 ft). Whitebark pine is a hardy conifer that tolerates poor soils, steep slopes, and windy exposures and is found at alpine tree line and subalpine elevations throughout its range (Tomback et al. 2001, pp. 6, 27, as referenced in USDA 2008). It grows under a wide range of precipitation amounts, from about 51 to over 254 cm (20 to 100 in.) per year (Farnes 1990, p. 303 as referenced in USDA 2008). Whitebark pine may occur as a climax species, early successional species, or seral (mid-successional stage) co-dominant associated with other tree species. Although it occurs in pure or nearly pure stands at high elevations, it typically occurs in stands of mixed species in a variety of forest community types.

Whitebark pine is a slow-growing, long-lived tree with a life span of up to 500 years and sometimes more than 1,000 years (Arno and Hoff 1989, pp. 5–6, as referenced in USDA 2008). It is considered a keystone, or foundation species in western North America where it increases biodiversity and contributes to critical ecosystem functions (Tomback et al. 2001, pp. 7–8 as referenced in USDA 2008). As a pioneer or early successional species, it may be the first conifer to become established after disturbance, subsequently stabilizing soils and regulating runoff (Tomback et al. 2001, pp. 10–11, as referenced in USDA 2008). At higher elevations, snow drifts around whitebark pine trees, thereby increasing soil moisture, modifying soil temperatures, and holding soil moisture later into the season (Farnes 1990 p. 303 as referenced in USDA 2008). These higher elevation trees also shade, protect, and slow the progression of snowmelt, essentially reducing spring flooding at lower elevations.

Populations, Distribution, Trend

Whitebark pine occurs in the mountainous regions of western North America (Kral 1993 as referenced in USDA 2008). Outside the Pacific Northwest states, it is distributed in the British Columbia Coast Range Mountains and Cascades, the Rocky Mountains from British Columbia and Alberta to Wyoming, the Sierra Nevada and Klamath Mountains of California, and in some of the high Great Basin ranges of Nevada (Figure 18).

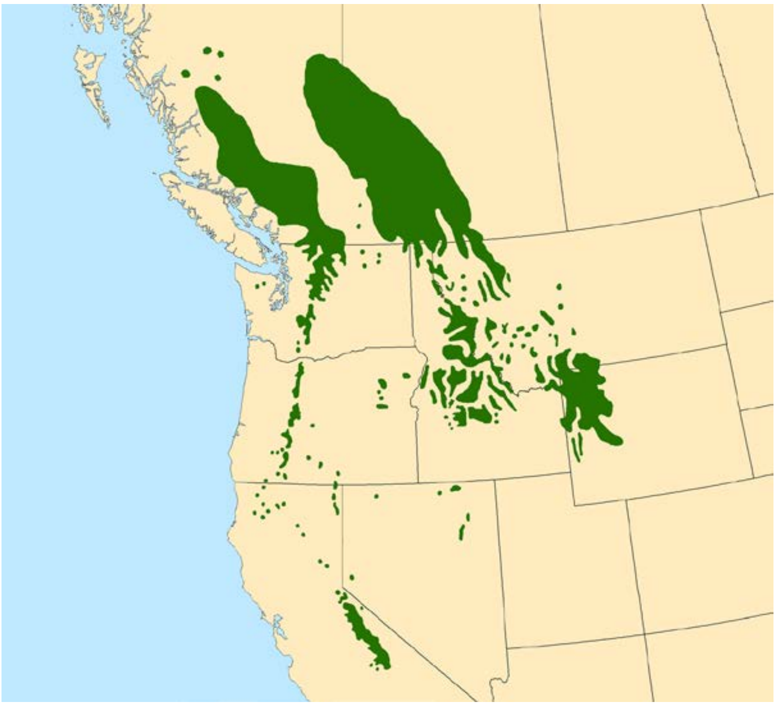


Figure 18. Range of whitebark pine (From Figure1 USDA 2008 p.14; USGS 1999).

In Washington and Oregon, whitebark pine grows in the Cascade Range and in the Olympic, Kettle River, Selkirk, Blue, Wallowa, Paulina, Yamsey, North Warner, and Siskiyou Mountains (Ward et al. 2006 as referenced in USDA 2008). Whitebark pine populations tend to be scattered and spotty because of the often discontinuous distribution of favorable habitat on high mountain peaks and ridges. Individual populations are of widely varying sizes, with some being quite small. Some Pacific Northwest whitebark pine populations, notably those in the Olympic and Blue Mountains, are widely separated from any other populations, and the populations in northeastern Washington are closer to the Rocky Mountain portion of the species' range than they are to the Cascades.

Most whitebark pine habitat in Washington and Oregon occurs on federally administered land, and 81 percent is on lands administered by the Forest Service, Region 6, in Washington and Oregon (USDA 2008). Sixty percent of the known occupied whitebark pine habitat and 72 percent of the potential whitebark pine habitat on National Forest System land in the Pacific Northwest occurs in congressionally designated wilderness areas.

Unfortunately, information on long-term whitebark pine population trends in individual stands in the Pacific Northwest is lacking. Re-measured permanent forest inventory plots containing whitebark pine are few and flawed because only trees greater than 12.5 cm (4.9 in.) are recorded. Comprehensive surveys of whitebark pine stands done at different points in time are currently nonexistent. Virtually all stand data available that evaluate pines of all sizes are from single, one-time examinations. The contention that whitebark pine is seriously declining in the region is based on high observed amounts of recent and current mortality due to fire, white pine blister rust infection, and mountain pine beetle infestation; documentation of very high levels of white pine blister rust on still living trees involving a large number of presumably lethal main stem infections; high proportions of trees with topkill caused by white pine blister rust that affects cone and seed production; and stand structures in which small white pine blister rust-affected trees represent by far the most numerous size class.

Whitebark pine is experiencing an overall long-term pattern of decline, even in areas originally thought to be mostly immune from the above threats. Recent predictions indicate a continuing downward population trend within the majority of the whitebark pine range, across the range of the species (USFWS 2016). Determinations of serious whitebark pine declines are based on high observed amounts of recent and current mortality due to fire, white pine blister rust infection, and mountain pine beetle infestation; documentation of very high levels of white pine blister rust on still living trees involving a large number of presumably lethal main stem infections; high proportions of trees with topkill caused by white pine blister rust that affects cone and seed production; and stand structures in which small white pine blister rust-affected trees represent by far the most numerous size class (USDA 2008 p.21-22).

Threats

Threats to the whitebark pine include, mortality from white pine blister rust, mortality from mountain pine beetle, habitat loss from catastrophic fire and/or fire suppression, and habitat loss from environmental effects resulting from climate change. These threats and stressors interact, with one building upon the other to increase effects.

Since many white pine blister rust infections on smaller whitebark pines (20 cm diameter at breast height or smaller) are main-stem infections, a high proportion of these trees are very likely to die or suffer top mortality in the next few years. Larger infected trees may survive for some time with greatly reduced vigor; large trees with substantial amounts of blister rust generally are poor cone producers.

Much of the following discussion of threats comes directly from the threats summaries in the 2011 warranted-but-precluded finding for whitebark pine (76 FR 42631). More detail can be found in that document.

<u>Fire</u>

Fire suppression results in conditions that favor the dominance of shade tolerant species such as *Abies lasiocarpa, Picengelmannii,* and *Tsuga mertensiana,* which form dense stands that eventually exclude Whitebark pine (Agee 1993, p. 252; Arno 2001, p. 83). We assume that fire suppression efforts that create these impacts will continue to occur into the future. Where whitebark pine persists, dense forest structure crowds and stresses individual trees, making them more susceptible to white pine blister rust, infestation by mountain pine beetle, and mortality. Succession to more shade-tolerant species also results in less whitebark pine regeneration because whitebark pine is shade-intolerant, and seeds will not survive if cached in heavily shaded forest stands. The interaction between fire suppression and environmental effects from climate change exacerbates the impacts to whitebark pine, and in the future will be particularly devastating to whitebark pine populations as whitebark pine seed sources are expected to become increasingly limited by continued impacts from white pine blister rust and mountain pine beetle.

The balance of a natural fire regime with related vegetative successive processes has been disrupted across the whitebark pine ecosystem. As a result, whitebark pine has lost its competitive advantage and trends indicate its presence has been reduced on the landscape. Because there is seldom a historic baseline for comparison and the degree of succession is very locally specific, we are not able to quantify what portion of the species decline can be attributed to fire management and changes in fire regimes. However, we consider the current fire regime and fire management practices to be threats that limit the abundance of the species and weaken whitebark pine communities, such that other factors create additional negative impacts to the species. The effects of changing fire regimes and fire suppression on whitebark pine, combined with the interaction of white pine blister rust and mountain pine beetles, have created more homogenous forest stands with reduced numbers of whitebark pine compared to historic subalpine landscapes. These effects are becoming more pronounced with climate change (Morgan and Murray 2001, p. 300), creating a trajectory toward forest stands without whitebark pine. The species appears likely to be in danger of extinction, or likely to become so within the foreseeable future, because of habitat losses due to changes to the fire regime, particularly when viewed in combination with climate change, disease, and predation.

Climate Change

Given projected increases in temperature, a significant loss of the cool high-elevation habitats of whitebark pine is expected. Rapid warming is likely to outpace the ability of whitebark pine to migrate to suitable habitats. Additionally, adaptation to warming conditions for this long-lived species seems unlikely. Synergistic interactions between environmental changes resulting from climate change, wildfire, disease, and mountain pine beetle also are negatively impacting whitebark pine rangewide. In particular, mountain pine beetle epidemics brought about by increasing temperatures are currently having significant negative impacts on whitebark pine rangewide.

White Pine Blister Rust

Despite white pine blister rust's complex life cycle and the exacting environmental conditions required for reproduction and transmission, it has successfully spread across almost the entire range of whitebark pine, and its frequency of occurrence and intensity of infection are increasing. Although some whitebark pine regeneration has been documented in portions of its range, the change in overall whitebark pine population structure will reduce the number of large trees, expose surviving trees to higher white pine blister rust infection levels, and reduce the number of mature, cone-producing trees. The likelihood of sustaining whitebark pine in suitable habitats is further diminished in locations where populations are small (Schwandt et al. 2010, p. 235).

While whitebark pine trees will continue to persist on the landscape, whitebark pine forests may become functionally extinct (USFWS 2016; 76 FR 42631). Where additional threats occur, the pattern of forest renewal may be disrupted, leading to severe declines and potential extirpation of whitebark pine (Larson 2009, pp. 45–46).

Predation

Mountain pine beetle outbreaks are becoming more common throughout the range of the whitebark pine and are having increasingly significant impacts on whitebark pine. In some locations, mortality rates are as high as 96 percent. There are no known ways to stop a mountain pine beetle epidemic once it has started (Raffa et al. 2008, p. 514). Mountain pine beetle epidemics typically subside when the availability of suitable hosts is exhausted. In a worst-case scenario, there could be 95 percent mortality of mostly cone-bearing (i.e., reproductive) adults by the time the current epidemic collapses (Keane et al. 2010, p. 35). Therefore, we expect the ongoing epidemic to continue to intensify and expand in the future. Additionally, we expect ongoing and predicted environmental effects from climate change to create more favorable conditions for mountain pine beetle outbreaks to persist in whitebark pine habitats into the foreseeable future.

Summary

Disease in the form of white pine blister rust and predation from mountain pine beetle are contributing, individually and in combination, to the decline of Whitebark pine rangewide. White pine blister rust is now ubiquitous on the landscape; millions of acres (hectares) of whitebark pine have been infected, and that number is increasing yearly. Due to the warmer temperatures and drier conditions brought on by climate change within the range of whitebark pine, mountain pine beetle epidemics now occur at unprecedented levels, causing mortality in millions of acres (hectares) of whitebark pine, much of which was previously thought to be mostly climatically immune from large-scale mountain pine beetle attacks. Additionally, the interaction between white pine blister rust and the mountain pine beetle further intensifies the impact of both threats. White pine blister rust and mountain pine beetle are impacting whitebark pine equally in both Canada and the U.S. portion of the range. In other words, there is currently no refuge from these threats (COSEWIC 2010, p. viii). There is no known way to control or reduce or eliminate either threat at this time, particularly at the landscape scale needed to effectively conserve this species. Thus, we expect both disease and predation to continue to heavily impact whitebark pine.

Recovery Needs/Conservation Strategies

There is a National Whitebark Pine Strategy (Keane et al. 2012). The strategy expects creation of a range-wide genetic resistance program to promote the conservation of rust resistance in whitebark pine (Keane et al. 2012 p.46), and development of a prioritization process for conservation efforts. Out of a total 5,770,013 hectares of whitebark pine range (Keane et al. 2012 p.49), there is 5,769,542 ha of Forest Service ownership, and of that the Pacific Northwest region has 668,967 ha of whitebark pine range. The National Plan refers to the regional plan for the Pacific Northwest Region of the Forest Service (described below).

The Pacific Northwest Region of the Forest Service published a Whitebark Pine Restoration Strategy in September, 2008 (USDA 2008). This document lays out a strategy for whitebark pine assessment and restoration. The overriding goal of the strategy is to restore and conserve a network of viable populations of whitebark pine and associated species across the Pacific

Northwest (Oregon and Washington). There are five objectives listed to complete this goal:

1. Restore degraded habitat.
2. Protect genetic resources through gene conservation.
3. Increase blister rust resistance in whitebark pine populations.
4. Evaluate the health and status of whitebark pine stands.
5. Increase our understanding of the threats to whitebark pine and develop practical and effective restoration techniques.

The components of this process include an ecosystem based analysis (USDA 2008 p.47):

1. Conduct an ecoregion-based assessment.
2. Identify overarching threats.
3. Select a portfolio of sites for conservation and restoration.
4. Create a biodiversity vision.
5. Set long- and short-term conservation goals.
6. Prioritize actions to meet conservation goals.

The region was divided into nine subregions. These were originally developed as seed zones for the genetic restoration program but also worked well as the first scale for analysis. Seed zones were then divided into 30 smaller conservation areas. Each conservation area was divided into one to eight management units based on geographic features, whether the unit is in a designated wilderness area or not, and fire history. The Colville National Forest is in Seed Zone 3. Three conservation areas separated by at least 30 miles are located on the Okanogan (301) and Colville National Forests (302, 303). Most whitebark pine habitat is outside of designated wilderness except for the northeast corner of conservation area 303. Round Top Mt., also in conservation area 303, is a designated research natural area. Most habitat in this seed zone is in small patches on isolated peaks and ridges. Blister rust infection rate was recorded at 18 to 35 percent. Mountain pine beetle activity is high. Post-fire planting is needed to regenerate conservation areas 302 and 303; these are established cone collection areas but additional seed is needed for sowing. Tree thinning also is needed in both these areas to reduce competition.

One or more of the following proposed actions were assigned to each management unit:

1. Safeguard habitat—Conserve/safeguard from fire (both wild and prescribed). These units will be included in fire and land management plan maps. This action was only assigned to designated wilderness areas, which do not require restoration.
2. Collect cones—Collect cones from mature whitebark pine stands with high potential for cone production.
3. Restore—Plant seed or seedlings, thin for conifer release, and/or prune. Included in this category are units that have burned or have high mortality due to mountain pine beetle infestation. If a stand represents a unique ecological or aesthetic resource (say, at a popular ski area or campground), then pruning branches with blister rust cankers might be a good tool to retain live trees on the landscape, increase the stand's conebearing and regenerative potential, and provide ongoing recruitment of young trees as material for natural selection for blister rust resistance. Pruning may also be beneficial to protect individual high-value trees, such as blister rust resistant candidate trees and trees that are important local seed sources.

4. Survey – condition—Survey to determine if whitebark pine is present, to record the general stand condition, and to determine what actions, if any, are needed.
5. Survey – seed trees—Survey to determine if conebearing trees are present.

ENVIRONMENTAL BASELINE

A general environmental baseline description, applicable to all listed, proposed, or candidate species was previously described and is incorporated here by reference. The following discussion provides a more specific environmental baseline for the whitebark pine.

Whitebark pine habitat (subalpine forests and parklands) can be found throughout the upper reaches of the peaks and ridges of the Selkirk Mountains and the Kettle Crest. Most of its occurrences are in a designated wilderness area, recommended wilderness, or backcountry. There are a few sites in focused and general restoration. There are about 12,500 acres of subalpine forests and parklands on the CNF. There are 37 sites and 1,651 acres of occupied habitat. The following map (Figure 19) shows whitebark pine locations in relation to management areas.

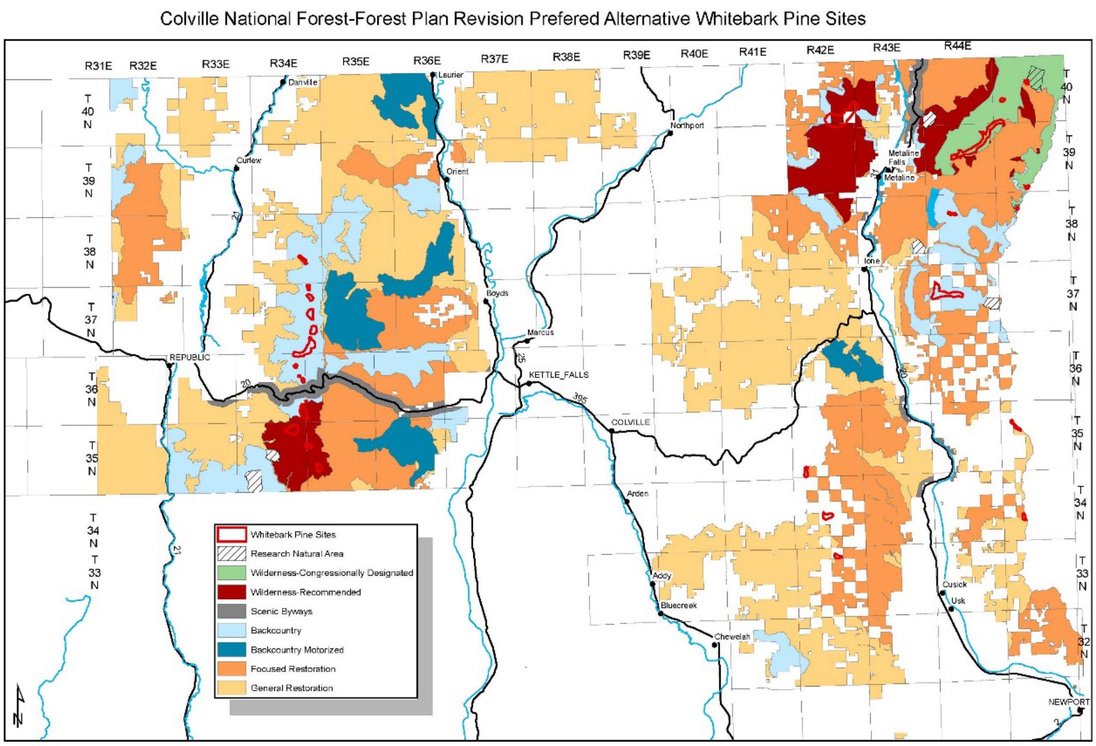


Figure 19. Whitebark Pine Locations and Management Areas on CNF.

The forest has already had stand replacing fires in whitebark pine stands (e.g., the Kettle Crest, Mankato Mountain, North and South Baldy) (Honeycutt 2017, *in litt.*). Some of the trees lost in these fires had offspring that showed resistance to blister rust in tests conducted at the Forest Service, Dorena Genetic Resources Center and the Coeur d'Alene Nursery test center. These trees' rust resistant genotypes need to be preserved through collection of scion material which is grafted onto rootstock and planted in areas which will be protected from fire. The existing whitebark pine stands need to have the highest priority for protection from fires. When these stands are lost, their individual rust resistant tree genotypes are lost.

Conservation Role of the Action Area

The CNF is in seed zone 3 for the whitebark pine (USDA 2008). Region 6 of the Forest Service's whitebark pine goal is to restore and conserve a network of viable populations of whitebark pine and associated species across the Pacific Northwest by restoring degraded habitat, protecting genetic resources through gene conservation, increasing blister rust resistance in whitebark pine populations, evaluating the health and status of whitebark pine stands where lacking, increasing our understanding of the threats to whitebark pine, and developing practical and effective restoration techniques (USDA 2008 p.2).

EFFECTS OF THE ACTION ON SPECIES

The effects of the action refers to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

As stated earlier in the Opinion, the CNF Plan is a Federal action that provides a framework for the development of future CNF actions that will be authorized, funded, or carried out at a later time within the next 15 years. The overall goal of this section 7 consultation and conferencing process is to evaluate the CNF Plan for its consistency with the conservation of listed (and proposed and candidate) species. Since whitebark pine is a candidate species, we are conferencing on the species as if it was listed, as requested by the CNF. For more detail on the consultation expectations if the whitebark pine is listed, see the Reinitiation Notice at the end of the Opinion.

Appendix B includes a matrix comparing conservation needs of the whitebark pine and how the CNF Plan addresses the applicable expectations in that plan. Below, we discuss the general effects of the CNF Plan on the whitebark pine.

Effects of the MAs and Management Direction

Whitebark pine sites on the CNF total 6,113 acres and occur in the following MAs: Congressionally Designated Wilderness (1,250 acres), Recommended Wilderness (2,041 acres), Backcountry (2,496 acres), Focused restoration (225 acres), General Restoration (68 acres), and Research Natural Area (35 acres). The great majority (95%) of whitebark pine stands on the Forest are in the following management areas: Designated Wilderness, Recommended Wilderness, Research Natural Area, and Backcountry.

CNF Plan Management Direction that is relevant to whitebark pine or listed plants is as follows:

> *FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species*
> Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species.
>
> *FW-DC-WL-05. Grizzly Bear Recovery Area – Key Habitat Components for Grizzly Bear*
> Key grizzly bear habitat components (such as whitebark pine, riparian habitats, berry-producing shrubfields, natural meadows, and forest cover) are available within core areas and in quantities that contribute toward a recovered bear population.
>
> *FW-DC-VEG-01. Plant Species Composition*
> Native species and native plant communities are the desired dominant vegetation. National Forest System lands contribute to the diversity, species composition, and structural diversity of native upland plant communities. The full range of potential natural vegetation is maintained on the Forest where it supports plant and animal diversity including pollinators and other invertebrates, and robust ecological function.
>
> *FW-DC-VEG-08. Threatened, Endangered and Sensitive Plant Species - Special and Unique Habitats*
> Special and unique habitats support threatened, endangered, and sensitive plant species populations and contribute to high quality suitable habitat for these species. Degraded or diminished special and unique habitats are restored within their natural range of variation.
>
> *FW-DC-VEG-09. Threatened, Endangered and Sensitive Plant Species - Management-Related Disturbance*
> Ecological conditions and processes that sustain the habitats currently or potentially occupied by threatened, endangered, or sensitive plant species are retained or restored. The geographic distributions of sensitive plant species in the Forest Plan area are maintained. This includes sufficient seed or vegetative reproduction to maintain existing plant populations and associated native plant community biodiversity. Soil disturbance is managed to avoid degradation of threatened, endangered and sensitive plant species and their habitat as well as plant community composition, structure, and productivity.
>
> *FW-DC-VEG-10. Threatened, Endangered and Sensitive Plant Species - Habitat and Population Trends*
> Population trends, amount of occupied habitat, and amount of unoccupied suitable habitat are stable or increasing for threatened, endangered, and sensitive plant species.

Alpine and subalpine meadows, fellfields, and parklands habitats where whitebark pine occurs are generally a high vulnerability group with exposure to environmental change from climatic and fire regime factors (Miller-Struttmann et al. 2015, Munson and Sher 2015, as referenced in BA p.234). Whitebark pine is exposed to threats from insect and disease, as well as environmental changes (Devine et al. 2012). Additionally, whitebark pine, along with other high alpine and subalpine species has exposure to livestock grazing, recreational activity, hydrologic regime alteration, and plant collecting. Together this creates high to medium levels of risk for desired conservation outcomes.

The Plan promotes landscape scale restoration of sustainable vegetation types within historic and future ranges of variation and it would continue to provide capable habitat. The proposed conservation desired future conditions to maintain or enhance existing populations are mediated by application of plan components. These include protective standards and guidelines as well as implementation of plant monitoring that targets population and habitat conditions and trends.

Future restoration activities, including controlled fire, could have short-term adverse effects, with long term benefits.

Vegetation Management Effects, including Restoration, Climate Change, Fire, and Insects and Disease

Whitebark pine is not highly vulnerable to timber harvest because most of the sites (95%) occur in Designated Wilderness, Proposed Wilderness, Research Natural Areas or Back Country (BA p.234-35). The sites that do not occur in those MAs are addressed through the following management direction, making timber harvest of whitebark pine unlikely.

> *FW-DC-VEG-03. Forest Structure*
> Forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to aesthetic settings, particularly along scenic byways and highways.
>
> Forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. Table 14 [in CNF Plan] contains desired conditions for each vegetation type.
>
> *FW-DC-VEG-05. Biological Legacies*
> Large trees, snags, and down material are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem.
>
> *FW-GDL-VEG-01. Threatened, Endangered and Sensitive Plant Species – Disturbance in Occupied Habitat*
> Soil and habitat disturbance should be managed within occupied and potentially suitable habitat to the extent practicable to maintain or enhance threatened, endangered, and sensitive plant populations and avoid invasive plant species establishment or spread. Consequently, occupied habitat should not be used for timber harvest, fuel breaks or developments associated with wildfire suppression, delivery of fire retardant or

petroleum products, placement of stock-handling facilities, recreation, or special use developments. A 100-foot buffer between the occupied habitat and these management activities should be maintained.

Trees in occupied habitat that are felled for safety reasons should be retained on site as needed to maintain, protect, or enhance habitat unless such action is detrimental to the threatened, endangered, and sensitive species population or habitat and represents a threat through physical impacts or potential uncharacteristic wildfire.

All new road and trail construction should be designed to avoid the occupied habitat of threatened, endangered, and sensitive plant species (minimum 100-foot buffer).

Use of prescribed fire should be avoided in occupied habitat except in areas occupied by fire-dependent or fire-tolerant species. Habitat restoration activities may proceed when designed to benefit threatened, endangered, and sensitive plant species.

Slash piles and other fuels should be managed to avoid the occupied habitat of threatened, endangered, and sensitive species (minimum 100-foot buffer).

Grazing management (including timing, intensity, duration, frequency of use, and type and class of livestock) should allow for completion of threatened, endangered, and sensitive plant species annual life cycle and development and dispersal of reproductive materials like seed and spores. Salting or water developments should not be authorized or allowed such that they reduce threatened, endangered, or sensitive plant populations.

Mining operations shall be conducted to minimize adverse environmental impacts on National Forest surface resources. Operations approved in a Plan of Operations shall avoid threatened, endangered, and sensitive plant species and their habitat to the extent practicable.

FW-STD-VEG-02. Threatened, Endangered and Sensitive Plant Species -- Surveys
Surveys for threatened, endangered, and sensitive plant species shall be conducted in suitable habitat on National Forest System lands before habitat-disturbing activities to identify and protect vulnerable populations. All existing sites are identified and managed to support rare species recovery on National Forest System lands. Suitable habitat shall be managed to enhance or maintain rare species occurrences on the Forest.

Future vegetation management actions could result in insignificant or adverse effects to whitebark pine, depending on the site specific details.

Vegetation management for conservation or restoration activities, such as thinning of other trees species is likely to occur, consistent with CNF Plan management direction as follows:

FW-GDL-VEG-02. Plant Material Collection for Conservation Purposes
Commercial or non-commercial permits or authorizations should generally be issued for collection of seed or plant materials when project objectives are consistent with rare

species conservation practices (these practices could include seed storage in recognized seed banks, or collection of plant material for restoration and rehabilitation purposes, or scientific research that benefits species viability).

FW-DC-VEG-08. Threatened, Endangered and Sensitive Plant Species - Special and Unique Habitats
Special and unique habitats support threatened, endangered, and sensitive plant species populations and contribute to high quality suitable habitat for these species. Degraded or diminished special and unique habitats are restored within their natural range of variation.

FW-DC-VEG-09. Threatened, Endangered and Sensitive Plant Species - Management-Related Disturbance
Ecological conditions and processes that sustain the habitats currently or potentially occupied by threatened, endangered, or sensitive plant species are retained or restored. The geographic distributions of sensitive plant species in the Forest Plan area are maintained. This includes sufficient seed or vegetative reproduction to maintain existing plant populations and associated native plant community biodiversity. Soil disturbance is managed to avoid degradation of threatened, endangered and sensitive plant species and their habitat as well as plant community composition, structure, and productivity.

FW-DC-VEG-10. Threatened, Endangered and Sensitive Plant Species - Habitat and Population Trends
Population trends, amount of occupied habitat, and amount of unoccupied suitable habitat are stable or increasing for threatened, endangered, and sensitive plant species.

FW-GDL-VEG-03. Large Tree Management
Management activities should retain and generally emphasize recruitment of individual large trees (greater than 20 inches diameter at breast height) across the landscape. Exceptions where individual large trees may be removed or destroyed include the following:
• Trees need to be removed to promote special plant habitats (such as, but not limited to, aspen, cottonwood, whitebark pine)

MA-GDL-WCD-04. Research, Studies, and Data Gathering (Congressionally Designated Wilderness)
Non-manipulative research or data gathering may be authorized where such use is reliant on a wilderness setting, and does not detract from wilderness character.
Markings should be unobtrusive and not be viewed from trails or occupied areas. Permanent markings should only be authorized when there is a long-term need to relocate the site with a high degree of precision where other technologies are not sufficient. Other than unobtrusive markings, permanent installations should not be authorized.

MON-FLS-01: Federally listed species
To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

Appendix B in the CNF Plan lists possible actions that may take place on the CNF at the project or activity-level to help maintain existing conditions or move toward the desired conditions. These include: 1) Planting white pine blister rust resistant western white pine or whitebark pine; 2) Maintenance or restoration of rare plant habitat and special and unique natural communities; and 3)Management or treatment of insects and diseases using integrated pest management techniques. While the actions in this appendix are simply projections of what may occur in the future, they indicate intent by the CNF to conserve whitebark pine.

The CNF Plan will respond to climate change through the following Desired Conditions, Guidelines, and Monitoring expectations:

> *FW-DC-WR-14. Resiliency to Climate Change*
> Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin scale is used for Forest planning and 5th field watershed scale is used for project planning.
>
> *MA-DC-WCD-03. Ecological Processes*
> Ecological conditions are affected primarily by natural ecological processes, with the appearance of little or no human intervention.
>
> Fire functions as a natural ecological process.
>
> Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest. Wilderness areas are free of invasive species.
>
> *FW-DC-WL-03. Habitat Conditions for all Surrogate Species*
> Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the viability of surrogate species and associated species.
>
> *FW-GDL-WL-04. Federally Listed Species*
> Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.
>
> *MON-VEG-01*
> To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

The predicted impacts of warming temperatures include a severe decline in suitable habitat; increased mountain pine beetle activity; an increase in the number, intensity, and extent of wildfires; and perhaps an increase in white pine blister rust-related mortality. Climate change, coupled with the other threats, may result in loss of individuals or complete sites and continued declines in populations. The CNF Plan responds to climate change through working towardsresilienttowards resilient landscapes and historic range of variability.

Fire

When used under controlled conditions, prescribed fire can be used to reduce fire hazards, reduce competition to whitebark pine from other plant species, and prepare areas where Clark's nutcrackers can cache seeds. Unretrieved seed from these seed caches results in whitebark pine regeneration. The great majority of whitebark pine stands on the Forest are in the following management areas, with specific fire related management direction:

> *MA-GDL-WCD-07. Wildland Fire (Congressionally Designated Wilderness)*
> Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role or to achieve wilderness desired conditions.
> Wildfires should be managed for the benefit of wilderness resources. A full suppression strategy may be used where or when a wildfire:
> - would adversely affect an ESA-listed species…
>
> *MA-STD-RW-05. Fire (Recommended Wilderness)*
> Objective(s) and strategies for all unplanned ignitions shall be identified at the time of the fire.
> Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact suppression tactics).
> Use planned ignitions only in situations that meet all of the following criteria:
> - There is an unnatural buildup of fuel.
> - The treatment would increase the probability of accepting naturally occurring fire.
> - Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness.
>
> *MA-GDL-KCRA-03. Fire (Kettle Crest Recreation Area)*
> Use of planned and management of unplanned fire ignitions may be authorized. Fire should be allowed to play its natural ecological role in the semi-primitive non-motorized and semi-primitive motorized recreation opportunity spectrum classes of the KCRA. The preferred strategy for managing unplanned fires is to manage for the benefit of resources. A full suppression strategy may be used where or when a fire:
> - would adversely affect the long-term recovery of ESA listed species.
>
> *MA-GDL-BC-05. Fire (Backcountry)*
> Wildland fire should generally be allowed to play its natural role of influencing natural processes and scenic values. Trail infrastructure should be protected. Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role.

In other areas, the CNF Plan includes the following management direction:

> *FW-DC-VEG-11. Fuels Treatments in Wildland-urban Interface*
> Fuel treatments continue to reduce surface, ladder, and crown fuels that lower the potential for high-severity wildfires while providing for diversity within the stands. Generally, treated areas consist of open understories with overstory trees (conifers and hardwoods) populated by predominately fire resistant species, with scattered individual or small patches of shrubs and small trees in the understory, maintaining some cover in important wildlife corridors. Surface, ladder, and crown fuels have been treated and maintained to allow low-intensity surface wildland fires (flame lengths of 4 feet or less). Vegetation has been modified (interrupted) to improve community protection and enhance public and firefighter safety.
>
> Crown base heights (height from the forest floor to the bottom most branches of the live tree crown) are managed to avoid crown fires. Crown cover of forest stands allow for adequate spacing between crowns to reduce crown fire potential while minimizing effects on surface wind speeds and drying of surface fuels.

When used under controlled conditions, prescribed fire can be used to reduce fire hazards, reduce competition to whitebark pine from other plant species, and prepare areas where Clark's Nutcrackers can cache seeds. Unretrieved seed from these seed caches results in whitebark pine regeneration.

Large, high-severity fires have the potential to severely reduce or even eliminate cone-bearing whitebark pine across an extensive landscape. The forest has already had stand replacing fires in whitebark pine stands (e.g. the Kettle Crest, Mankato Mountain, North and South Baldy). Some of the trees lost in these fires had offspring that showed resistance to blister rust in tests conducted at the Forest Service, Dorena Genetic Resources Center and the Coeur d'Alene Nursery test center. These trees' rust resistant genotypes need to be preserved through collection of scion material which is grafted onto rootstock and planted in areas which will be protected from fire. The existing whitebark pine stands need to have the highest priority for protection from fires. When these stands are lost, their individual rust-resistant tree genotypes are lost.

Future actions under the CNF Plan and USDA 2008 may have beneficial effects to whitebark pine. Fire suppression efforts may have beneficial effects on the species. However, large high severity fires may cause mortality and result in loss of individuals or complete sites.

<u>Insects and Disease</u>

Assessments describe the existing threats for the Whitebark pine ecosystem from both western white pine blister rust and mountain pine beetle (76 FR 42631, Spies et al. 2010, all as referenced in BA p.236). Across the range of Whitebark pine, these agents have contributed significantly to recent tree mortality. This species is a candidate for federal listing with a "warranted but precluded" finding issued in 2011. Continued implementation of the Pacific Northwest whitebark pine restoration strategy would be a critical management action to accomplish conservation goals. In the Pacific Northwest, whitebark pine is highly vulnerable to insects and diseases (Devine et al. 2012).

The CNF Plan includes the following management direction for insects and disease:

> *FW-DC-IPM-01. Integrated Pest Management.*
> Unwanted plant, animal (vertebrate and invertebrate) and pathogen species are prevented, suppressed, contained, controlled or eradicated. Native insects and plant and animal disease pathogens exist at endemic levels. Forests are managed for resilience to pests and pathogens…pest response plans are prepared, or existing plans reviewed…to facilitate rapid response to new pest outbreaks and infestations.
>
> *FW-OBJ-IPM-01. Integrated Pest Management*
> Damaging plant, animal, insect and plant and animal disease pest outbreaks are prevented, suppressed, contained, controlled or eradicated in a timely manner in accordance with proactive pest response plans. New outbreaks are addressed within one year of detection through the life of the plan.
>
> *FW-STD-IPM-01. Integrated Pest Management*
> Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest. Cooperate with other federal, state, and county agencies and other citizens to take an all lands approach to pest management. Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species.

The great majority of whitebark pine stands on the Forest are in the following management areas: Designated Wilderness, Recommended Wilderness, Kettle Crest Recreation Area, and Backcountry. Specific management direction relevant to insects and disease for these areas follows:

> *MA-GDL-WCD-09. Invasive Plants* (Congressionally Designated Wilderness)
> Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants. Treatments would need to be carried out by measures that have the least adverse impact on the wilderness resource and are compatible with wilderness management objectives.
>
> *MA-GDL-RW-08. Invasive Plants*
> Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants

> *MA-GDL-KCRA-04. Invasive Species* (Kettle Crest Recreation Area)
> Manual, biological, cultural, mechanical or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive species within all recreation opportunity spectrum classes of the recreation area.

> *MA-GDL-BC-07. Invasive Plants (Backcountry)*
> Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants.

> *FW-DC-VEG-02. Insects and Diseases*
> Native insects, diseases, fungi, bacteria, and viruses engage in their natural (endemic) role in contributing to ecosystem processes…. Landscapes provide a patchwork of varied structural, compositional, and successional stages that ensure the continuation of these processes.

Mountain pine beetles are endemic to forest ecosystems and western white pine blister rust, although an introduced disease, is now endemic. It will not be possible to eliminate the disease or the pest, but through proper management of stands, impacts from mountain pine beetles to whitebark pine stands can be reduced, and blister rust resistance genotypes can be introduced into stands through planting of rust resistant seedlings.

Addressing insects and disease may result in beneficial effects to whitebark pine and assist in conservation efforts.

National Forest Access System Effects, including roads, OHV trails, Recreation, including Dispersed Recreation and Winter Recreation

Access systems including roads and trails are not listed in the literature as a specific stressor or threat to whitebark pine. The following guideline includes discussion of buffers for roads.

> *FW-GDL-VEG-01. Threatened, Endangered and Sensitive Plant Species – Disturbance in Occupied Habitat*
> Soil and habitat disturbance should be managed within occupied and potentially suitable habitat to the extent practicable to maintain or enhance threatened, endangered, and sensitive plant populations and avoid invasive plant species establishment or spread. Consequently, occupied habitat should not be used for timber harvest, fuel breaks or developments associated with wildfire suppression, delivery of fire retardant or petroleum products, placement of stock-handling facilities, recreation, or special use developments. A 100-foot buffer between the occupied habitat and these management activities should be maintained.
>
> Trees in occupied habitat that are felled for safety reasons should be retained on site as needed to maintain, protect, or enhance habitat unless such action is detrimental to the threatened, endangered, and sensitive species population or habitat and represents a threat through physical impacts or potential uncharacteristic wildfire.

All new road and trail construction should be designed to avoid the occupied habitat of threatened, endangered, and sensitive plant species (minimum 100-foot buffer).

Use of prescribed fire should be avoided in occupied habitat except in areas occupied by fire-dependent or fire-tolerant species. Habitat restoration activities may proceed when designed to benefit threatened, endangered, and sensitive plant species.

Slash piles and other fuels should be managed to avoid the occupied habitat of threatened, endangered, and sensitive species (minimum 100-foot buffer).
Grazing management (including timing, intensity, duration, frequency of use, and type and class of livestock) should allow for completion of threatened, endangered, and sensitive plant species annual life cycle and development and dispersal of reproductive materials like seed and spores. Salting or water developments should not be authorized or allowed such that they reduce threatened, endangered, or sensitive plant populations.

Mining operations shall be conducted to minimize adverse environmental impacts on National Forest surface resources. Operations approved in a Plan of Operations shall avoid threatened, endangered, and sensitive plant species and their habitat to the extent practicable.

The Access System may result in loss of individuals or habitat if roads or trails are built through occupied or potential whitebark pine habitat. There may be indirect effects of increased human access resulting in accidental fire starts, or gathering of wood including whitebark pine. However, the management direction will minimize these impacts.

Lands and Special Uses, including Livestock Grazing and Mining.

Most of the lands and special uses actions occur in low elevations where the whitebark pine is unlikely to be exposed. Many, but not all, whitebark pine sites occur in designated wilderness, recommended wilderness, and backcountry where large scale development and resultant habitat loss will not occur. The CNF Plan will address infrastructure development through the following DCs, STDs, and GDLs.

MA-DC-WCD-02. Human Developments (Congressionally designated wilderness)
Wilderness is undeveloped except for those facilities deemed necessary for administration of the area as wilderness or essential for accommodating provisional uses…

MA-STD-RW-01. Existing and Proposed Uses (recommended wilderness)
Management actions must maintain the wilderness characteristics of the recommended wilderness areas that were identified in the 2009 wilderness evaluations for the Abercrombie Hooknose, Salmo-Priest Adjacent, and Bald Snow recommended wilderness areas prior to designation or release from wilderness consideration by Congress.

MA-DC-BC-04. Developments and Improvements (backcountry)
Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters (see direction under Administrative and Recreation Sites Management Area) as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments.

FW-GDL-WL-04. Federally Listed Species
Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

Because 95 percent of whitebark pine sites are within congressionally designated wilderness, proposed wilderness, research natural areas, and backcountry, most Lands and Special Uses actions are unlikely to affect whitebark pine.

The BA (p.235) listed whitebark pine as having a medium vulnerability to livestock grazing and trampling. Allotments include 3,654 acres of whitebark pine sites, or 60 percent of the total whitebark pine acres. The following guideline addresses livestock grazing; and also mining.

FW-GDL-VEG-01. Threatened, Endangered and Sensitive Plant Species – Disturbance in Occupied Habitat
Soil and habitat disturbance should be managed within occupied and potentially suitable habitat to the extent practicable to maintain or enhance threatened, endangered, and sensitive plant populations and avoid invasive plant species establishment or spread. Consequently, occupied habitat should not be used for timber harvest, fuel breaks or developments associated with wildfire suppression, delivery of fire retardant or petroleum products, placement of stock-handling facilities, recreation, or special use developments. A 100-foot buffer between the occupied habitat and these management activities should be maintained…

Grazing management (including timing, intensity, duration, frequency of use, and type and class of livestock) should allow for completion of threatened, endangered, and sensitive plant species annual life cycle and development and dispersal of reproductive materials like seed and spores. Salting or water developments should not be authorized or allowed such that they reduce threatened, endangered, or sensitive plant populations. Mining operations shall be conducted to minimize adverse environmental impacts on National Forest surface resources. Operations approved in a Plan of Operations shall avoid threatened, endangered, and sensitive plant species and their habitat to the extent practicable.

Depending on the size of the allotment, density of cattle grazed, and terrain, trampling could impact whitebark pine. Grazing on the trees themselves is unlikely, since cattle do not prefer conifer species. Future actions in or near occupied or potential whitebark pine habitat may result in direct or indirect loss of whitebark pine habitat.

Monitoring

In addition to the CNF Plan components described above, there habitat and species monitoring questions to be addressed. The monitoring questions specify the information that is essential for measuring CNF Plan accomplishments and effectiveness. The associated evaluation process determines whether the observed changes are consistent with the desired conditions and what

adjustments may be needed, if any. The monitoring plan include monitoring conducted in compliance with other laws, policies, and site-specific decisions.

> *MON-VEG-01*
> To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.
>
> *MON-VEG-02*
> Have management activities met Plan objectives and trended towards desired conditions for invasive terrestrial plant species?
>
> *MON-FLS-01:* To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

The information gained through monitoring and evaluation may be the catalyst for plan revisions or amendments.. The CNF Plan annual and five year monitoring reports will be shared with the USFWS.

Summary of Effects

Beneficial, insignificant, and/or adverse effects may occur to whitebark pine from future actions implemented under the CNF Plan. Future vegetation management actions could result in insignificant or adverse effects to whitebark pine, depending on the site specific details. Effects are summarized as follows:

- The great majority (95%) of whitebark pine stands on the Forest are in the following management areas: Designated Wilderness, Recommended Wilderness, Research Natural Area, and Backcountry. These MAs allow actions that are generally protective of whitebark pine habitat. Future actions under the CNF Plan and USDA 2008 may have beneficial effects to whitebark pine.

- Whitebark pine is not highly vulnerable to timber harvest because most of the sites (95%) occur in Designated Wilderness, Proposed Wilderness, Research Natural Areas or Back Country (BA p.234-35). The sites that do not occur in those MAs are addressed through management direction that makes timber harvest of whitebark pine unlikely. Future vegetation management actions could result in insignificant or adverse effects to whitebark pine, depending on the site specific details.

- Climate change will continue and exacerbate the main threats to whitebark pine (intense fires, pests, and disease). Climate change coupled with the other threats may result in loss of individuals or complete sites, and continued declines in populations. The CNF Plan responds to climate change through working towards resilient landscapes and historic range of variability.

- Restoration activities will be implemented consistent with the R6 Whitebark Pine Restoration Strategy to maintain and enhance whitebark pine. Future restoration activities, including controlled fire, may have short-term adverse effects (for instance, a prescribed fire may burn hotter or further than predicted), but long term benefits may result from the restoration actions. Large, high-severity fires may cause mortality and result in loss of individuals or complete sites across an extensive landscape. Fire suppression efforts may have beneficial effects on the species. Mountain pine beetles are endemic to forest ecosystems, and western white pine blister rust, although an introduced disease, is now endemic. It will not be possible to eliminate the disease or the pest, but through proper management of stands, impacts from mountain pine beetles to whitebark pine stands can be reduced, and blister rust resistance genotypes can be introduced into stands through planting of rust resistant seedlings.

- The most viable approach to restoring whitebark pine on the forest is to plant blister rust resistant seedlings in areas where whitebark pine will survive and grow well. However, the forest is not allowed to plant whitebark pine seedlings in designated wilderness areas. The forest has a number of whitebark pine trees whose offspring have tested resistant to blister rust. Many of these resistant parent trees are located in the Salmo-Priest wilderness area.

- Addressing insects and disease may result in beneficial effects to whitebark pine and assist in conservation efforts. The CNF Plan includes management direction to address insects and disease.

- The Access System could result in loss of individuals or habitat if roads or trails are built through occupied or potential whitebark pine habitat. There may be indirect effects of increased human access resulting in accidental fire starts, or gathering of wood including whitebark pine. However, the management direction will minimize these impacts.

- Because 95 percent of whitebark pine sites are within congressionally designated wilderness, proposed wilderness, research natural areas, and backcountry, most lands and special uses actions are unlikely to affect whitebark pine. Depending on the size of the allotment, density of cattle grazed, and terrain, trampling could impact whitebark pine. Grazing on the trees themselves is unlikely, since cattle do not prefer conifer species. Future actions in or near occupied or potential whitebark pine habitat may result in direct or indirect loss of whitebark pine habitat.

- Appendix B displays the conservation needs of whitebark pine, and how the CNF Plan addresses them. The CNF Plan is addressing the applicable threats.

CUMULATIVE EFFECTS

Past, present, and reasonably foreseeable future non-federal actions that affect whitebark pine habitat include timber harvest, fuels reduction, and grazing on private and state lands (BA p.236). These activities may reduce fuel loadings which would reduce the risk of large wildfires. Actions such as thinning to reduce bark beetle outbreaks will also beneficially affect nearby populations of whitebark pine.

INTEGRATION AND SYNTHESIS OF EFFECTS

Whitebark pine is affected by white pine blister rust and predation from mountain pine beetle. That, coupled with climate change and more frequent and higher intensity fires, has resulted in the decline of whitebark pine range wide. Most whitebark pine habitat in Washington and Oregon occurs on federally administered land, and 81 percent is on lands administered by the Forest Service, Region 6 (USDA 2008). Sixty percent of the known occupied whitebark pine habitat and 72 percent of the potential whitebark pine habitat on National Forest System land in the Pacific Northwest occurs in congressionally designated wilderness areas.

The Forest Service, including the Colville National Forest, can protect the habitat, manage for white pine blister rust resistant genetic lines, and implement restoration activities. The CNF Plan provides management direction that is consistent with National (Keane et al. 2012) and regional level (USDA 2008) whitebark pine strategies (Appendix B).

Out of a total 5,770,013 hectares (ha) of whitebark pine range (Keane et al. 2012 p.49), there is 5,769,542 ha of Forest Service ownership, and of that the Pacific Northwest region (Oregon and Washington) has 668,967 ha of whitebark pine range. Within the Pacific Northwest Region, the CNF has 37 whitebark pine sites, and 1,651 acres (668 ha) of occupied habitat. Therefore, the CNF has a relatively small contribution to whitebark pine conservation, given the size of the range. However, there are some white pine blister rust resistant whitebark pines on the CNF, so the Forest may have valuable sources.

Despite regional and national efforts, the whitebark pine may continue to decline. The CNF Plan provides management direction to address this species and its habitat. Coupled with other efforts in other regions, the decline may be slowed and allow conservation efforts to be developed.

CONCLUSION

After reviewing the current status of the whitebark pine, the environmental baseline for the action area, the effects of the proposed CNF Plan, and the cumulative effects, it is the Service's Opinion that the action, as proposed, is not likely to jeopardize the continued existence of the whitebark pine.

No critical habitat has been designated for this species; therefore none will be affected.

The whitebark pine is a candidate species. See the Reinitiation Notice regarding future confirming of this conference opinion as a biological opinion.

INCIDENTAL TAKE STATEMENT (For All Species)

Although the CNF Plan provides descriptions of program activities and overall goals for a variety of resource programs (e.g., timber harvest, recreational use, etc.), it does not provide a detailed list of proposed actions that will occur within these programs during the next 15 years. The proposed action that is the subject of this consultation is a "framework programmatic action" as defined in 50 C.F.R. 402.02. In accordance with 50 C.F.R. 402.14(i)(6), an incidental take statement is not required for this action. Any incidental take resulting from any action subsequently authorized, funded, or carried out under this framework programmatic action will be addressed in subsequent section 7 consultations, as appropriate.

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species (for example, whitebark pine). However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under Federal jurisdiction, or the destruction of endangered plants on non-Federal areas in violation of State law or regulation or in the course of any violation of a State criminal trespass law. It is expected that the Forest will comply with these limited protections for whitebark pine, should this species become listed during the life of the CNR Plan.

CONSERVATION RECOMMENDATIONS FOR ALL SPECIES

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Bull Trout

1. Coordinate with USFWS, Eastern Washington Field Office (EWFO), on annual bull trout surveys. Work together to determine highest priority areas and efforts.
2. For future site-specific actions and step-down consultations, consider the best available scientific information and current bull trout distribution to determine the likely exposure of bull trout.
3. In the Pend Oreille Core Area, and in the Northeastern Washington Research Needs Area, work with the USFWS to implement recovery and conservation actions identified in the recovery plan including but not limited to, identifying suitable spawning habitats, genetic surveys, and developing distribution records. Work with BC and Salmo watershed groups to support recovery efforts in the Salmo watershed.

Woodland Caribou

1. If the status of the caribou listed entity changes, revisit the CNF plan to ensure that the management direction is consistent with the SCITWG management plan or a final recovery plan.

2. Continue to manage for caribou and cooperate with research and management of the caribou on the forest.
3. Coordinate with caribou recovery planning efforts to ensure latest recovery plan expectations are met.

Grizzly Bear

1. Continue to manage for grizzly bear and cooperate with research and management of the bear on the forest.
2. Coordinate with grizzly bear recovery planning efforts to ensure latest recovery plan expectations are met.
3. Monitor and enforce the sanitation and food storage order. In any problem areas, conduct emphasis patrols and provide bear-resistant food storage containers.

Canada Lynx

The USFWS has no additional species-specific conservation recommendations at this time.

Yellow-Billed Cuckoo

1. If the status of the WYBC listed entity changes, revisit the CNF Plan to ensure that the management direction is consistent with the revised recovery plan.
2. Continue to manage for WYBC and cooperate with survey efforts for the bird on the forest.
3. Coordinate with WYBC cuckoo recovery planning efforts to ensure latest recovery plan expectations are met.

Wolverine

1. Cooperate with efforts to better understand the distribution and life history of wolverine in Washington and the Northwest.
2. If the wolverine is listed, cooperate with recovery efforts for the wolverine.

Whitebark Pine

1. Continue efforts to conserve whitebark pine on the forest. Protect whitebark pine sites from fire.
2. Collect whitebark pine seed to contribute to developing white pine blister rust resistant trees. Mark each collected tree with small aluminum tags at the base to ensure that the data and locations can be tracked.
3. Explore methods and encourage research to reduce pine beetle activity in vulnerable whitebark pine sites.
4. Continue to implement the Whitebark Pine Restoration Strategy for the Pacific Northwest Region (USDA 2008). Explore replanting blister-rust resistant seedlings in previously occupied habitats as evidenced by whitebark pine snags.

In order for the USFWS to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the USFWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE FOR LISTED SPECIES

This concludes formal consultation on the action(s) outlined in the request for formal consultation. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion; 3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. As described previously, this is a framework Opinion, and therefore no incidental take is anticipated or exempted for the action.

REINITIATION NOTICE FOR PROPOSED AND CANDIDATE SPECIES

This concludes formal conference for wolverine, whitebark pine, and southern mountain caribou DPS, on the CNF Plan. You may ask the EWFO to confirm the conference opinion as a biological opinion issued through formal consultation if the wolverine, whitebark pine, or southern mountain caribou become listed. The request must be in writing. If the EWFO reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the EWFO will confirm the conference opinion as the biological opinion and no further section 7 consultation on the CNF Plan as a framework document will be necessary. After listing of the species as endangered or threatened and after any subsequent adoption of this conference opinion, the Federal Agency shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

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Appendix A

INFISH and ARCS Comparison

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
Riparian Goal (7) maintain or restore riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geoclimatic region. **Riparian Goal (8)** maintain or restore habitat to support populations of well distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of aquatic-dependent communities. **Riparian Goal (1)** maintain or restore water quality, to a degree that provides for stable and productive riparian and aquatic ecosystems; **Riparian Goal (2)** maintain or restore stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed; **Riparian Goal (3)** maintain or restore instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges; **Riparian Goal (4)** maintain or restore natural timing and variability of the water table elevation in meadows and wetlands;	**FW-DC-WR-01. Natural Disurbance Regime of Aquatic and Riparian Systems** National Forest System lands contribute to the distribution, diversity, and resiliency of watershed and landscape-scale features, including natural disturbance regimes, of the aquatic, riparian, and wetland ecosystems to which plant and animal species, populations, and communities are adapted. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity National Forest System lands contribute to uninterrupted physical and biological processes within and between watersheds. Floodplains, groundwater-dependent systems, upslope areas, headwater tributaries, and intact habitat refugia provide vertical, horizontal, and drainage network connections. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian- dependent, and many terrestrial species of plants and animals. Subbasin scale is used for Forest planning, and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-03. Self-Sustaining Native and Aquatic and Riparian-Dependent Species National Forest System lands contribute to habitat and ecological conditions that are capable of supporting self-sustaining populations of native aquatic and riparian-dependent plant and animal species. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
	Provincial scales. Conditions assessed at the subbasin scale for forest and project planning.
	FW-DC-WR-05. Water Quality National Forest System lands contribute to water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality is within the range that maintains the biological, physical, and chemical integrity and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities, and meets appropriate Washington State water quality standards. Subbasin scale is used for forest planning and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-06. Sediment Regimes National Forest System lands contribute to the sediment regime within the natural range of variation. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport. Watershed scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-07. In-stream Flows National Forest System lands contribute to in-stream flows and groundwater sufficient to create and sustain riparian, aquatic, and wetland habitats, retain patterns of sediment, temperature, nutrient, and wood routing, and provide for (permitted or certificated) consumptive uses. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows functions in concert with local geology, valley types, soils and geomorphology. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-08. Floodplain Innundation National Forest System lands contribute to the timing, variability, and duration of floodplain inundation that are within the natural range of variation. Fifth field watershed or subwatershed scale is used for both Forest and project planning.
	FW-DC-WR-09. Groundwater-Dependent Systems: Seeps, Springs,

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
	and Groundwater-fed Wetlands (Fens) National Forest System lands contribute to the timing, variability, and water table elevation in groundwater-fed wetlands, seeps, springs and other groundwater-dependent systems. These features are within or moving toward proper functioning condition. Subwatershed scale is used for both Forest and project planning.
	FW-DC-WR-10. Water Production for Downstream Uses National Forest System lands produce high-quality water for downstream ecological communities (including human communities) dependent upon them. Watershed scale is used for both Forest and project planning.
Riparian Goal (6) maintain or restore riparian vegetation, to: a) provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems; b) provide adequate summer and winter thermal regulation within the riparian and aquatic zones; c) and help achieve rates of surface erosion, bank erosion, and channel migration characteristic of those under which the communities developed.	**FW-DC-WR-11. Native Plant Communities** National Forest System lands contribute to the species composition and structural diversity of native plant communities in riparian management areas (including wetlands). These contribute to adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration; and supply amounts and distributions of coarse woody debris and fine particulate organic matter sufficient to sustain physical complexity and stability. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.
Riparian Goal (5) maintain or restore diversity and productivity of native and desired non-native plant communities in riparian zones.	**FW-DC-WR-12. Aquatic Invasive and Non-Native Species** Aquatic invasive species do not occur as a component of lake, stream, and other riparian- related ecosystems or compete with native species for critical resources. Subbasin scale is used for Forest planning. Fifth field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-13. Aquatic Threatened, Endangered, and Sensitive Species National Forest System lands contribute to the recovery of federally threatened and endangered aquatic species and conservation of Regional Forester's sensitive aquatic species. Aquatic habitat supports spawning, rearing, and/or other key life history requirements. Aquatic habitat also is designated as critical habitat for listed species (such as bull trout) in some areas.

Appendix A, From Honeycutt email 5-30-17; [Aquatic direction plan component comparison 4-11-17]

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
	Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning.
	FW-DC-WR-14. Resiliency to Climate Change Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin is scale is used for Forest planning and 5th field watershed scale is used for project planning.
	FW-DC-WR-15. Water Quality Standards in Source Water Protection Areas National Forest system lands in ground and surface source water protection areas provide water that meets or exceeds state water quality standards for drinking water with appropriate treatment.
	FW-DC-WR-19. Focus and Priority Watershed Network Focus and priority watersheds contribute to the sustainability of aquatic and riparian systems and species and provide resilient, productive habitat and high water quality.
No specific “DC” were incorporated into INFISH for Priority/Key WA	**FW-DC-WR-16. Key Watershed Network** Networks of watersheds with functional habitat and functionally intact ecosystems contribute to and enhance conservation and recovery of specific threatened, endangered, and/or sensitive aquatic species and high water quality and natural flow regimes. The networks contribute to short-term conservation and long-term recovery at the Recovery Unit or other appropriate population scale.
	FW-DC-WR-17. Roads in Key Watersheds Roads in key watersheds are not a risk to the function of soil and water resources. Roads do not disrupt hydrologic or aquatic habitat function or threatened and endangered species biological and behavioral attributes.
	FW-DC-WR-18. Key Watershed Integrity Key watersheds have high watershed integrity and contribute to resilient aquatic and riparian ecosystems.

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
	MA-DC-RMA-01. Composition Riparian management areas consist of native flora and fauna in a functional system and a distribution of physical, chemical, and biological conditions appropriate to natural disturbance regimes affecting the area.
	MA-DC-RMA-02. Key Riparian Processes Key riparian processes and conditions (including slope stability and associated vegetative root strength, capture and partitioning of water within the soil profile, wood delivery to streams and within the riparian management areas, input of leaf and organic matter to aquatic and terrestrial systems, solar shading, microclimate, and water quality) are operating consistently with local disturbance regimes.
	MA-DC-RMA-03. Livestock Grazing Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment.
	MA-DC-RMA-04. Roads Roads located in or draining to riparian management areas do not present a substantial risk to soil or hydrologic function. Roads do not disrupt riparian and aquatic function.
	FW-OBJ-WR-01. Aquatic Invasive Species Within the next 15 years, implement aquatic invasive species prevention measures at all developed recreation sites providing direct and/or indirect access to water bodies, such as boat ramps, campgrounds, and day use areas that provide portal zones for hand carried watercraft. Implement aquatic invasive species prevention measures as part of all aquatic survey and inventory procedures and other management activities that pose high potential for invasion vectors to occur. For guidance on invasive riparian plants see Vegetation Desired Condition section.

Appendix A, From Honeycutt email 5-30-17; [Aquatic direction plan component comparison 4-11-17]

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
	FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species Within the next 15 years, implement aquatic invasive species control and eradication in 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and ecological systems are determined to be unacceptable.
	FW-OBJ-WR-03. General Watershed Function and Restoration Within the next 15 years, decrease sediment delivery from management activities on 1,000 acres including but not limited to roads, trails, livestock, unauthorized off-highway vehicle use, vegetation management, and dispersed and developed campsites. Restore hydrologic, aquatic and riparian processes through activities that stabilize stream bank erosion, and other accelerated channel destabilizing processes (i.e., headcutting), improve lateral and vertical hydrologic connectivity, and improve stream channel and floodplain function on 10 miles of streams.
	FW-OBJ-WR-04. Fish Habitat Improvement. Within 15 years restore aquatic organism passage for all life stages of native species at 45 road/stream crossings and man-made instream structures such as water diversions and dams outside of key watersheds. Culverts and other passage improvements are to be designed to restore and maintain hydrologic and aquatic habitat function and stream channel resiliency to a range of flows through natural channel design and other acceptable treatment measures.
	FW-OBJ-WR-10. Watershed Restoration in Focus and Priority Watersheds Over 15 years, implement the watershed condition framework through completion of essential projects outlined in watershed action plans in existing focus and priority watersheds to improve watershed condition class. Focus watersheds designated at the 5th field watershed scale include Upper Sanpoil, Chewelah Creek-Colville River, and LeClerc Creek-Pend Oreille River watersheds. Priority watersheds designated at the subwatershed scale include Ninemile Creek and West Branch LeClerc Creek subwatersheds.
	FW-OBJ-WR-11. Watershed Analysis

No Action and B Alternative	**Alternative P**
INFISH (1995)	**Colville ARCS**
	Within 15 years of plan implementation complete or update watershed analyses for 5 subwatersheds. Criteria for selecting subwatershed for watershed analysis include; Key watersheds, Priority Watersheds, watersheds that support designated critical habitat, or support listed species, and watersheds where management activities are likely to occur that may affect aquatic resources (due to their inherent nature, location, timing, or scale).
	FW-OBJ-WR-05. Key Watershed Restoration Prioritization Management in key watersheds focuses on restoration or preservation of watershed, aquatic, and riparian function and recovery of threatened and endangered species. Improve watershed condition class in key watersheds that are a priority for restoration within 15 years of forest plan implementation. Key watersheds that are a priority for restoration include: *East Branch LeClerc Creek, West Branch LeClerc Creek, Deadman Creek, Barnaby Creek, Harvey Creek, North Fork Deadman Creek, North Fork Sullivan Creek, Sullivan Creek, Ruby Creek, Tonata Creek, Upper Sherman Creek, and South Fork Sherman Creek subwatersheds.* Additional key watersheds that are a priority for restoration will be identified, as appropriate, through the life of the plan through the WCF process.
	FW-OBJ-WR-06. Key Watershed Road Treatments Reduce road-hydrologic connectivity and sediment delivery on roads through storm damage risk reduction treatments, full hydrologic decommissioning, and other accepted treatment measures on 116 miles of hydrologically connected road within 15 years of forest plan implementation. Restore or maintain aquatic organism passage and improve hydrologic and aquatic habitat function at 53 road/stream crossings for all native aquatic species, seasons, flows, and life stages in key watersheds within 15 years of forest plan implementation through culvert replacement or crossing improvement and natural channel design or other acceptable treatment measures that provide for natural stream channel function at all flows.
	FW-OBJ-WR-07. Key Watershed Range Infrastructure Improvements

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	Improve hydrologic and aquatic function through range infrastructure improvements, including riparian fencing, movement and improvement of watering troughs, and other acceptable treatments over 240 acres within 15 years of plan implementation.
	FW-OBJ-WR-08. Upland Vegetation Structure in Riparian Management Areas in Key Watersheds Move upland vegetation within riparian management areas in key watersheds toward historical range of variability (table 8) on 1,500 acres within 15 years of plan implementation.
	FW-OBJ-WR-09. Stream Restoration in Key Watersheds Restore hydrologic, geomorphic, and riparian process and function on 81 miles of stream within 15 years of forest plan implementation through activities including streambank stabilization, restoration of lateral and vertical hydrologic connectivity and improvement of stream channel and floodplain function.
	MA-OBJ-RMA-01. Improve Riparian Function at Dispersed and Developed Recreation Sites Over the next 15 years, restore riparian processes and balance need for occupancy and access to water at 75 dispersed and developed recreation sites, through education, enforcement, and engineering where recreational use results in bank damage, reduction in water quality, and/ or a reduction in stream shade. **MA-OBJ-RMA-02. Restoration of Riparian Habitat and Process on Roads** Restore hydrologic and riparian habitat function within riparian management areas in non-key watersheds by reducing road-related impacts on 80 miles of road within 15 years. **MA-OBJ-RMA-03. Restoration of Late Forest Structure** Move upland vegetation within riparian management areas outside of key watersheds toward historic range of variability on 500 acres within 15 years of plan implementation.

Appendix A, From Honeycutt email 5-30-17; [Aquatic direction plan component comparison 4-11-17]

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Pool Frequency (kf)- Varies by Channel Width (all systems) • Wetted with in feet: … • Number pools per mile: … **Water Temperature** (sf) No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 59°F within adult holding habitat and below 48°F within spawning and rearing habitats. **Large Woody Debris** (sf)(forested systems) East of Cascade Crest in Oregon, Washington, Idaho, Nevada and western Montana. >20 pieces per mile; >12 inch diameter; >35 foot length. **Bank Stability** (sf)(non-forested systems) - > 80 percent stable **Lower Bank Angle** (sf)(non-forested systems) - >75 percent of banks with <90 degree angle (i.e. undercut)	**FW-STD-WR-01. Properly Functioning Watersheds** When aquatic and riparian desired conditions are being achieved and watersheds are functioning properly37, projects shall maintain38 those conditions. When aquatic and riparian desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk 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 be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.

37 Per Watershed Condition Framework Technical Guide (USDA Forest Service, 2011b) and/or subsequent versions and/or comparable methods. Other broad-scale or local inventory, assessment and monitoring data and analysis can be used to refine initial classifications made per WCF.
38 See glossary for definitions of the terms “maintain”, “restore”, “degrade”, and “retard attainment”.

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No Action and B Alternative	**Alternative P**
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Width/Depth Ratio (sf)(all systems) - <10, mean wetted width divided by mean depth	
	FW-STD-WR-02. Best Management Practices All projects shall be implemented in accordance with Best Management Practices, as described in National and Regional Technical Guides.
	FW-STD-WR-03. Aquatic Invasive Species—In-Water Work Implement prevention measures for in-water projects to decrease the potential for aquatic invasive species transference into non-infested water bodies.
	FW-STD-WR-05. Construction of New Roads, Trails, and Developed Recreation Sites New roads and trails will be designed to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over land drainage features. New roads, trails and developed recreation sites will integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.
	FW-GDL-WR-01. Aquatic Invasive Species—Wildfire Suppression Equipment During wildfire suppression, cross contamination between streams and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident.
	FW-STD-WR-04. Aquatic Invasive Species—Aquatic Resource Sampling Aquatic sampling equipment should be disinfected prior to use in new stream or lake locations.

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	FW-GDL-WR-02. Aquatic Invasive Species—Early Detection and Rapid Response Principles and processes of early detection and rapid response (EDRR) to find, identify, and quantify new aquatic invasive species occurrences should be utilized. EDRR should be coupled with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species.
WR-1. Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserve the genetic integrity of native species, and contributes to attainment of Riparian Management Objectives.	**FW-GDL-WR-03. Watershed Restoration** Use the restoration methods that maximize the use of natural ecological processes for long- term sustainability and minimize the need for long-term maintenance.
	FW-GDL-WR-04. Hydrologic Function of Roads, Trails, and Developed Recreation Sites Roads and trails should be maintained to minimize disruption of natural hydrologic processes at perennial and intermittent stream crossings, valley bottoms, valley approaches and other over- land drainage features. Roads and trails should integrate features, such as, but not limited to, rocked stream crossings, drain dips, sediment filtration, cross drains and crossings that minimize unnatural stream constriction, bank erosion, channel incision, sedimentation, or disruption of surface and subsurface flow paths.
	FW-GDL-WR-05. Chemical Fire Suppression Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by riparian and aquatic-dependent threatened, endangered, proposed, candidate, or sensitive species, or their habitats.
	FW-STD-06. Road Construction and Hydrologic Risk Reduction in Key

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	Watersheds In Key Watersheds and in subwatersheds with ESA critical habitat for aquatic species that are functioning properly with respect to roads, there will be no net increase (at least one mile of road-related risk reduction for every new mile of road construction) in system roads that affect hydrologic function. In Key Watersheds and in subwatersheds with ESA critical habitat for aquatic species that are functioning-at-risk or have impaired function with respect to roads, there will be a net decrease (for every mile of road construction there would be greater than one mile of road-related risk reduction) in system roads that affect hydrologic function to move toward proper function. Treatment priority shall be given to roads that pose the greatest relative ecological risks to riparian and aquatic ecosystems. Road-related risk reduction will occur prior to new road construction unless logistical restrictions require post-construction risk reduction.
	FW-STD-WR-07. Hydroelectric and Other Water Development Authorizations in Key Watersheds Hydroelectric and other water development authorizations shall include requirements for in-stream 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.
	FW-STD-WR-08. New Hydroelectric Facilities and Water Developments New hydroelectric facilities and water developments shall not be located in a key watershed unless it can be demonstrated they have minimal risks and/or no adverse effects to fish and water resources for which the key watershed was established.
Pool Frequency (kf)- Varies by Channel Width (all systems) • Wetted with in feet: … • Number pools per mile: … **Water Temperature** (sf) No measurable increase in maximum water temperature (7-day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7-day period). Maximum water temperatures below 59°F within adult holding habitat and below 48°F within spawning	**MA-STD-RMA-01. Aquatic and Riparian Conditions** Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When RMAs are properly functioning and aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. When RMAs have impaired function or are functioning-at-risk or if aquatic and riparian desired conditions are not yet being achieved and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired

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and rearing habitats. **Large Woody Debris** (sf)(forested systems) East of Cascade Crest in Oregon, Washington, Idaho, Nevada and western Montana. >20 pieces per mile; >12 inch diameter; >35 foot length. **Bank Stability** (sf)(non-forested systems) - > 80 percent stable **Lower Bank Angle** (sf)(non-forested systems) - >75 percent of banks with <90 degree angle (i.e. undercut) **Width/Depth Ratio** (sf)(all systems) - <10, mean wetted width divided by mean depth	conditions. Short-term adverse effects from project activities may be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of RMA desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities.
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 inland native fish.	**MA-STD-RMA-02. Chemical Application** Apply herbicides, insecticides, piscicides, and other toxicants, other chemicals, and biological agents only to maintain, protect, or enhance aquatic and riparian resources and/or native plant communities.

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TM-1 Prohibit timber harvest, including fuel wood cutting, in Riparian Habitat Conservation Areas, except as described below. A. Where catastrophic events such as fire, flooding, volcanic, wind, or insect damage result in degraded riparian conditions, allow salvage and fuel wood cutting in Riparian Habitat Conservation Areas 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 can be avoided to inland native fish. For priority watersheds, complete watershed analysis prior to salvage cutting in RHCAs. 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 inland native fish.	**MA-STD-RMA-03. Personal Fuelwood Cutting** Personal fuelwood cutting shall not be authorized within riparian management areas or source areas for large woody debris. **MA-STD-RMA-04. Timber Harvest and Thinning** Timber harvest and other silvicultural practices can occur in riparian management areas only as necessary to attain desired conditions for aquatic and riparian resources. Vegetation in riparian management areas will not be subject to scheduled timber harvest.

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	MA-STD-RMA-05. Yarding Activities Cable yarding activities shall achieve full suspension over wet and dry stream channels.
	MA-GDL-RMA-10. Fish Passage Barriers Consider retaining fish passage barriers where they serve to restrict access by undesirable non- native species and are consistent with restoration of habitat for native species.
	n/a
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.	**MA-GDL-RMA-01. Fuel Storage** Refueling shall occur with appropriate containment equipment and a spill response plan in place. Wherever possible, storage of petroleum products and refueling will occur outside of RMAs. If refueling or storage of petroleum products is necessary within RMAs, these operations will be conducted no closer than 100 feet from waterways**.**
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 inland native fish.	**MA-STD-RMA-02. Chemical Application** Apply herbicides, insecticides, piscicides, and other toxicants, other chemicals, and biological agents only to maintain, protect, or enhance aquatic and riparian resources and/or native plant communities.
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.	**MA-GDL-RMA-02. Felling Trees** When trees are felled for safety, they should be retained onsite (channels and adjacent floodplains) to maintain, protect, or enhance aquatic and riparian resources unless otherwise determined that such trees pose a new risk to administrative or developed recreation sites.
RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by: a.) Completing watershed analyses prior to construction of new roads or landings in	**MA-GDL-RMA-03. Landings, Skid Trails, Decking, and Temporary Roads** Landings, designated skid trails, staging or decking shall not occur in riparian management areas, unless there are no other reasonable

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<table>
<tr><th>***No Action and B Alternative***</th><th>**Alternative P**</th></tr>
<tr><th>**INFISH (1995)**</th><th>**Colville ARCS**</th></tr>
<tr><td rowspan="5">Riparian Habitat Conservation Areas within priority watersheds.
b.) Minimizing road and landing locations in RHCA's
c.) – included on page 28 of this table
d.) avoiding sediment delivery to streams from the road surface.
1. 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.
2. Route road drainage away from potentially unstable stream channels, fills and hillslopes
e.) Avoiding disruption of natural hydrologic flow paths
f.) Avoiding sidecasting of soils or snow. Sidecasting of road material is prohibited on road segments within or abutting RHCA's in priority watersheds.

RF-3. Determine the influence of each road on the Riparian Management Objectives. Meet Riparian Management Objectives
and avoid adverse effects on inland native fish by:

a. 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.

b. prioritizing reconstruction based on the current and potential damage to 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.

c. 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 inland native fish in priority watersheds, and the ecological value of the riparian resources affected.</td><td>alternatives, in which case they will:
• Be of minimum size
• Be located outside the active floodplain
• Minimize effects to large wood, bank integrity, temperature, and sediment levels
• Not result in unnatural modification of flow paths
• Impacted site(s) to be reclaimed as soon as practicable.
Existing infrastructure may be reused with intent of removal and restoration of riparian function as soon as practicable.</td></tr>
<tr><td>**MA-GL-RMA-04. Road Construction**
Construction of permanent or temporary roads in riparian management areas should be avoided except where Forest authorities are limited by law or regulation, and except where necessary for:
• stream crossings
• stream, wetland, riparian restoration, or road relocation
• mine reclamation
• employee, contractor, or public safety</td></tr>
<tr><td>**MA-GDL-RMA-05. Temporary Road Reconstruction**
Temporary roads in RMAs should be avoided. When avoidance is not possible, temporary roads in RMAs should be managed to protect and restore aquatic and riparian desired conditions.</td></tr>
<tr><td>**MA-STD-RMA-06. Road and Trail Construction and Maintenance**
No sidecasting or placement of fill in riparian management areas, except where needed to construct or replace stream crossings Snowplowing activities shall not allow runoff from roads and trails in locations where it could deliver sediment to streams.</td></tr>
<tr><td>Consolidated into MA-STD-RMA-06</td></tr>
</table>

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RF-2. For each existing or planned road, meet the Riparian Management Objectives and avoid adverse effects to inland native fish by: c.) initiating development and implementation of a Road Management Plan or a Transportation Management Plan. At a minimum, address the following items in the plan: 1. Road design criteria, elements, and standards that govern construction and reconstruction. 2. Road management objectives for each road. 3. Criteria that govern road operation, maintenance, and management. 4. Requirements for pre-, during-, and post-storm inspections and maintenance. 5. Regulation of traffic during wet periods to minimize erosion and sediment delivery and accomplish other objectives. 6. Implementation and effectiveness monitoring plans for road stability, drainage, and erosion control. 7. Mitigation plans for road failures.	**MA-GDL-RMA-06. Road and Trail Construction—Wetlands and Unstable Areas** Wetlands and unstable areas should be avoided when reconstructing existing roads and trails or constructing new roads, trails, and landings. Impacts should be mitigated where avoidance is not possible.
	n/a
	MA-GDL-RMA-07. Road and Trail Management—Drainage Road and trail drainage should be routed away from potentially unstable channels, fills, and hillslopes.
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 priority watersheds from increased sedimentation. Base priority for upgrading on risks in 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.	**MA-STD-RMA-07. Road and Trail Construction at Stream Crossings** At a minimum, all new or replaced permanent stream crossings shall accommodate at least the 100-year flood and its bedload and debris. 100-year flood estimates will reflect the best available science regarding potential effects of climate change.

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	MA-GDL-RMA-09. Road and Trail Construction at Stream Crossings-Minimization of Diversion Potential Where feasible, new or reconstructed stream crossings should be designed to prevent the diversion of streamflow out of the channel and down the road or trail in the event of crossing failure. If avoidance is not possible, minimize the potential effects of crossing failure.
RF-5. Provide and maintain fish passage at all road crossings of existing and potential fish-bearing streams.	**MA-GDL-RMA-08. Road and Trail Construction—Passage for Riparian—Dependent Species** Construction or reconstruction of stream crossings should allow passage for other riparian dependent species where connectivity has been identified as an issue.
	MA-STD-RMA-08. Road and Trail Construction-Fish Passage Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic species and for riparian-dependent organisms where connectivity has been identified as an issue. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows.
GM-1. Modify grazing practices (e.g., 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 adversity affect inland native fish. Suspend grazing if adjusting practices is not effective in meeting Riparian Management Objectives.	**MA-STD-RMA-09. Management of Livestock Grazing to Attain Desired Conditions** Manage livestock grazing to move toward aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing management. If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures.
	MA-STD-RMA-10. Recreational and Permitted Grazing Management-Livestock Handling, Management, and Water Facilities New and replaced livestock handling and/or management facilities and

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	livestock trailing, salting, and bedding are prohibited in riparian management areas unless they do not prevent or retard attainment of aquatic and riparian desired conditions, inherently must be located in an RMA, or are needed for resource protection.
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. Relocate or close facilities where these objectives cannot be met.	**MA-GDL-RMA-11. Annual Grazing Use Indicators** The purpose of this guideline is to manage livestock grazing to help attain and maintain aquatic and riparian desired conditions over time. Specifically, it is intended to maintain or improve vegetative and stream conditions, help ensure the viability of aquatic species, provide important contributions to the recovery of ESA-listed species, and facilitate attainment of State water quality standards. The annual livestock use and disturbance indicators described below should be applied to help achieve, over longer timeframes, conditions at site and watershed scales that enable attainment and maintenance of desired conditions. The values specified below are starting points for management. Only those indicators and numeric values that are appropriate to the site and necessary for maintaining or moving towards desired conditions should be applied. Specific indicators and indicator values should be prescribed and adjusted, if needed, in a manner that reflects existing and natural conditions for the specific geo-climatic, hydrologic and vegetative setting in which they are being applied[39]. Indicators and 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 ESA consultation documents, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline. 1. In subwatersheds that are functioning properly[40] for water quality,

39For example, the stubble height values contained herein may not be appropriate for some sites (e.g., those with short graminoids).
40Subwatershed classification as properly functioning, functioning-at-risk, or impaired function should be determined based on a weight-of-evidence approach that considers, at a minimum, the water quality, aquatic habitat, and riparian/wetland vegetation indicators of the Watershed Condition Framework (WCF). Only WCF water quality parameters relevant to livestock grazing (e.g., temperature, nutrients, bacteria, sediment) need be considered. Local inventory, assessment and monitoring data and information (e.g., Multiple Indicator Monitoring, Proper Functioning Condition) can be used to refine initial classifications made per WCF.41Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height,

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	aquatic habitat, and riparian and wetland vegetation, maintain those conditions by managing annual livestock grazing use and disturbance as follows[41]: • maintain a minimum of 6-inch residual herbaceous stubble height on the greenline[42], except for sites in late-seral conditions[43] being managed under any grazing system that supports a late-seral ecological stage, where a minimum of 4-inch to 6-inch stubble height should be maintained • utilize no more than 30-45% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area • Allow no more than 20-25% streambank alteration[44] • limit use of woody species to no more than 30-40% of current year's leaders along streambanks and, as needed, in other critical portions of the riparian management area 2. In subwatersheds that are functioning-at-risk or that have impaired functic for water quality, aquatic habitat, and/or riparian and wetland vegetation a where grazing contributes to those conditions, enable recovery by manag annual livestock grazing use and disturbance as follows: • maintain a minimum of 6-inch to 8-inch residual herbaceous

streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization.

41Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height, streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization.

42Stubble height criteria apply at the end of the grazing period, when that period ends after the growing season. When the grazing period ends before the growing season does, stubble height criteria can be applied at the end of the grazing period or the end of the growing season.

43 'Late-seral' means the existing riparian vegetation community is >60% similar to the potential natural community composition (per Winward 2000).

44Streambank alteration criteria are assessed in designated monitoring areas (DMA) following guidance in BLM Technical Reference 1737-23 and apply within 1-2 weeks of removal of livestock from each pasture.

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	stubble height on the greenline • on sites with late-season grazing[45] and where willow is or should be an important component of the riparian vegetation community, maintain a minimum of 8-inch residual herbaceous stubble height • utilize no more than 30-35% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area • Allow no more than 15-20% streambank alteration • limit use of woody species to no more than 20-30% of current year's leaders along streambanks and, as needed, other critical portions of the riparian management areas More conservative values, within and potentially beyond the ranges described above, should be used when: (1) relevant indicators (e.g., water quality, aquatic habitat, riparian vegetation) are highly departed from desired conditions and not improving due to livestock influence; (2) ESA-listed aquatic species or critical habitat sensitive to grazing impacts are present and conditions are not improving; or (3) grazing-related requirements of water quality restoration plans for impaired waters (e.g., site potential shade) are not being met and conditions are not improving. Implement other applicable actions contained in ESA Recovery Plans and water quality restoration plans.
	MA-STD-RMA-11. Permitted Grazing Management—Allotment Management Planning During allotment management planning, negative impacts to water quality and aquatic and riparian function from existing livestock handling or management facilities located within riparian management areas shall be

45 Late season grazing generally begins after sugar storage in woody vegetation is complete and leaf fall has started. Upland plant seeds have shattered and mean air temperatures begin to cool.

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	minimized to allow conditions to move toward the desired condition.
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 inland native fish. **GM-4.** Adjust wild horse and burro management to avoid impacts that prevent attainment of Riparian Management Objectives or adversely affect inland native fish.	**MA-GDL-RMA-12. Recreational and Permitted Grazing Management—Livestock Handling Activities** Livestock trailing, bedding, loading, and other handling activities should be avoided in riparian management areas, except for those that inherently must occur in a riparian management area. **MA-GDL-RMA-13. Recreational and Permitted Grazing Management—Fish Redds** Prohibit livestock trampling of Federally-listed Threatened or Endangered fish redds.
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 inland native fish. Complete watershed analysis prior to construction of new recreation facilities in Riparian Habitat Conservation Areas within 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 inland native fish. Relocate or close recreation facilities where Riparian Management Objectives cannot be met or adverse effects on 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 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 inland native fish, eliminate the practice or occupancy. **RM-3.** Address attainment of Riparian management Objectives and potential effect on inland native fish in Wild and Scenic Rivers, Wilderness and other Recreation Management Plans.	**MA-GDL-RMA-14. Recreation Management—New Facilities and Infrastructure** New facilities or infrastructure should not be placed within expected long-term channel migration zones. Facilities that inherently occur in riparian management areas (e.g., road stream crossings, boat ramps, docks, interpretive trails) should be located to minimize impacts on riparian-dependent resource conditions (e.g., within geologically stable areas, avoiding major spawning sites). **MA-GDL-RMA-15. Recreation Management—Existing Facilities** Consider removing, relocating, or re-designing existing recreation facilities that are not meeting desired conditions in riparian management areas or are in active floodplains.
MM-1. Minimize adverse effects to inland native fish species from mineral operations. 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	**MA-STD-RMA-18. Mineral Operations in RMAs** For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian-dependent resources affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this standard include situations

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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.	where Forest Service has limited discretionary authorities. In those cases, project effects shall be minimized and shall not prevent or retard attainment of aquatic and riparian desired conditions to the extent possible within those authorities.
	MA-STD-RMA-19. Operating Plans for Existing Activities Work with operators to adjust their mineral operations to minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures 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.	**MA-STD-RMA-20. Minerals Management—Structures and Support Facilities** Work with operators to locate structures, support facilities, and roads outside RMAs. Where no alternative exists, work with operators to locate and manage them to minimize effects upon aquatic and riparian desired conditions. When structures, support facilities, and roads are no longer required for mineral activities, reclaim sites to achieve aquatic and riparian desired conditions. Require operations to provide financial assurance adequate for the forest to reclaim disturbed areas in the absence of a financially solvent operator. Bonding will be posted prior to approval of any Plan of Operations.

Appendix A, From Honeycutt email 5-30-17; [Aquatic direction plan component comparison 4-11-17]

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MM-3 Prohibit solid and sanitary waste facilities in Riparian Habitat Conservation Areas. If no alternative to locating mine waste (waste rock, spent ore, tailings) facilities in Riparian Habitat Conservation Areas exists, and releases can be prevented and stability can be ensured, then: a. analyze the waste material using the best conventional sampling methods and analytic techniques to determine its chemical and physical stability characteristics. b. locate and design the waste facilities using the best conventional techniques to ensure mass stability and prevent the release of acid or toxic materials. If the best conventional technology is not sufficient to prevent such releases and ensure stability over the long term, prohibit such facilities in Riparian Habitat Conservation Areas. c. monitor waste and waste facilities to confirm predictions of chemical and physical stability, and make adjustments to operations as needed to avoid adverse effects to inland native fish and to attain Riparian Management Objectives. d. reclaim and monitor waste facilities to assure chemical and physical stability and revegetation to avoid adverse effects to inland native fish, and to attain the Riparian Management Objectives. e. require reclamation bonds adequate to ensure long-term chemical and physical stability and successful revegetation of mine waste facilities.	**MA-STD-RMA-21. Mine Waste** Do not locate mine waste with the potential to generate hazardous substances (as defined by CERCLA) within RMAs and/or areas where groundwater contamination is possible. The exception is short-term staging of waste during abandoned mine cleanup.
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 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 inland native fish	**MA-STD-RMA-22. Leasable Exploration and Development** Consent decisions to allow mineral leasing will provide Bureau of Land Management (BLM) stipulations for lease management. Once leased, the Forest will actively coordinate and consult with BLM regarding lease exploration and development activities. In consultation with the BLM, the Forest will recommend BMPs and mitigation as Conditions of Approval to support attainment and maintenance of aquatic and riparian desired conditions.
MM-5. Permit sand and gravel mining and extraction within Riparian Habitat Conservation Areas will occur only if no alternatives exist, if the action(s) would not	**MA-STD-RMA-23. Saleable Minerals** Prohibit saleable mineral activities such as sand and gravel mining and

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retard or prevent attainment of Riparian Management Objectives and adverse effects to inland native fish can be avoided.	extraction within RMAs unless no alternatives exist and if the action(s) will not retard or prevent attainment of aquatic and riparian desired conditions.
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 inland native fish.	**MA-STD-RMA-24. Inspection and monitoring of mineral plans, leases, and permits** Conduct inspections, monitor, and annually review required monitoring for mineral plans, leases, and permits. Evaluate inspection and monitoring results and require mitigations for mineral plans, leases, and permits as needed to eliminate impacts that retard or prevent attainment of aquatic and riparian desired conditions.
	MA-STD-RMA-25. Suction Dredge and Placer Mining Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations and their designated critical habitat. • All suction dredge mining activities in occupied habitat for aquatic threatened or endangered species/populations and in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or “will likely cause significant disturbance of surface resources”46. A likelihood that a threatened or endangered species "take" (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics. • If the District Ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the District Ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance.

46 [1] The phrase ‘‘will likely cause significant disturbance of surface resources’’ means that, based on past experience, direct evidence, or sound scientific projection, the District Ranger reasonably expects that the proposed operations would result in impacts to NFS lands and resources which more probably than not need to be avoided or ameliorated by means such as reclamation, bonding, timing restrictions, and other mitigation measures to avoid or minimize adverse environmental impacts on NFS resources.

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	MA-GDL-RMA-16. Wildland Fire and Fuels Management—Temporary Fire Facilities Temporary fire facilities (e.g., incident bases, camps, staging areas, helispots, and other centers) for incident activities should be located outside riparian management areas. When no practical alternative exists, all appropriate measures to maintain, restore, or enhance aquatic and riparian-dependent resources should be used.
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.	**MA-STD-RMA-14. Pump and Dipping Equipment Cleaning** Fish habitat and water quality shall be protected when withdrawing water for administrative purposes. When drafting, pumps shall be screened at drafting sites to prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use appropriate screening criteria where listed fish or critical habitat are present. **MA-STD-RMA-13. Fire and Fuels Management—Portable Pumps** Portable pump set-ups shall include containment provisions for fuel spills and fuel containers shall have appropriate containment provisions. Park vehicles in locations that do not allow entry of spilled fuel into streams. **MA-GDL-RMA-17. Water Drafting Sites** Water drafting sites should be located and managed to minimize adverse effects on stream channel stability and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat.
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 or inland native fish. **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	**MA-STD-RMA-15. Aerial Application of Fire Chemicals** Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on avoidance area maps and intermittent streams with surface water at the time of retardant use. **MA-GDL-RMA-18. Fire and Fuels Management—Fire Line Construction**

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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. **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 biologist, when the action agency determines an escape fire would cause more long-term damage to fish habitats than chemical delivery to surface waters. **FM-4**. Design prescribed burn projects and prescriptions to contribute to the attainment of the Riparian Management objectives. **FM-5**. Immediately establish an emergency team to develop a rehabilitation treatment plan to attain Riparian Management objectives and avoid adverse effects on inland native fish whenever Riparian Habitat Conservation Areas are significantly damaged by wildfire or a prescribed fire burning out of prescription.	Water bars on fire lines should be located and configured to minimize sediment delivery to streams and to minimize creation of new stream channels and unauthorized roads and trails. **MA-GDL-RMA-19. Fire and Fuels Management—Burning Masticated Fuels** To minimize soil damage when burning masticated fuels within riparian management areas, burning of masticated fuel beds greater than 3 inches in depth should be accomplished with moist soil conditions. **MA-GDL-RMA-20. Direct Ignition** Direct ignition in RMAs should not be used unless effects analysis demonstrates that it would not retard attainment of aquatic and riparian desired conditions. **MA-STD-RMA-12. Fire and Fuels Management—Minimum Impact Suppression Tactics** Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas.
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 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 adversity 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.	**MA-STD-RMA-17. Hydroelectric—New Support Facilities** Locate new support facilities outside of riparian management areas. Support facilities include any facilities or improvements (workshops, housing, switchyards, staging areas, transmission lines, etc.) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation, or enhancement measures.

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	MA-STD-RMA-16. Lands and Special Uses Authorizations Authorizations for all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation, or improvement of those conditions and processes. These authorizations include, but are not limited to, water diversion or transmission facilities (e.g, pipelines, ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals.
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 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.	**MA-GDL-RMA-21. Hydroelectric – Existing Support Facilities** Existing support facilities that are located within riparian management areas should be operated, maintained, or removed to restore or enhance aquatic and riparian-dependent resources.
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.	
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.	
WR-2. Cooperate with federal, state, local, and tribal agencies, and private landowners	

Appendix A, From Honeycutt email 5-30-17; [Aquatic direction plan component comparison 4-11-17]

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to develop watershed-based Coordinated Resource Management Plans (CRMPs) or other cooperative agreements to meet Riparian Management objectives.	
FW-1. Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of the 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 inland native fish. For existing fish and wildlife interpretative and other user-enhancement facilities inside Riparian Habitat Conservation Areas, assure that Riparian Management objectives are met and adverse effects on inland native fish avoided or 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 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. **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	

Appendix B

Conservation Strategy and CNF Plan Matrix for each Species

Appendix B1. List of recovery or conservation strategies for Bull Trout that are addressed by the Colville National Forest Revised Land Management Plan. Mid-Columbia Recovery Unit

Recommended Recovery or Conservation Strategies for Bull Trout that can be addressed by CNF Forest Plan **Sources:** **Bull Trout Recovery Plan – Mid-Columbia Recovery Unit Implementation Plan (September 2015 p. C70-71)**	**How the Colville National Forest Revised Forest Plan addresses these** **DC = desired condition** **OBJ = objective** **GDL = guideline** **STD = standard** **MON = monitoring**
Upper Mid-Columbia Geographic Region ***Salmo River Core Area*** 1. Actions to Address Habitat Threats 1.1.1 Complete Watershed Action Plan. Work with transboundary stakeholders to complete the Salmo River Watershed Aquatic Ecosystem Health Action Plan. Identify areas for improving pool frequency, habitat complexity, thermal refugia, and riparian vegetation conditions. 1.1.2 Improve riparian and instream habitat. Identify areas within local populations which need habitat restoration. Implement projects to improve instream habitat by restoring recruitment of large woody debris and pool development. Revegetate streambanks to restore shade and canopy, riparian cover and native vegetation.	*FW-DC-SOIL-02. Detrimental Soil Conditions* Surface erosion rates are within the natural range of variation for a given biophysical setting. There is no degradation of aquatic habitat and water quality from surface erosion rates resulting from permitted uses and management actions. Ecological and hydrologic functions are not impaired by soil compaction. *FW-DC-VEG-05. Snags and Coarse Woody Debris* Snags and down wood occur in sizes, amounts, and distributions to provide important wildlife habitat and contribute to ecosystem processes and services. This desired condition for snag and down wood levels applies forestwide within forested habitat types with the exception of the Administrative and Recreation Sites Management Areas. The desired conditions for snags and down wood levels is evaluated on National Forest system lands at the watershed scale. *FW-DC-VEG-06. Biological Legacies* Large trees, snags, and down wood are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem. *FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool

	depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning. *FW-DC-WR-13. Aquatic Threatened, Endangered, and Sensitive Species* National Forest System lands contribute to the recovery of federally threatened and endangered aquatic species and conservation of Regional Forester's sensitive aquatic species. Aquatic habitat supports spawning, rearing, and/or other key life history requirements. Aquatic habitat also is designated as critical habitat for listed species (such as bull trout) in some areas. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning. *FW-DC-WR-17. Roads in Key Watersheds* Roads in key watersheds are not a risk to the function of soil and water resources. Roads do not disrupt hydrologic or aquatic habitat function or threatened and endangered species biological and behavioral attributes. *FW-OBJ-WR-04. Fish Habitat Improvement* Within 15 years restore aquatic organism passage for all life stages of native species at 45 road/stream crossings and man-made instream structures such as water diversions and dams outside of key watersheds. Culverts and other passage improvements are to be designed to restore and maintain hydrologic and aquatic habitat function and stream channel resiliency to a range of flows through natural channel design and other acceptable treatment measures. *FW-OBJ-WR-06. Key Watershed Road Treatments* Reduce road-hydrologic connectivity and sediment delivery on

	roads through storm damage risk reduction treatments, full hydrologic decommissioning, and other accepted treatment measures on 116 miles of hydrologically connected road within 15 years of forest plan implementation. Restore or maintain aquatic organism passage and improve hydrologic and aquatic habitat function at 53 road/stream crossings for all native aquatic species, seasons, flows, and life stages in key watersheds within 15 years of forest plan implementation through culvert replacement or crossing improvement and natural channel design or other acceptable treatment measures that provide for natural stream channel function at all flows. *FW-OBJ-WR-10. Watershed Restoration in Focus and Priority Watersheds* Over 15 years, implement the watershed condition framework through completion of essential projects outlined in watershed action plans in existing focus and priority watersheds to improve watershed condition class. Focus watersheds designated at the 5th field watershed scale include Upper Sanpoil, Chewelah Creek-Colville River, and LeClerc Creek-Pend Oreille River watersheds. Priority watersheds designated at the subwatershed scale include Ninemile Creek, and West Branch LeClerc Creek subwatersheds. *MA-DC-FR-02. Habitat* These areas contribute important habitat for plant, wildlife, and aquatic species that benefit from areas with relatively low road density and high habitat effectiveness (e.g., relatively low level of human disturbances). Road interaction with surface and sub-surface water is such that it does not result in an increase in drainage density and/or accelerated or abnormal hill slope failure. Roads function in a hydraulic and geomorphic manner that provides watershed-scale aquatic habitat connectivity and contributes to attainment of state water quality

	standards. *MA-DC-GR-02. Habitat* These areas contribute habitat for plant and wildlife species that are relatively tolerant of human activities/disturbances. Habitat effectiveness is expected to be lower for species that are sensitive to human activities and disturbances. These areas provide wildlife-related recreational opportunities (e.g., wildlife viewing, hunting, etc.) for species not sensitive to human activities and disturbance. Road interactions with surface and sub-surface water is such that there is limited potential to increase drainage density and/or accelerated or abnormal hill slope failure. Roads function in a hydraulic and geomorphic manner that provides watershed and sub-basin scale aquatic habitat connectivity and contributes to attainment of state water quality standards. *MA-GDL-GR-01. Roads* Limit potential road interactions with surface and sub-surface water by decreasing drainage density and/or accelerated or abnormal hill slope failure. When constructing or reconstructing roads, do so in a hydraulic and geomorphic manner that provides watershed and sub-basin scale aquatic habitat connectivity and contributes to attainment of state water quality standards. *MA-DC-RMA-03. Livestock Grazing* Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment. *MA-GDL-RMA-11. Annual Grazing Use Indicators* The purpose of this guideline is to manage livestock grazing to help attain and maintain aquatic and riparian desired conditions over time. Specifically, it is intended to maintain or improve vegetative and stream conditions, help ensure the viability of aquatic species,

	provide important contributions to the recovery of ESA-listed species, and facilitate attainment of State water quality standards. The annual livestock use and disturbance indicators described below should be applied to help achieve, over longer timeframes, conditions at site and watershed scales that enable attainment and maintenance of desired conditions. The values specified below are starting points for management. Only those indicators and numeric values that are appropriate to the site and necessary for maintaining or moving towards desired conditions should be applied[47]. Specific indicators and indicator values should be prescribed and adjusted, if needed, in a manner that reflects existing and natural conditions for the specific geo-climatic, hydrologic and vegetative setting in which they are being applied . Indicators and 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 ESA consultation documents, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline. 1. In subwatersheds that are functioning properly[48] for water quality, aquatic habitat, and riparian and wetland vegetation, maintain those conditions by managing annual livestock grazing use and disturbance as follows[49]:

47 For example, the stubble height values contained herein may not be appropriate for some sites (e.g., those with short graminoids)

48 Subwatershed classification as properly functioning, functioning-at-risk, or impaired function should be determined based on a weight-of-evidence approach that considers, at a minimum, the water quality, aquatic habitat, and riparian/wetland vegetation indicators of the Watershed Condition Framework (WCF). Only WCF water quality parameters relevant to livestock grazing (e.g., temperature, nutrients, bacteria, sediment) need be considered. Local inventory, assessment and monitoring data and information (e.g., Multiple Indicator Monitoring, Proper Functioning Condition) can be used to refine initial classifications made per WCF

49 Per Pacfish/Infish Monitoring, Multiple Indicator Monitoring (BLM Technical Reference 1737-23) protocols or comparable methods for stubble height, streambank alteration, and use of woody species. Per Bureau of Land Management protocols (BLM/RS/ST-96/004+1730) or comparable methods for herbaceous utilization

	• maintain a minimum of 6-inch residual herbaceous stubble height on the greenline[50], except for sites in late-seral conditions[51] being managed under any grazing system that supports a late-seral ecological stage, where a minimum of 4-inch to 6-inch stubble height should be maintained • utilize no more than 30-45% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area • allow no more than 20-25% streambank alteration[52] • limit use of woody species to no more than 30-40% of current year's leaders along streambanks and, as needed, in other critical portions of the riparian management area 2. In subwatersheds that are functioning-at-risk or that have impaired function for water quality, aquatic habitat, and/or riparian and wetland vegetation and where grazing contributes to those conditions, enable recovery by managing annual livestock grazing use and disturbance as follows: • maintain a minimum of 6-inch to 8-inch residual herbaceous stubble height on the greenline • on sites with late-season grazing and where willow is or should be an important component of the riparian vegetation community, maintain a minimum of 8-inch residual herbaceous stubble height • utilize no more than 30-35% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area • Allow no more alter streambanks no more than 15-20%

50 Stubble height criteria apply at the end of the grazing period, when that period ends after the growing season. When the grazing period ends before the growing season does, stubble height criteria can be applied at the end of the grazing period or the end of the growing season
51 'Late-seral' means the existing riparian vegetation community is >60% similar to the potential natural community composition (per Winward 2000).
52 Streambank alteration criteria are assessed in designated monitoring areas (DMA) following guidance in BLM Technical Reference 1737-23 and apply within 1-2 weeks of removal of livestock from each pasture

	streambank alteration • limit use of woody species to no more than 20-30% of current year's leaders along streambanks and, as needed, other critical portions of the riparian management areas More conservative values, within and potentially beyond the ranges described above, should be used when: (1) relevant indicators (e.g., water quality, aquatic habitat, riparian vegetation) are highly departed from desired conditions or and not improving due to livestock influence; (2) ESA-listed aquatic species or critical habitat sensitive to grazing impacts are present and conditions are not improving; or (3) grazing-related requirements of water quality restoration plans for impaired waters (e.g., site potential shade) are not being met and conditions are not improving. Implement other applicable actions contained in ESA Recovery Plans and water quality restoration plans
2. Actions to Address Demographic Threats 2.1.1 Assess and remove barriers. Assess and remove barriers throughout watershed from beaver dams, intakes, and subsurface flows. Work with transboundary partners to identify and prioritize barriers for removal or correction; focusing on tributary mouths and spawning/rearing areas. 2.2.1 Increase enforcement of fishing regulations (Canada). Work with Canada to increase enforcement of illegal harvest of bull trout in the mainstem and tributaries. Work with transboundary partners to develop outreach and education throughout the watershed to reduce illegal harvest.	*FW-OBJ-WR-04. Fish Habitat Improvement* Within 15 years restore aquatic organism passage for all life stages of native species at 45 road/stream crossings and man-made instream structures such as water diversions and dams outside of key watersheds. Culverts and other passage improvements are to be designed to restore and maintain hydrologic and aquatic habitat function and stream channel resiliency to a range of flows through natural channel design and other acceptable treatment measures. *FW-OBJ-WR-06. Key Watershed Road Treatments* Reduce road-hydrologic connectivity and sediment delivery on roads through storm damage risk reduction treatments, full hydrologic decommissioning, and other accepted treatment measures on 116 miles of hydrologically connected road within 15 years of forest plan implementation. Restore or maintain aquatic organism passage and improve hydrologic and aquatic habitat function at 53 road/stream crossings for all native aquatic species, seasons, flows, and life stages in key

	watersheds within 15 years of forest plan implementation through culvert replacement or crossing improvement and natural channel design or other acceptable treatment measures that provide for natural stream channel function at all flows. *MA-STD-RMA-08. Road and Trail Construction-Fish Passage* Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic species and for riparian-dependent organisms where connectivity has been identified as an issue. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows. *MA-GDL-RMA-08. Road and Trail Construction – Passage for Riparian-dependent Species* Construction or reconstruction of stream crossings should allow passage for other riparian-dependent species where connectivity has been identified as an issue *MA-GDL-RMA-10. Fish Passage Barriers* Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.
<u>3. Actions to Address Nonnative Fishes</u> 3.1 Nonnative Fishes 3.1.1 <u>Suppress non-native populations</u>. Suppress brook trout populations throughout the core area focusing on spawning/rearing tributaries. Work with transboundary partners to prevent invasion of brook trout into unoccupied areas such as the South Fork. 3.1.2 <u>Seattle City Light and partners will reduce entrainment of non-native predatory species</u> such as pike, bass, and walleye at Boundary Dam.	*FW-DC-WR-12. Aquatic Invasive and Non-Native Species* Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native species for critical resources. Subbasin scale is used for Forest planning. Fifth field watershed or subwatershed scale is used for project planning. *FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species* Within the next 15 years, implement aquatic invasive species control and eradication at 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and

	ecological systems are determined to be unacceptable. *FW-GDL-WR-01. Aquatic Invasive Species - Wildfire Suppression Equipment* During wildfire suppression, cross contamination between streams and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident. *FW-GDL-WR-02. Aquatic Invasive Species - Early Detection and Rapid Response* Principles and processes of early detection and rapid response (EDRR) to find, identify and quantify new aquatic invasive species occurrences should be utilized. EDRR should be coupled with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species *MA-GDL-RMA-10. Fish Passage Barriers* Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.
<u>4. Research, Monitoring, and Evaluation</u> 4.1.1 <u>Monitor and assess South Fork population</u>. Conduct routine surveys and population assessments for the US portion of the South Fork to determine status, use of tributaries, identify spawning and rearing areas, and identify passage barriers. 4.1.2 <u>Research extent of the use of the Pend Oreille River FMO</u>. Determine the use of the mainstem Pend Oreille River by Salmo River bull trout, including distribution, timing, and extent of movement patterns, including use of other	*FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning. MON-WTS-02

tributaries to the Pend Oreille downstream of Boundary Dam. Work with Canadian partners to track bull trout movements downstream of Boundary Dam.	MON-WTS-02-01 MON-AQH-01-01 MON-AQH-01-02 MON-AQH-02-01 MON-AQH-02-02 MON-AQH-03 MON-AQH-03-01 MON-AQH-03-02
Sources: **Bull Trout Recovery Plan – Mid-Columbia Recovery Unit Implementation Plan (September 2015 p. C128-129)**	
Northeastern Washington Research Needs Area 1. Actions to Address Habitat Threats None 2. Actions to Address Demographic Threats None 3. Actions to Address Nonnative Fishes None	
4. Research, Monitoring, and Evaluation 4.1 Habitat 4.1.1 Develop list of suitable habitat patches that provide potential spawning and rearing habitat and conduct surveys and evaluations. Use tools such as the 2015 Bull Trout Vulnerability Assessment (Dunham 2015) and Climate Shield Analysis (Isaak et al. 2015) to assist in prioritizing focal streams. 4.2 Demographic 4.2.1 Develop genetic inventory. Develop a genetic inventory of bull trout collected throughout the entire Research Area to identify source populations and/or the presence	*FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning. MON-WTS-02 MON-WTS-02-01 MON-AQH-01-01

of new populations. Work cooperatively with permitting agencies to develop agreements for researchers, fishing charters, and others to collect genetic samples, location information, and biometric data. 4.2.2 <u>Develop a records compilation</u>. Collect Tribal oral histories and observation data to identify areas of historical and potential new populations. Use identified areas for focusing restoration actions and targeting biological surveys for bull trout. 4.2.3 <u>Collect eDNA samples at focal tributaries</u>. Develop protocol and collect eDNA samples in tributary mouths and in areas above natural barriers. Collect samples in tributaries that have sufficient habitat, lack historical information, or infrequent observations of bull trout occur, including but not limited to, the Sanpoil, Kettle, and Spokane Rivers, Crown, Onion, Big Sheep, Sherman, Ninemile, Wilmont, and Stranger Creeks on the Columbia River, and Cedar, Fish, and Russian Creeks on the Pend Oreille River. Use resulting data to complete more comprehensive surveys in targeted streams. 4.3 Non-natives 4.3.1 Develop <u>a strategy to reduce non-natives and reduce potential invasion by predatory species</u> such as northern pike and lake trout present in watersheds upstream.	MON-AQH-01-02 MON-AQH-02-01 MON-AQH-02-02 MON-AQH-03 MON-AQH-03-01 MON-AQH-03-02 *FW-DC-WR-12. Aquatic Invasive and Non-Native Species* Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native species for critical resources. Subbasin scale is used for Forest planning. Fifth field watershed or subwatershed scale is used for project planning. *FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species* Within the next 15 years, implement aquatic invasive species control and eradication at 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and ecological systems are determined to be unacceptable. *FW-GDL-WR-01. Aquatic Invasive Species - Wildfire Suppression Equipment* During wildfire suppression, cross contamination between streams and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident. *FW-GDL-WR-02. Aquatic Invasive Species - Early Detection and Rapid Response* Principles and processes of early detection and rapid response (EDRR) to find, identify and quantify new aquatic invasive species

	occurrences should be utilized. EDRR should be coupled with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species *MA-GDL-RMA-10. Fish Passage Barriers* Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.

Columbia Headwaters Recovery Unit

Recommended Recovery or Conservation Strategies for Bull Trout that can be addressed by CNF Forest Plan **Sources:** **Bull Trout Recovery Plan – Columbia Headwaters Recovery Unit Implementation Plan (September 2015 p. D87-90)**	**How the Colville National Forest Revised Forest Plan addresses these** **DC = desired condition** **OBJ = objective** **GDL = guideline** **STD = standard** **MON = monitoring**
Lake Pend Oreille (LPO-C) - Portions of Idaho and Northeast Washington Downstream of Albeni Falls Dam to Boundary Dam Recovery tasks that address primary threats are bolded. **1. Actions to Address Habitat Threats** 1.1. Upland/Riparian Land Management **1.1.1 Seattle City Light, Pend Oreille PUD (POPUD), and partners will improve habitat through acquisitions and easements.** Use acquisition and/or conservation easements with willing landowners or other measures in bull trout critical habitat watersheds to prevent degradation. **1.1.2 Seattle City Light, POPUD, Forest Service and partners will improve habitat within streams through restoration actions and fencing.** Implement measures	*FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity* National Forest System lands contribute to uninterrupted physical and biological processes within and between watersheds. Floodplains, groundwater-dependent systems, upslope areas, headwater tributaries, and intact habitat refugia provide vertical, horizontal, and drainage network connections. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-dependent, and many terrestrial species of plants and animals. Subbasin scale is used for Forest planning, and 5th field watershed or subwatershed scale is used for project planning. *FW-DC-WR-03. Self-Sustaining Native and Aquatic and Riparian-Dependent Species* National Forest System lands contribute to habitat and ecological

defined in the updated Forest Plan and FERC licenses to improve riparian habitat and sedimentation within streams identified as potential local populations (Appendix I). Work with local partners and funding sources, including but not limited to, the tribe, WDFW, Salmon Recovery Funding Board, County, and property owners, to implement restoration actions within suitable tributary streams improving riparian conditions, LWD, and pool formation. 1.2 Instream Impacts **1.2.1 <u>WDFW and partners will address mining impacts in Sullivan Creek.</u>** Minimize or eliminate impacts of dredging and sluicing within Sullivan Creek. **1.2.2 <u>Seattle City Light, POPUD, Forest Service, and partners will improve instream conditions restoration actions including but not limited to channel improvement floodplain connectivity, and floodplain restoration.</u>** Implement measures defined in the updated Forest Plan and FERC licenses to improve instream habitat. 1.3 Water Quality **1.3.1 <u>Seattle City Light, USACOE, and partners will manage water temperatures to support adfluvial migration through the Pend Oreille River and to tributaries between Boundary and Albeni Falls Dams.</u>** Restore, enhance, and create thermal refugia in reservoir(s) and mouths of tributaries to provide thermal microhabitats that can be used to avoid elevated river temperatures. Maximize cooling of the Pend Oreille River during late-summer/early-fall with adaptive management of water releases from Albeni Falls Dam.	conditions that are capable of supporting self-sustaining populations of native aquatic and riparian-dependent plant and animal species. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning. *FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning. *FW-DC-WR-07. In-stream Flows* National Forest System lands contribute to in-stream flows and groundwater sufficient to create and sustain riparian, aquatic, and wetland habitats, retain patterns of sediment, temperature, nutrient, and wood routing, and provide for (permitted or certificated) consumptive uses. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows functions in concert with local geology, valley types, soils and geomorphology. Subbasin scale is used for Forest planning and 5th field watershed or subwatershed scale is used for project planning *FW-DC-WR-16. Key Watershed Network* Networks of watersheds with functional habitat and functionally intact ecosystems contribute to and enhance conservation and recovery of specific threatened, endangered, and/or sensitive aquatic species and high water quality and natural flow regimes. The networks contribute to short-term conservation and long-term recovery at the Recovery Unit or other appropriate population scale. *FW-DC-WR-17. Roads in Key Watersheds*

1.3.2 USACOE<u>, POPUD, and Seattle City Light will reduce gas entrainment</u> which causes supersaturation conditions believed to be detrimental to bull trout at Albeni Falls, Boundary, and Box Canyon dams.	Roads in key watersheds are not a risk to the function of soil and water resources. Roads do not disrupt hydrologic or aquatic habitat function or threatened and endangered species biological and behavioral attributes. *FW-DC-WR-19. Focus and Priority Watershed Network* Focus and priority watersheds contribute to the sustainability of aquatic and riparian systems and species and provide resilient, productive habitat and high water quality. *FW-OBJ-WR-03. General Watershed Function and Restoration* Within the next 15 years, decrease sediment delivery from management activities on 1,000 acres including but not limited to roads, trails, livestock, unauthorized off-highway vehicle use, vegetation management, and dispersed and developed campsites. Restore hydrologic, aquatic and riparian processes through activities that stabilize stream bank erosion, and other accelerated channel destabilizing processes (i.e., headcutting), improve lateral and vertical hydrologic connectivity, and improve stream channel and floodplain function on 10 miles of streams. *FW-OBJ-WR-04. Fish Habitat Improvement* Within 15 years restore aquatic organism passage for all life stages of native species at 45 road/stream crossings and man-made instream structures such as water diversions and dams outside of key watersheds. Culverts and other passage improvements are to be designed to restore and maintain hydrologic and aquatic habitat function and stream channel resiliency to a range of flows through natural channel design and other acceptable treatment measures. *FW-OBJ-WR-05. Key Watershed Restoration Prioritization* Management in key watersheds focuses on restoration or preservation of watershed, aquatic, and riparian function and recovery of threatened and endangered species. Improve watershed condition class in key watersheds that are a priority for restoration

	within 15 years of forest plan implementation. Key watersheds that are a priority for restoration include: East Branch LeClerc Creek, West Branch LeClerc Creek, Deadman Creek, Barnaby Creek, Harvey Creek, North Fork Deadman Creek, North Fork Sullivan Creek, Sullivan Creek, Ruby Creek, Tonata Creek, Upper Sherman Creek, and South Fork Sherman Creek subwatersheds. Additional key watersheds that are a priority for restoration will be identified, as appropriate, through the life of the plan through the WCF process. *FW-OBJ-WR-07. Key Watershed Range Infrastructure Improvements* Improve hydrologic and aquatic function through range infrastructure improvements, including riparian fencing, movement and improvement of watering troughs, and other acceptable treatments over 240 acres within 15 years of plan implementation. *FW-OBJ-WR-09. Stream Restoration in Key Watersheds* Restore hydrologic, geomorphic, and riparian process and function on 81 miles of stream within 15 years of forest plan implementation through activities including streambank stabilization, restoration of lateral and vertical hydrologic connectivity and improvement of stream channel and floodplain function. *FW-OBJ-WR-10. Watershed Restoration in Focus and Priority Watersheds* Over 15 years, implement the watershed condition framework through completion of essential projects outlined in watershed action plans in existing focus and priority watersheds to improve watershed condition class. Focus watersheds designated at the 5th field watershed scale include Upper Sanpoil, Chewelah Creek-Colville River, and LeClerc Creek-Pend Oreille River watersheds. Priority watersheds designated at the subwatershed scale include

	Ninemile Creek, and West Branch LeClerc Creek subwatersheds. *FW-GDL-WR-03. Watershed Restoration* Use the restoration methods that maximize the use of natural ecological processes for long-term sustainability and minimize the need for long-term maintenance. *FW-DC-PA-02. Cooperation and Community Involvement* Cooperative programs, such as agreements, activities, grants, volunteers, and partnerships, are occurring with federal, state, and county agencies; other nongovernmental organizations; and individuals to help achieve Forest goals and improve overall resource management. Information, interpretation, and education programs are provided that communicates forest resource conditions and opportunities. *MA-OBJ-RMA-02. Restoration of Riparian Habitat and Process on Roads* Restore hydrologic and riparian habitat function within riparian management areas in non-key watersheds by reducing road-related impacts on 80 miles of road within 15 years. *MA-STD-RMA-14. Pump and Dipping Equipment Cleaning* Fish habitat and water quality shall be protected when withdrawing water for administrative purposes. When drafting, pumps shall be screened at drafting sites to prevent entrainment of aquatic species, screen area shall be sized to prevent impingement on the screens, and shall have one-way valves to prevent back-flow into streams. Use appropriate screening criteria where listed fish or critical habitat are present. *MA-STD-RMA-25. Suction Dredge and Placer Mining* Mineral activities on NFS lands shall avoid or minimize adverse effects to aquatic threatened or endangered species/populations and their designated critical habitat. • All suction dredge mining activities in occupied habitat for

	aquatic threatened or endangered species/populations and in their designated critical habitat shall be evaluated by the District Ranger to determine if the mining activity is causing or "will likely cause significant disturbance of surface resources." A likelihood that a threatened or endangered species "take" (defined in Section 3[18] of the ESA of 1973 as amended) incidental to the mining activity is an example of a significant resource disturbance. Other significant disturbances that do not involve incidental take might involve effects on channel stability or stream hydraulics. • If the District Ranger determines that placer mining operations are causing or will likely cause significant disturbance to surface resources, the District Ranger shall contact and inform the operator to seek voluntary compliance with 36 CFR 228 mining regulations and to cease operations until compliance. *MA-GDL-RMA-03. Landings, Skid Trails, Decking, and Temporary Roads* Landings, designated skid trails, staging or decking should not occur in riparian management areas, unless there are no other reasonable alternatives, in which case they should: • Be of minimum size • Be located outside the active floodplain • Minimize effects to large wood, bank integrity, temperature, and sediment levels • Not result in unnatural modification of flow paths • Impacted site(s) to be reclaimed as soon as practicable. Existing infrastructure may be reused with intent of removal and restoration of riparian function as soon as practicable.
2. Actions to Address Demographic Threats 2.1 Connectivity Impairment **2.1.1 <u>Pend Oreille PUD and partners will remove Mill Pond Dam.</u>** The PUD, in partnership with Seattle City	*FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity* National Forest System lands contribute to uninterrupted physical and biological processes within and between watersheds.

Light will remove Mill Pond Dam and the associated log crib dam, manage sediment, restore the Sullivan Creek stream channel, implement site restoration measures for the affected area, and conduct long-term monitoring and maintenance. This dam removal and restoration has already been required by FERC under the Pend Oreille PUD's surrender of its license to operate the Sullivan Project. **2.1.2 USFS and partners will remove historic water diversions and log crib dams on LeClerc Creek** and the upper West Branch LeClerc Creek. **2.1.3 USACOE, POPUD, and partners will improve passage and minimize entrainment issues at Albeni Falls and Box Canyon Dams.** Provide safe, timely and effective fish passage (both upstream and downstream) for bull trout at Albeni Falls and Box Canyon dams. **2.1.4 Seattle City Light and partners will reduce entrainment issues at Boundary Dam.** Seattle City Light will develop entrainment reduction strategies to reduce or eliminate loss of individuals over Boundary Dam. **2.1.5 Pend Oreille PUD, Seattle City Light, Kalispel Tribe, and others will improve passage and entrainment issues in tributary streams.** Provide fish passage at the Calispell Creek Pumping Plant, Calispell Duck Club Dam, and other barriers identified in regional barrier assessment for streams designated as critical habitat. **2.1.6 Maintain and enhance connectivity of cold water patches.** Downstream of Albeni Falls and Box Canyon Dams cold water habitat is limited, but some patches	Floodplains, groundwater-dependent systems, upslope areas, headwater tributaries, and intact habitat refugia provide vertical, horizontal, and drainage network connections. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-dependent, and many terrestrial species of plants and animals. Subbasin scale is used for Forest planning, and 5th field watershed or subwatershed scale is used for project planning. *FW-OBJ-WR-04. Fish Habitat Improvement* Within 15 years restore aquatic organism passage for all life stages of native species at 45 road/stream crossings and man-made instream structures such as water diversions and dams outside of key watersheds. Culverts and other passage improvements are to be designed to restore and maintain hydrologic and aquatic habitat function and stream channel resiliency to a range of flows through natural channel design and other acceptable treatment measures. *FW-OBJ-WR-06. Key Watershed Road Treatments* Reduce road-hydrologic connectivity and sediment delivery on roads through storm damage risk reduction treatments, full hydrologic decommissioning, and other accepted treatment measures on 116 miles of hydrologically connected road within 15 years of forest plan implementation. Restore or maintain aquatic organism passage and improve hydrologic and aquatic habitat function at 53 road/stream crossings for all native aquatic species, seasons, flows, and life stages in key watersheds within 15 years of forest plan implementation through culvert replacement or crossing improvement and natural channel design or other acceptable treatment measures that provide for natural stream channel function at all flows. *FW-OBJ-WR-09. Stream Restoration in Key Watersheds* Restore hydrologic, geomorphic, and riparian process and function

persist in tributaries (*e.g.*, LeClerc Creek (Box Canyon pool), Sullivan Creek (Boundary Pool), and others) which may, over time and with habitat improvement, support migratory bull trout. Maximizing the scope, resiliency, and connectivity of these patches is important in maintaining the migratory life history form in the portion of the LPO-C (downstream of Albeni Falls Dam). 2.2 Fisheries Management 2.3 Small Population Size **2.3.1 <u>The Service, Seattle City Light, and partners will investigate re-introducing extirpated local populations.</u>** Re-establishment of local populations within portions of LPO-C will require the use of translocation and potentially artificial propagation (Dunham *et al.* 2014). Constructing a regional (downstream of Albeni Falls Dam) native conservation facility (SCL 2013) is necessary to facilitate holding, propagation, and improvement of populations in the region. The Service will facilitate reintroduction efforts with funding of responsible parties, landowners, and other partners to determine appropriate streams, source stocks, and timing. **2.3.2 <u>The Service and partners will investigate the potential for an experimental population in Sullivan Lake and its tributaries.</u>**	on 81 miles of stream within 15 years of forest plan implementation through activities including streambank stabilization, restoration of lateral and vertical hydrologic connectivity and improvement of stream channel and floodplain function. *FW-STD-WR-07. Hydroelectric and Other Water Development Authorizations in Key Watersheds* Hydroelectric and other water development authorizations shall include requirements for in-stream 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. *MA-STD-RMA-08. Road and Trail Construction-Fish Passage* Construction or reconstruction of stream crossings shall provide and maintain passage for all life stages of all native and desired non-native aquatic species and for riparian-dependent organisms where connectivity has been identified as an issue. Crossing designs shall reflect the best available science regarding potential effects of climate change on peak flows and low flows. *MA-GDL-RMA-08. Road and Trail Construction – Passage for Riparian-dependent Species* Construction or reconstruction of stream crossings should allow passage for other riparian-dependent species where connectivity has been identified as an issue. *MA-GDL-RMA-10. Fish Passage Barriers* Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.
3. Actions to Address Nonnatives 3.1 Nonnative Fish **3.1.1 <u>WDFW and partners will suppress nonnative</u>**	*FW-DC-WR-12. Aquatic Invasive and Non-Native Species* Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native

<u>predators and competitors in important portions of the lower Pend Oreille River and tributaries.</u> Utilize chemical, mechanical, or other means to control populations of predating and competing northern pike, smallmouth bass, and walleye for the purpose of enhancing bull trout populations. **3.1.2 <u>WDFW and partners will suppress/eradicate competing and interbreeding nonnative brook trout from prioritized tributaries of the Pend Oreille River.</u>** Utilize chemical, mechanical, or other means to control populations of brook trout for the purpose of enhancing bull trout populations. Work with partners to prioritize suppression and eradication efforts.	species for critical resources. Subbasin scale is used for Forest planning. Fifth field watershed or subwatershed scale is used for project planning. *FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species* Within the next 15 years, implement aquatic invasive species control and eradication at 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and ecological systems are determined to be unacceptable. *FW-GDL-WR-01. Aquatic Invasive Species - Wildfire Suppression Equipment* During wildfire suppression, cross contamination between streams and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident. *FW-GDL-WR-02. Aquatic Invasive Species - Early Detection and Rapid Response* Principles and processes of early detection and rapid response (EDRR) to find, identify and quantify new aquatic invasive species occurrences should be utilized. EDRR should be coupled with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species *MA-GDL-RMA-10. Fish Passage Barriers* Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.
4. Research, Monitoring and Evaluation 4.1 Habitat	*FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* National Forest System lands provide aquatic habitats in which the

4.2 Demographic 4.2.1 Complete a Pend Oreille River bull trout reintroduction feasibility analysis and framework for the Pend Oreille River downstream of Albeni Falls Dam, to determine limiting factors for reintroduction, identify source populations, and potential for success. 4.3 Nonnatives 4.3.1 Develop Pend Oreille River native salmonid conservation plan in northeast Washington, including bull trout.	distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning. MON-WTS-02 MON-WTS-02-01 MON-AQH-01-01 MON-AQH-01-02 MON-AQH-02-01 MON-AQH-02-02 MON-AQH-03 MON-AQH-03-01 MON-AQH-03-02
Conservation Recommendations 2.2.1 WDFW, IDFG, and partners will prevent illegal introductions. Enforce policies for preventing illegal transport and introduction of nonnative fishes. 2.2.2 Suppress nonnatives through angling. Implement mandatory catch and kill for northern pike and walleye. 2.2.3 Eliminate creel limit on brook trout. 2.3.3 Incorporate survey data into Lake Pend Oreille core area threats assessment for LPO-C area. Evaluate whether a self-reproducing migratory population is established or maintained in the Lake Pend Oreille core area downstream of Albeni Falls Dam (connected to and spawning in all suitable tributary streams, and sufficiently robust to maintain demographic and genetic viability).	*FW-DC-WR-12. Aquatic Invasive and Non-Native Species* Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native species for critical resources. Subbasin scale is used for Forest planning. Fifth field watershed or subwatershed scale is used for project planning. *FW-OBJ-WR-02. Aquatic Invasive and Non-Native Species* Within the next 15 years, implement aquatic invasive species control and eradication at 15 waterbodies (streams and lakes) where such invasions have become established and prevent attainment of listed fish recovery plan goals and/or effects to social, economic, and ecological systems are determined to be unacceptable. *FW-GDL-WR-01. Aquatic Invasive Species - Wildfire Suppression Equipment* During wildfire suppression, cross contamination between streams

	and lakes from pumps, suction, and dipping devices should be avoided. Dumping water directly from one stream or lake into another should be avoided. Water storage and conveyance components of water tenders, engines, and aircraft should be disinfected prior to use on a new on-forest incident. *FW-GDL-WR-02. Aquatic Invasive Species - Early Detection and Rapid Response* Principles and processes of early detection and rapid response (EDRR) to find, identify and quantify new aquatic invasive species occurrences should be utilized. EDRR should be coupled with other integrated activities to rapidly assess and respond with quick and immediate actions to eradicate, control, or contain aquatic invasive species *MA-GDL-RMA-10. Fish Passage Barriers* Consider retaining fish passage barriers where they serve to restrict access by undesirable non-native species and are consistent with restoration of habitat for native species.

Appendix B2. List of recovery or conservation strategies for woodland caribou that are addressed by the Colville National Forest (CNF) Revised Land Management Plan

Recommended Recovery or Conservation Strategies for Woodland Caribou that can be addressed by the CNF Forest Plan **Sources:** **Recovery Plan for the Selkirk Mountain Woodland Caribou (*Rangifer tarandus caribou*).** 1994. USDI Fish and Wildlife Service, Pacific Region, Portland, OR. 59 pp with appendices.	How the CNF Revised Forest Plan addresses the interim caribou recovery objectives and criteria. DC = desired condition OBJ = objective GDL = guideline STD = standard MON = monitoring Blue font= clarifying notes by CNF.
1. Maintain the population. Maintain the 2 existing herds in the Selkirk Ecosystem. 1.1. Reduce the impacts of poaching and accidental kills by hunters.	Note: The CNF's portion of the caribou recovery area is entirely included within the Selkirk Mountains Grizzly Bear Recovery Area. The following management framework related to grizzly bears should limit poaching opportunities afforded by open roads. *FW-DC-WL-06. Grizzly Bear Recovery Area – Core Areas* The amount of core areas available to grizzly bears within each grizzly bear management unit meets the standards in

	table 10. grizzly bear habitat standards for the shared gbmus of the cnf and idaho panhandle national forests (from ba table 24 p. 147). . Core areas are expanded where other forest access priorities / obligations can also be met. *FW-GDL-WL-01. Hiding Cover for Wildlife* Where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to created openings. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments. *FW-STD-WL-07. Grizzly Bear Recovery Area - Road Densities* Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal actions shall not result in a net increase in open or total road densities above the levels in **table 10. grizzly bear habitat standards for the shared gbmus of the cnf and**

	idaho panhandle national forests (from ba table 24 p. 147). . Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in). Note: We conduct regular visitor contact patrols on weekends during the hunting seasons. We distribute brochures and post signs intended to increase awareness of caribou and reduce accidental hunter kills.
1.2. Reduce the impacts of caribou-vehicle collisions.	The CNF's portion of the caribou recovery area contains no high-speed roads.
1.3. Reduce the impacts from other sources of mortality.	The CNF will continue to provide funding and / or logistical support to cooperating agencies that are researching caribou mortalities.
1.4 Reduce population impacts to genetic and demographic influences.	The CNF will continue to provide funding and / or logistical support to any interagency efforts intended to increase the size of the South Selkirk Mountains caribou herd. These could include; additional transplants, maternal pen operations, and predator control.
2. Secure and manage at least 179,000 ha (443,000 acres) of habitat in the Selkirks to support a self-sustaining caribou population. 2.1. Protect, enhance, and restore Selkirk caribou habitat. 2.1.1. Inventory caribou habitat 2.1.2. Determine caribou habitat capability	The CNF manages approximately 98,093 acres of the caribou recovery area. An initial inventory of caribou habitat on the CNF was completed in the 1990s. Caribou habitat suitability was modeled based on an index developed by Allen (1993). We update our caribou habitat GIS layers when wildfires alter or remove habitat, and on an individual forest management project basis (timber sale planning). We now have Lidar coverage for the CNF's portion of the recovery area which includes canopy closure and tree height data.
2.1.3. Reduce the impacts of fire on caribou habitat.	*FW-DC-WL-07. Woodland Caribou Seasonal Habitat Components* For the Desired Habitat Conditions for caribou, manage toward the upper 10 percent of the Desired Conditions for vegetation in late-successional-closed forest within western hemlock/red cedar and spruce/subalpine fir, measured at the caribou management unit scale. Seasonal habitat components of well-connected, large blocks of late-successional forest provide essential habitat for caribou.

	FW-GDL-VEG-04. Planned and unplanned ignitions Use of planned and management of unplanned ignitions may be authorized. Objectives and strategies for all unplanned ignitions shall be identified at the time of the fire. *MA-GDL-WCD-07. Wildland Fire (designated wilderness)* Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role or to achieve wilderness desired conditions. Wildfires should be managed for the benefit of wilderness resources. A full suppression strategy may be used where or when a wildfire: 1. has a high potential to spread outside national forest boundaries, or into areas with extensive recreation or administrative developments; 2. is not meeting wilderness objectives; 3. would adversely affect an ESA-listed species. *FW-GDL-WR-05. Chemical Fire Suppression* Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by riparian and aquatic-dependent threatened, endangered, proposed, candidate, or sensitive species, or their habitats. *MA-STD-RMA-12. Wildland Fire and Fuels Management – Minimum Impact Suppression Tactics (riparian management areas)* Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas. *MA-STD-RMA-15. Aerial Application of Fire Chemicals (riparian management areas)* Aerial application of chemical retardant, foam, or other fire chemicals is prohibited within 300 feet (slope distance) of perennial and intermittent waterways. Waterways are defined as any body of water (including lakes, rivers, streams, and ponds) whether or not

	it contains aquatic life except in cases where human life or public safety is threatened and chemical use could be reasonably expected to alleviate that threat. This includes open water that may not be mapped as such on avoidance area maps and intermittent streams with surface water at the time of retardant use.
2.1.4. Reduce the impacts of insects and disease.	*FW-DC-IPM-01. Integrated Pest Management* Unwanted plant, animal (vertebrate and invertebrate) and pathogen species are prevented, suppressed, contained, controlled or eradicated. Native insects and plant and animal disease pathogens exist at endemic levels. Forests are managed for resilience to pests and pathogens and to maintain native plant communities. Proactive pest response plans are prepared, or existing plans reviewed, in cooperation with partners, to facilitate rapid response to new pest outbreaks and infestations. *FW-DC-VEG-02. Insects and Diseases* Native insects, diseases, fungi, bacteria, and viruses engage in their natural (endemic) role in contributing to ecosystem processes such as pollination, food webs, decay and nutrient cycling, providing habitats, and functioning as natural control agents. Landscapes provide a patchwork of varied structural, compositional, and successional stages that ensure the continuation of these processes. *FW-OBJ-IPM-01. Integrated Pest Management* Damaging plant, animal, insect and plant and animal disease pest outbreaks are prevented, suppressed, contained, controlled or eradicated in a timely manner in accordance with proactive pest response plans. New outbreaks are addressed within one year of detection through the life of the plan. *FW-STD-IPM-01. Integrated Pest Management* Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest. Cooperate with other federal, state, and county agencies and other citizens to take an all lands approach to pest management. Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or

	when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species.
2.1.5. Reduce the impacts of timber management on caribou and their habitat.	*FW-DC-VEG-01. Plant Species Composition* Native species and native plant communities are the desired dominant vegetation. National Forest System lands contribute to the diversity, species composition, and structural diversity of native upland plant communities. The full range of potential natural vegetation is maintained on the Forest where it supports plant and animal diversity including pollinators and other invertebrates, and robust ecological function. *FW-DC-VEG-04. Coniferous Forest Structure* Coniferous forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to scenic quality and contributes to desired landscape character, particularly along scenic byways and highways. Coniferous forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for coniferous forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. Table 5 contains desired conditions for each coniferous forest vegetation type. *FW-DC-VEG-06. Biological Legacies* Large trees, snags, and down wood are represented across the landscape and large tree habitat is maintained to support wildlife, aquatic and soil resources and support recovery processes in the post disturbance ecosystem. *FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the

	recovery of federally listed threatened and endangered species. *FW-DC-WL-07. Woodland Caribou Seasonal Habitat Components* For the Desired Habitat Conditions for caribou, manage toward the upper 10 percent of the Desired Conditions for vegetation in late-successional-closed forest within western hemlock/red cedar and spruce/subalpine fir, measured at the caribou management unit scale. Seasonal habitat components of well-connected, large blocks of late-successional forest provide essential habitat for caribou. *FW-DC-WL-08. Woodland Caribou Habitat – Forage Availability* Preferred lichens (Bryoria and Alectoria) are present in sufficient quantities for woodland caribou to forage. *FW-OBJ-WL-04. Restoration of Late-Successional Forest Habitat and Associated Surrogate Species* During the expected 15 years of plan implementation, restore western hemlock/western red cedar vegetation types within late-successional forest habitats for surrogate wildlife species on 1,400 acres within the following watersheds [**Error! Reference source not found.**]. Generally focus activity in previously treated areas that are now early to mid-successional forest to enhance large tree development. **Table 14. Surrogate species habitat – watersheds for treatment** Watershed: Sullivan Creek — Acres: 800 Watershed: LeClerc — Acres: 600 *FW-GD-VEG-03. Large Tree Management* Management activities should retain and generally emphasize recruitment of individual large trees (greater than 20 inches diameter at breast height) across the landscape. Exceptions are listed in this guideline.

Table 14. Surrogate species habitat – watersheds for treatment

Watershed	Acres
Sullivan Creek	800
LeClerc	600

	FW-STD-WL-09. Woodland Caribou Recovery Areas – Management Activities Management activities within lands identified as capable habitat for woodland caribou enhance or facilitate the development of suitable habitat. Management activities within stands identified as suitable habitat are avoided, except when a clear benefit of the activity to habitat conditions can be demonstrated. *FW-STD-WL-10. Woodland Caribou Recovery Area - Management and Caribou Calving* Management activities that cause disturbance shall be avoided in potential caribou calving habitat from June 1 to July 15.
2.1.6. Reduce or eliminate the impacts of recreational activity on caribou and their habitat.	*FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation* Winter recreation is managed so that woodland caribou are not displaced from suitable habitat and the caribou can make full use of existing habitat in the recovery area. *FW-STD-WL-11. Woodland Caribou and Snowmobiles* Restrict over-the-snow vehicle use to designated routes within the Selkirk Mountain Woodland caribou recovery area.

2.2 Manage appropriate habitats 2.2.1 Establish recovery zone boundary. 2.2.2. Delineate boundaries for Caribou Management Units (CMUs). 2.2.3. A management plan will be developed for each CMU. 2.2.4. Implement the plans for each CMU.	*Chapter 2 – Forest-Wide Direction* A small population of woodland caribou occurs on the northeastern portion of the Colville National Forest within the Selkirk Mountain Woodland Caribou Recovery Area. The caribou recovery area has been divided into 17 caribou management units, of which 4 occur on the Colville National Forest. *Chapter 2 – Forest-Wide Direction* Plan direction is consistent with existing recovery plans for federally listed species and applies in those areas identified by the USDI Fish and Wildlife Service as recovery areas for each listed species.
2.3. Secure the habitat 2.3.1. Private lands 2.3.2. Public land	Approximately 93 percent of the CNF portion of the recovery area is in public ownership. Approximately 7 percent (7,215 acres) is owned by Stimson Lumber Company in the vicinity of Molybdenite and Monumental Mountains. *FW-DC-LSU-01. Lands and Special Uses* Achieve a land ownership pattern and right-of-way acquisition pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land. *FW-GDL-WL-04. Federally Listed Species* Habitat for federally listed wildlife species within recovery areas that occur on National Forest System lands should be retained in public ownership. *FW-STD-LSU-01. Land Acquisition, Conveyance, and Exchange* The Forest has a consolidated land ownership pattern that contributes to ecosystem resilience, allows reasonable public and/or Forest Service administrative access where suitable, and improves land management efficiencies. There is a downward trend in the number of isolated, non-Federal inholdings that occur within the proclaimed Forest boundaries. Congressionally designated areas lack private inholdings.

2.3.3. Secure essential habitat on public lands	*Chapter 2 – Forest-Wide Direction* Caribou Critical Habitat: The USFWS designated 30,010 acres of Federal land in Boundary County, Idaho, and Pend Oreille County, Washington as Critical Habitat for the southern Selkirk Mountains caribou population. The portion of the Critical Habitat that occurs in Washington is located on the Colville National Forest.
3. Gather information needed for recovery actions (verify recovery objectives). 3.1. Habitat research needs. 3.1.1. Determine caribou habitat relations.	The CNF will continue to provide support (funding, labor, logistics) to cooperating agencies responsible for conducting caribou research.
i. Evaluate timber management practices as related to caribou habitat.	*MON-FLS-01: Federally listed species* To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives? *MON-FLS-01-03: Woodland caribou* Maintenance of seasonal habitat components of well-connected, large blocks of late-successional forest at or above current levels.
ii. Effects of roads and motorized vehicles on caribou and their habitat	*MON-FLS-01-04: Woodland caribou* Management of motorized winter recreation at or below current levels so that woodland caribou are not displaced from suitable habitat within the caribou recovery area.
iii. Develop and implement, and validate the cumulative effects model.	The CNF will continue to provide support (funding, labor, logistics) to cooperating agencies responsible for conducting caribou research.
b. Population research needs. 3.2.1. Develop methodology to economically count and classify caribou. 3.2.2. Determine caribou population, trend, structure, and morality factors. 3.2.3. Monitor potential pathogens in caribou and associated species.	The CNF will continue to provide support (funding, labor, logistics) to cooperating agencies responsible for conducting caribou research.

c. Determine recovery goals and objectives. 3.3.1. Determine population size at recovery. 3.3.2. Determine the amount of habitat needed for the recovered population.	The CNF will continue to provide support (funding, labor, logistics) to cooperating agencies responsible for conducting caribou research.
3.3.3. Establish caribou in the western portion of the Selkirks in Washington.	The CNF assisted with caribou transplants to the Sullivan Creek drainage in 1996 and 1997.
4. Keep the public and agency personnel informed and involved in caribou management.	*FW-DC-PA-01. Information, Education, and Participation* A broad range of people in rural, urban, and underserved populations understand the complexities of managing natural resources for the full range of benefits associated with the multiple use mission of the Forest Service. A multi-faceted outreach strategy aims to help the public understand: a) the natural and cultural history of the national forest, b) important themes of ecological processes, including fish, plant, and wildlife species habitat needs and the importance of disturbance processes, c) the human benefits of the National Forest System, including recreational and commodity values, d) forest regulations and resource protection practices, e) safety practices, f) potential impacts of human activity on resources, and how to participate effectively in national forest decision-making activities. Youth are introduced to the natural world and resource management careers. Outstanding features of the Forest, such as recreation areas, national trails, and scenic byways are interpreted for the public where appropriate. Opportunities for viewing wildlife and plants are present and the public is aware of the opportunities. *FW-DC-PA-02. Cooperation and Community Involvement* Cooperative programs, such as agreements, activities, grants, volunteers, and

	partnerships, are occurring with federal, state, and county agencies; other nongovernmental organizations; and individuals to help achieve Forest goals and improve overall resource management. Information, interpretation, and education programs are provided that communicates forest resource conditions and opportunities.

Appendix B3. List of recovery strategies for Grizzly Bear that are addressed by the Colville National Forest Revised Land and Resource Management Plan

Recommended Recovery or Conservation Strategies for Grizzly Bear that can be addressed by Colville National Forest (CNF) Land and Resource Management Plan **Sources:** **Servheen**. 1993. **Grizzly Bear Recovery Plan**. USDI Fish and Wildlife Service, Missoula, MT. 181 pp.	**How the Colville National Forest Revised Forest Plan addresses these** **DC = Desired ConditionOBJ = Objective** **GDL = Guideline** **STD = Standard** **Blue font=clarifying noted by CNF of USFWS.**
Selkirk Recovery Zone S1. Establish the Population Objective for Recovery, and Identify the Limiting Factors.	USDI Fish and Wildlife Service (FWS) is primarily responsible for this task.
S11. Determine Population Conditions at which the Species is Viable and Self-sustaining.	FWS is primarily responsible for this task.
S111. Determine Population Monitoring Methods and Criteria.	FWS is primarily responsible for this task.
S112. Establish Reporting Procedures and Systems to Evaluate and Gather Information on Populations.	FWS is primarily responsible for this task. CNF biologists interview individuals who report potential grizzly bear sightings. We record data collected from these interviews on the WA Dept. of Fish and Wildlife (WDFW), Grizzly Bear Observation form. We then share the completed forms with the cooperating agencies.
S12. Determine Current Population Conditions.	FWS is primarily responsible for this task.
S13. Identify the Human-related Population Limiting Factors if Present Populations Differ from Desired.	Direct and indirect sources of mortality in the ecosystem are generally known.

S131. Identify Sources of Direct Mortality.	The CNF maintains GIS map layers of Forest roads by IGBC class in the Forest's portion of the recovery area. Open roads tend to facilitate poaching. In the CNF portion of the recovery area, there are no high-speed roads or train tracks; where accidental deaths from vehicle collisions could be a source of mortality. There is one livestock allotment in the area. Bear depredations of livestock have not been documented on this allotment to date.
S132. Identify Indirect Sources of Mortality.	The CNF maintains GIS map layers of potential indirect sources of mortality including; private lands and buildings, livestock allotments, and recreation sites. We also maintain a Forest-wide database of sites that could potentially attract bears and lead to human / bear interactions. These include; garbage transfer stations, unsecured dumpsters at private resorts, developed campgrounds, high-use dispersed campsites, etc. This database lists all the existing animal resistant structures (e.g., dumpsters, food storage lockers) at sites located on or adjacent to the Forest.
S21. Reduce Sources of Direct Mortality S211. Reduce Illegal Killing S2111. Coordinate State, Federal, and Canadian Efforts	The CNF will continue to report any suspected illegal activities to the wildlife management agencies. We would report any documented or suspected kills of grizzly bears.
S2112. Reduce Illegal Killing by Big Game Hunters and Mistaken Identity Killing by Black Bear Hunters.	CNF Forest Protection Officers, including the east zone biologist, conduct regular visitor contact patrols on weekends during the hunting seasons. We distribute brochures and post signs related to distinguishing between bear species. These efforts are intended to increase awareness of grizzly bears and reduce accidental hunter kills of bears.
S2113. Investigate and Prosecute Illegal Killing of Grizzly Bears.	The CNF would cooperate with the wildlife management agencies in any investigations related to illegal killings.
S2114. Reduce Accidental Deaths. S21141. Increase Efforts to Clean up Carrion and Other Attractants in Association with Roads, Human Habitation, and Developed	*FW-OBJ-WL-01. Wildlife Habitats – Proper Storage of Human Food, Garbage and Other Wildlife Attractants* Address any food or garbage storage problem areas promptly to avoid habituation of grizzly bears or other wildlife. Maintain the wildlife-resistant garbage storage devices installed in all developed campgrounds on the Colville National Forest, as needed.

Areas Within Recovery Zones.	Within 15 years of plan implementation install at least 15 wildlife-resistant food storage lockers at developed campgrounds or heavily used dispersed campsites. Priority will be given to sites within or adjacent to the grizzly bear recovery area, or to areas with documented black bear or grizzly bear food or human interactions.
S21142. Reduce Losses due to Mishandling Bears during Research and Management Actions through Development of a Bear Handling Manual.	This is a FWS task.
S21143. Reduce Losses due to Predator and Rodent Control.	The CNF is unaware of any predator or rodent control programs involving poison bait within the recovery zone. *FW-STD-IPM-01. Integrated Pest Management* Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest. Cooperate with other federal, state, and county agencies and other citizens to take an all lands approach to pest management. Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species. *FW-STD-IPM-02. Pesticide Use and Risk Assessment* Pesticides (including herbicides) may be considered, as appropriate, within all management areas, to respond to native and invasive pests as part of an integrated pest management plan. Minimize use of formulations or tank mixes involving plausible harm to human health, soil organisms, water quality, non-target plants, non-target animals (including invertebrates), amphibians or fish. Use best available science in pesticide risk assessments to inform decisions about pesticide use.
S21144. Ensure that Control of Nuisance Bears is Accomplished According to 50 CFR 17.40 and the Guidelines.	This is a FWS task.
S21145. Reduce Losses by Implementing	CNF Forest Protection Officers, including the east zone biologist, conduct regular

Public Education and Awareness Programs.	visitor contact patrols on weekends during the summer holidays, and during the hunting seasons. CNF biologists regularly provide public education on bear awareness, proper sanitation, and recreating safely in bear occupied habitat.
S212. Appoint a Grizzly Bear Coordinator.	This is a FWS task.
S22. Identify and Reduce Sources of Direct Mortality. S221. Make Domestic Livestock Grazing Compatible with Grizzly Bear Habitat Requirements.	The LeClerc Creek Grazing Allotment is the only active grazing allotment within the CNF portion of the Selkirk Grizzly Bear Recovery Zone. *FW-GDL-LG-02. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments.* If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey. *FW-GDL-WL-03. Unique Habitats* Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance. *FW-STD-WL-08. Proper Storage of Human Food, Garbage and Other Wildlife Attractants* Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest.
S222. Make Timber Harvesting and Roadbuilding Compatible with Grizzly Bear Habitat Requirements.	*FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species. *FW-DC-WL-05. Grizzly Bear Recovery Area – Key Habitat Components for Grizzly Bear* Key grizzly bear habitat components (such as whitebark pine, riparian habitats, berry-producing shrubfields, natural meadows, and forest cover) are available within core

	areas and in quantities that contribute toward a recovered bear population. *FW-DC-WL-06. Grizzly Bear Recovery Area – Core Areas* The amount of core areas available to grizzly bears within each grizzly bear management unit meets the standards in **table 10. grizzly bear habitat standards for the shared gbmus of the cnf and idaho panhandle national forests (from ba table 24 p. 147).** . Core areas are expanded where other forest access priorities / obligations can also be met. *FW-OBJ-WL-03. Grizzly Bear Recovery Area – Habitat Restoration* During the expected 15 years of plan implementation, maintain or restore grizzly bear seasonal habitats on 900 acres in the following bear management units []. **Table 15. Grizzly bear seasonal habitats objective**

Bear Management Unit	Number of Acres Restored
LeClerc	300
Salmo-Priest	300
Sullivan Hughes	**300**

FW-STD-WL-07. Grizzly Bear Recovery Area -Road Densities
Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal actions shall not result in a net increase in open or total road densities above the levels in

table 10. grizzly bear habitat standards for the shared gbmus of the cnf and idaho panhandle national forests (from ba table 24 p. 147).
. Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in).

Table 16. Grizzly bear habitat standards for the shared BMUs of the Colville and Idaho Panhandle National Forests

Bear Management Unit	Maximum Open Roads >1 mi/sq. mi.	Maximum Total Roads >2 mi/sq. mi	Minimum Percent Core Habitat
Salmo-Priest (99% NFS land)	33%	26%	64%
Sullivan-Hughes (99% NFS land	23%	18%	61%
LeClerc	**48%**	**60%**	**27%**

	(64% NFS land) | | |
	FW-GDL-WL-03. Unique Habitats Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance. *FW-GDL-WL-04. Federally Listed Species* Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery. *FW-GDL-WL-11. Grizzly Bear Recovery Area – Forest Management Activities* Management activities (such as timber harvest, road building, blasting, etc.) and helicopter use that may displace grizzly bears should be scheduled to occur outside of the critical period of den emergence. Administrative, motorized vehicle entries on restricted-use roads should be managed to not exceed the levels prescribed by the Interagency Grizzly Bear Committee. *FW-GDL-WL-12. Grizzly Bear Recovery Area – Hiding Cover* Hiding cover for grizzly bears is defined as topography or vegetation capable of screening 90 percent of a bear at a distance of 200 feet. Within the grizzly bear recovery area, no point in a created opening should be farther than 600 feet from forested hiding cover. Blocks of forested cover retained within harvest units specifically for grizzly bears should be at least 600 feet across. Hiding cover should be maintained where it exists along open roads. Roadside cover can be provided by topography, or by strips / patches of shrubs / trees retained within harvest units.

S223. Make Mining and Oil and Gas Exploration and Development Compatible with Grizzly Bear Habitat Requirements.	Plan direction for timber harvest and roadbuilding may also be applicable here. *FW-DC-MIN-01. Mineral Materials Availability* Saleable mineral materials are available to Federal, State or local governments for public works, and to the public at the discretion of the authorized officer based upon agency needs, public interest and community needs, material availability, resource protection and capability. Production and administration of mineral material would meet the demand consistent with the management of other surface resources as long as the benefits derived exceed the cost and impacts of resource disturbance. *FW-DC-MIN-02. Reclamation and Extraction* Approved mining operations include concurrent, interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats; and scenic integrity objectives. *FW-STD-WL-08. Proper Storage of Human Food, Garbage and Other Wildlife Attractants* Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest.
S224. Make Recreation on Federal Lands Compatible with Grizzly Bear Habitat Needs.	Plan direction for timber harvest may also be applicable here. Also note that the CNF has developed a “Large Carnivore Conflict Guide”. This document provides written guidance to FS recreation staff, wildlife biologists, law enforcement, and decision makers for dealing with potential or actual conflict situations involving large carnivores and humans. *FW-DC-WL-01. Proper Storage of Human Food, Garbage, and Other Wildlife Attractants* All administrative sites, developed recreation sites, and dispersed recreation sites where garbage disposal services are provided, are equipped with animal-resistant food and waste storage devices so that food, garbage, and other attractants can be

	made inaccessible to wildlife. Forest visitors are aware of the need to properly store all wildlife attractants through one-on-one contacts with campground hosts and agency employees, signage, and the media. Compliance with the Forest's food storage order is increasing. *FW-OBJ-WL-01. Wildlife Habitats – Proper Storage of Human Food, Garbage and Other Wildlife Attractants* Address any food or garbage storage problem areas promptly to avoid habituation of grizzly bears or other wildlife. Maintain the wildlife-resistant garbage storage devices installed in all developed campgrounds on the Colville National Forest, as needed. Within 15 years of plan implementation install at least 15 wildlife-resistant food storage lockers at developed campgrounds or heavily used dispersed campsites. Priority will be given to sites within or adjacent to the grizzly bear recovery area, or to areas with documented black bear or grizzly bear food or human interactions. *FW-STD-WL-08. Proper Storage of Human Food, Garbage and Other Wildlife Attractants* Forest Service contracts, permits, and agreements that include camping on NFS lands shall incorporate the requirement to follow the current Food Storage Order for the Colville National Forest. Apiaries shall not be placed where they would increase the potential for human-bear conflicts. *FW-GDL-REC-01. Recreation Opportunities* …Food and other items that attract wildlife should be managed to prevent reliance on humans and to reduce human-wildlife conflicts. … On the CNF, the woodland caribou recovery zone is entirely included in the grizzly bear recovery zone. Grizzly bears are most likely to den in the higher elevation areas used by woodland caribou (above 4,000 feet). Thus, the following management framework related to winter recreation in caribou habitat is directly applicable to maintaining seclusion for grizzly bears in the den, and immediately following den emergence. *FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation* Winter recreation is managed so that woodland caribou are not displaced from

	suitable habitat and the caribou can make full use of existing habitat in the recovery area. *FW-STD-WL-11. Woodland Caribou and Snowmobiles* Restrict over-the-snow vehicle use to designated routes within the Selkirk Mountain Woodland caribou recovery area.
S225. Coordinate with State and County Governments to Make Land Development and Land Use Decisions Within Recovery Zones Compatible with Grizzly Bear Habitat Needs.	Not addressed in CNF Plan.
S226. Monitor the Cumulative Effects of Management Actions in Grizzly Bear Habitat.	*MON-FLS-01-01* Grizzly Bear: progress toward achieving and maintaining standards for percent core area, open motorized road density (OMRD) and total motorized road density (TMRD) within the Recovery Zone.
S23. Coordinate, Monitor, and Report on Activities Related to Redressing Population Limiting Factors and Monitor Compliance with the Recovery Plan.	The east zone biologist completes an annual report for the IGBC that describes accomplishments including habitat improvements (ex., road closures, animal resistant structures), research and monitoring, I&E and enforcement efforts.
S3. Determine the Habitat and Space Required for the Achievement of the Grizzly Bear Population Goal. S31. Define the Recovery Zone within which the grizzly bear will be Managed. S32. Identify Agency Management Stratifications within the Recovery Zone including Delineation of BMUs and Management Situation 1, 2, or 3 as Defined in the Guidelines.	*Chapter 2 – Forest-Wide Direction* The Selkirk Mountains Grizzly Bear Recovery Area includes a portion of the Colville National Forest located east of the Pend Oreille River. The recovery area is divided into grizzly bear management units (BMUs), three of which are shared between the Colville and Idaho Panhandle National Forests. These analysis units are large enough to allow the assessment of seasonal habitats and the cumulative effects of human activities on these habitats. Within BMUs, management is designed to ensure that important seasonal habitats are available to bears within core areas. The CNF maintains GIS map layers of the recovery area boundary, BMU boundaries, and Management Situations, as described in the Guidelines.

S33. Conduct Research to Determine the Extent of Grizzly Bear Range.	FWS is primarily responsible for the research tasks listed in this section of the recovery plan. To the extent possible, the CNF will continue to provide funding, labor, and logistical support to such efforts, but there are no specific CNF Plan components.
S4. Monitor Populations and Habitats. S41. Monitor Populations Before, During, and After Recovery.	To the extent possible, the CNF will continue to assist with monitoring grizzly bear populations and habitat use. CNF is currently assisting with the Selkirk Mountains Grizzly Bear Research and Monitoring Project, led by Wayne Kasworm, FWS Grizzly Bear Biologist.
S42. Monitor Habitats Before, During, and After Recovery.	*MON-FLS-01-01* Grizzly Bear: progress toward achieving and maintaining standards for percent core area, open motorized road density (OMRD) and total motorized road density (TMRD) within the Recovery Zone.
S5. Manage Populations and Habitats. S51. Manage Populations and Habitats Prior to Recovery on Federal Lands. S511. Refine Procedures for Relocating or Adversely Conditioning Nuisance Grizzly Bears.	FWS is primarily responsible for this task.
S512. Develop and Test Procedures to Relocate Bears from one Area to Another for Demographic or Genetic Purposes.	FWS is primarily responsible for this task.
S513. Apply Interagency Grizzly Bear Management Guidelines prior to Recovery that Maintain or Enhance Habitats.	The CNF will continue to apply the Guidelines in designing projects, contracts, permits, and agreements. The CNF used the 1986 guidelines, and more recent guidance from the IGBC to develop the management components, including road management and core expectations, within the recovery area (see response to S222 above).
S52. Manage Populations and Habitats on Private and State Lands.	The CNF works with Stimson Lumber Company and WA Department of Natural Resources on closed road management issues, monitoring, and annual reporting of road densities and core habitat.
S53. Develop and Implement a Conservation	The CNF would be happy to provide assistance, or comments / feedback to this

Strategy that Outlines all Habitat and Population Regulatory Mechanisms in Force After Recovery.	effort. This would be a future effort that is not addressed in the current CNF Plan.
S6. Develop and Initiate Appropriate I&E Programs.	*FW-DC-PA-01. Information, Education, and Participation* A broad range of people in rural, urban, and underserved populations understand the complexities of managing natural resources for the full range of benefits associated with the multiple use mission of the Forest Service. A multi-faceted outreach strategy aims to help the public understand: a) the natural and cultural history of the national forest, b) important themes of ecological processes, including fish, plant, and wildlife species habitat needs and the importance of disturbance processes, c) the human benefits of the National Forest System, including recreational and commodity values, d) forest regulations and resource protection practices, e) safety practices, f) potential impacts of human activity on resources, and how to participate effectively in national forest decision-making activities. Youth are introduced to the natural world and resource management careers. Outstanding features of the Forest, such as recreation areas, national trails, and scenic byways are interpreted for the public where appropriate. Opportunities for viewing wildlife and plants are present and the public is aware of the opportunities. *FW-DC-PA-02. Cooperation and Community Involvement* Cooperative programs, such as agreements, activities, grants, volunteers, and partnerships, are occurring with federal, state, and county agencies; other nongovernmental organizations; and individuals to help achieve Forest goals and improve overall resource management. Information, interpretation, and education programs are provided that communicates forest resource conditions and opportunities.

S7. Implement the Recovery Plan through Appointment of a Recovery Coordinator.	FWS is primarily responsible for this task.
S8. Revise Appropriate Federal and State Regulations to Reflect Current Situations an Initiate International Cooperation. S81. Revise Federal and State Regulations as Necessary. S82. Coordinate and Exchange Information and Expertise with Canada and other Countries Concerning Bear Research an Management.	FWS is primarily responsible for these tasks. The CNF continues to participate on the Selkirk Ecosystem subcommittee, and coordinates and exchanges information with Canada through that effort.

Appendix B4: List of recovery or conservation strategies for Canada lynx that are addressed by the Colville National Forest Revised Land Management Plan

Recommended Recovery or Conservation Strategies for Canada lynx that can be addressed by CNF Forest Plan ***Sources:*** ***Canada Lynx Conservation Assessment and Strategy (August 2013 pp. 89-95)*** ***Conservation Measures for Core Areas*** ***Recovery Outline: Contiguous US DPS of the Canada Lynx (USFWS 2005)***	**How the Colville National Forest Revised Forest Plan addresses these conservation measures.** **DC = Desired Condition** **OBJ = Objective** **STD = Standard** **GDL = Guideline** Blue font=additional background or clarifying statements provided by the Forest Service.
<u>Conservation measure applicable to core areas:</u> • Delineate LAUs within the core areas. Using the best available mapping tools, assess the abundance and juxtaposition of lynx habitat, and ensure that adequate amounts of lynx habitat are present within each LAU. If not, re-delineate the LAU in coordination with FWS to encompass additional lynx habitat, eliminate the LAU, or combine LAUs as appropriate. **<u>Recovery Outline</u>** Objective 1: Retain adequate habitat of sufficient quality to support the long-term persistence of lynx populations within each of the identified core areas. 8. Establish management commitments in core areas that will provide for adequate quality and quantity of habitat such that there is a reasonable expectation that persistent lynx populations can be supported in each	*Chapter 2 Forest-wide Direction, Wildlife Habitats* Canada Lynx: The Canada Lynx Conservation Assessment and Strategy (2013 version) was used to develop management direction. The Colville National Forest includes a core area (the Kettle-Wedge) that is important for the recovery of Canada lynx in Washington. The Forest does not have any designated critical habitat for Canada lynx. Habitat conditions (e.g., current habitat compared to Desired Conditions) are appropriately assessed at the lynx analysis unit (LAU) scale. There are 13 LAUs within the Kettle-Wedge Core Area. Core areas are defined by the USFWS as areas with the strongest long-term evidence of the persistence of lynx populations over time within the contiguous United States. *FW-GDL-WL-10. Canada Lynx – Kettle-Wedge Core Area - LAU adjustment* Lynx analysis unit boundaries should be adjusted based on scientific literature and coordination with the USDI Fish and Wildlife Service[53].

53 As of this revised plan, the Canada Lynx Conservation Assessment and Strategy (ILBT 2013) provides guidance for Canada Lynx analysis unit management

of the core areas for at least the next 100 years. 8.1. On major Federal land ownerships within each core area, establish and implement long term guidance whose adequacy to conserve lynx has been verified in a biological opinion.	
<u>Conservation measures for vegetation management in core areas</u>: • <u>Provide a mosaic</u> that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story coniferous stands to produce the desired snowshoe hare density within each LAU (Plate 5.2). • Use fire and mechanical vegetation treatments as tools to <u>maintain a mosaic of lynx habitat</u>, in varying successional stages, distributed across the LAU in a landscape pattern that is consistent with historical disturbance processes. **Recovery Outline Objective 2:** Ensure that sufficient habitat is available to accommodate the long-term persistence of immigration and emigration between each core area and adjacent populations in Canada or secondary areas in the United States. **<u>Recovery Actions from Recovery Outline</u>** 9. Maintain baseline inventories of lynx habitat in each core area, monitoring changes in structure and the distribution of habitat components. 10. Monitor lynx use in lynx analysis units or other appropriate management unit at least once every 10 years to determine distribution and occupancy within the core area.	*FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species. *FW-DC-WL-04. Habitat Components for Canada Lynx* Forest successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel and denning components) with landscape pattern that is consistent with the historical range of variability. While the CNF Plan does not have monitoring expectations for lynx themselves, they do have monitoring expectations for the habitat: Federally Listed Species Monitoring Questions and Indicators MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives? MON-FLS-01-02: Canada lynx: changes in lynx habitat as a result of moving towards the desired conditions for vegetation through providing a mosaic of lynx habitat with landscape pattern that is consistent with the historical range of variability

• Design vegetation management to <u>develop and retain dense horizontal cover</u>. Focus treatments in areas that have the potential to improve snowshoe hare habitat by developing dense horizontal cover in areas where it is presently lacking. In areas of young, dense conifers resulting from fire, timber harvest or other disturbance, do not reduce stem density through thinning until the stand no longer provides low, live limbs within the reach of hares during winter (e.g., self-pruning processes in the stem exclusion structural stage have eliminated snowshoe hare cover and forage availability during winter conditions with average snowpack). If studies are completed that demonstrate that thinning can be used to extend the duration of time that snowshoe hare habitat is available (e.g., by maintaining low limbs), then earlier thinning could be considered.	*FW-STD-WL-02. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area* Management projects shall not reduce horizontal cover (snowshoe hare habitat) in late-closed structure Subalpine fir/Lodgepole or Spruce/Subalpine fir vegetation types unless: (1) the subalpine fir/lodgepole pine or spruce/ subalpine fir vegetation types exceed Desired Conditions (historical range of variability) for late-closed structure, (2) the projects are within 200 feet of administrative sites, dwellings, out buildings, recreation sites and special use permit areas, including infrastructure within permitted ski area boundaries; or (3) for research studies or genetic tree test evaluating genetically improved reforestation stock. Lynx analysis units are used to measure changes to lynx habitat. *FW-STD-WL-06. Canada Lynx – Tree Stem Densities in the Kettle-Wedge Lynx Core Area* Retain a minimum of 20 percent in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types within a lynx analysis unit through mechanical tree removal or prescribed burning, except within 500 feet of structures (i.e., administrative sites, dwellings, out buildings), developed recreation sites and special use permit areas (including infrastructure within permitted ski area boundaries), and along major highways and powerline corridors. *FW-GDL-WL-05. Canada Lynx – Vegetation Management within the Kettle-Wedge Core Area* Vegetation management activities in lynx analysis units should be focused in areas of poor snowshoe hare habitat (poorly developed understories that lack horizontal cover between 3 and 10 feet from the ground) to recruit understories that support dense, horizontal cover.

• Retain mature multi-story conifer stands that have the capability to provide dense horizontal cover (Plate 5.3). If portions of these stands currently lack dense horizontal cover, focus vegetation management practices (such as group selection harvest) in those areas to increase understory density and improve snowshoe hare habitat.	*FW-STD-WL-02. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area* Management projects shall not reduce horizontal cover (snowshoe hare habitat) in late-closed structure Subalpine fir/Lodgepole or Spruce/Subalpine fir vegetation types unless: (1) the subalpine fir/lodgepole pine or spruce/ subalpine fir vegetation types exceed Desired Conditions (historical range of variability) for late-closed structure, (2) the projects are within 200 feet of administrative sites, dwellings, out buildings, recreation sites and special use permit areas, including infrastructure within permitted ski area boundaries; or (3) for research studies or genetic tree test evaluating genetically improved reforestation stock. Lynx analysis units are used to measure changes to lynx habitat. *FW-GDL-WL-06. Canada Lynx – Alternative Prey within the Kettle-Wedge Core Area* Habitat for alternate prey species, primarily red squirrel, should be available in each lynx analysis unit by providing cone bearing late, closed structure conifer forests with coarse woody debris.
• To maintain the amount and distribution of lynx foraging habitat over time, manage so that no more than 30% of the lynx habitat in an LAU is in an early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (i.e., does not provide winter snowshoe hare habitat). Emphasize sustaining snowshoe hare habitat in an LAU. If more than 30% of the lynx habitat in an LAU is in early stand initiation structural stage or has been silviculturally treated to remove horizontal cover (e.g., clearcuts, seed tree harvest, precommercial thinning, or understory removal), no further increase as a result of vegetation management projects should occur on federal lands.	*FW-STD-WL-05. Canada Lynx – Vegetation Management within the Kettle-Wedge Lynx Core Area* When conducting vegetation management of coniferous vegetation, do not reduce the suitability of lynx habitat within a lynx analysis unit below 70 percent of the area that is capable of providing suitable lynx habitat (subalpine fir associated forest types).

• Recognizing that natural disturbances and forest management of private lands also will occur, management-induced change of lynx habitat on federal lands that creates the early stand initiation structural stage or silviculturally treated to remove horizontal cover should not exceed 15% of lynx habitat on federal lands within a LAU over a I0-year period.	*FW-STD-WL-03. Canada Lynx – Rate of Change within the Kettle-Wedge Lynx Core Area* Do not change more than 15 percent of lynx habitat within any single lynx analysis unit to an unsuitable condition in any 10-year period.
• 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., Gartner 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 et al. 1999, Blackwell et al. 2003, Gray and Daniels 2006).	*FW-DC-VEG-04. Coniferous Forest Structure* Coniferous forest structural classes are resilient and compatible with maintaining characteristic disturbance processes such as wildland fire, insects and diseases. Habitat conditions for associated species are present. Structure contributes to scenic quality and contributes to desired landscape character, particularly along scenic byways and highways. Coniferous forest openings would be commensurate with historical conditions for size and distribution to reflect natural disturbance processes. The historical range of variability for coniferous forest structure is the desired condition. Historical range of variability will be evaluated on National Forest system lands at the appropriate scale given vegetation type and natural disturbance history. Table 5 in the CNF Plan contains desired conditions for each coniferous forest vegetation type.
• Design harvest units to mimic the pattern and scale of natural disturbances and retain natural connectivity across the landscape.	*FW-GDL-WL-09. Canada Lynx – Habitat Connectivity within the Kettle-Wedge Core Area* Large, permanent openings (generally greater than 300 feet wide with less than 10 percent overstory canopy) should not be created in prey habitat within lynx analysis units. When temporary openings (resulting from vegetation management treatments) are proposed, adequate forested habitat should be retained between these openings and natural openings to contribute to habitat connectivity.
• In aspen stands, maintain native plant species diversity including conifers.	*FW-GDL-WL-03. Unique Habitats* Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural

	meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.
• <u>Recruit a high density of stems</u>, generally greater than 4,600/ha (1,862/ac), of conifers, hardwoods, and shrubs, including species that are preferred by hares.	*FW-STD-WL-06. Canada Lynx – <u>Tree Stem Densities</u> in the Kettle-Wedge Lynx Core Area* Retain a minimum of 20 percent in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types within a lynx analysis unit through mechanical tree removal or prescribed burning, except within 500 feet of structures (i.e., administrative sites, dwellings, out buildings), developed recreation sites and special use permit areas (including infrastructure within permitted ski area boundaries), and along major highways and powerline corridors.
• Provide for continuing availability of lynx foraging habitat in proximity to denning habitat.	*FW-DC-WL-04. Habitat Components for Canada Lynx* Forest successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel and denning components) with landscape pattern that is consistent with the historical range of variability. *FW-OBJ-WL-02. Canada Lynx Habitat Restoration* During the expected 15 years of plan implementation, restore an average of 100 acres per year of snowshoe hare and/or lynx habitat within the lynx analysis units located in the Kettle-Wedge core area.
• When designing <u>fuels reduction projects</u>, where possible retain patches of untreated areas of dense horizontal cover within treated areas.	*FW-STD-WL-06. Canada Lynx – Tree Stem Densities in the Kettle-Wedge Lynx Core Area* Retain a minimum of 20 percent in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types within a lynx analysis unit through mechanical tree removal or <u>prescribed burning</u>, except within 500 feet of structures (i.e., administrative sites, dwellings, out buildings), developed recreation sites and special use permit areas (including infrastructure within permitted ski area boundaries), and along major highways and powerline corridors.
<u>Conservation measures for wildland fire management in core areas:</u>	*FW-STD-WL-06. Canada Lynx – Tree Stem Densities in the Kettle-Wedge Lynx Core Area*

• Maintain fire as an ecological process in lynx habitat, where small populations are not at risk of extirpation due to habitat loss. Evaluate whether fire suppression, forest type conversions, and other management practices have altered fire regimes and the functioning of ecosystems. • Consider the use of mechanical pre-treatment and management ignitions if needed to restore fire as an ecological process or to maintain specific lynx and/or prey species habitat components. • As federal fire management plans are developed or revised, integrate lynx habitat management objectives into the plans. Prepare plans for areas that are large enough to encompass large historical fire events. Collaborate across management boundaries to develop approaches that are complementary and that simulate natural disturbance patterns where possible. • Design burn prescriptions to promote response by shrub and tree species that are favored by snow-shoe hare.	Retain a minimum of 20 percent in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types within a lynx analysis unit through mechanical tree removal or prescribed burning, except within 500 feet of structures (i.e., administrative sites, dwellings, out buildings), developed recreation sites and special use permit areas (including infrastructure within permitted ski area boundaries), and along major highways and powerline corridors. [Large portions of the Kettle-Wedge Core Area would be in the Kettle Crest Recreation Area, Backcountry, and Recommended Wilderness Management Areas.] *MA-GDL-KCRA-03. Fire (Kettle Crest Recreation Area)* Use of planned and management of unplanned fire ignitions may be authorized. Fire should be allowed to play its natural ecological role in the semi-primitive non-motorized and semi-primitive motorized recreation opportunity spectrum classes of the KCRA. The preferred strategy for managing unplanned fires is to manage for the benefit of resources. A full suppression strategy may be used where or when a fire: 1) has a high potential to spread outside national forest boundaries, or into areas with extensive recreation or administrative developments; 2) is not meeting resource objectives; 3) would adversely affect the long-term recovery of ESA listed species. *MA-GDL-BC-05. Fire (Backcountry)* Wildland fire should generally be allowed to play its natural role of influencing natural processes and scenic values. Trail infrastructure should be protected. Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role. *MA-STD-RW-05. Fire (Recommended Wilderness)* Objective(s) and strategies for all unplanned ignitions shall be identified at the time of the fire. Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact suppression tactics). Use planned ignitions only in situations that meet all of the following criteria:

	1) There is an unnatural buildup of fuel. 2) The treatment would increase the probability of accepting naturally occurring fire. 3) Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness.
Conservation measures to minimize habitat fragmentation in core areas: • Emphasize land uses that promote or retain conservation of contiguous blocks of lynx habitat.	*FW-DC-LSU-01. Lands and Special Uses* Achieve a land ownership pattern and right-of-way acquisition pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land. *FW-STD-LSU-01. Land Acquisition, Conveyance, and Exchange* The Forest has a consolidated land ownership pattern that contributes to ecosystem resilience, allows reasonable public and/or Forest Service administrative access where suitable, and improves land management efficiencies. There is a downward trend in the number of isolated, non-Federal inholdings that occur within the proclaimed Forest boundaries. Congressionally designated areas lack private inholdings. *FW-GDL-WL-09. Canada Lynx – Habitat Connectivity within the Kettle-Wedge Core Area* Large, permanent openings (generally greater than 300 feet wide with less than 10 percent overstory canopy) should not be created in prey habitat within lynx analysis units. When temporary openings (resulting from vegetation management treatments) are proposed, adequate forested habitat should be retained between these openings and natural openings to contribute to habitat connectivity.
• Maintain a mosaic of vegetation and features such as riparian areas, forest stringers, unburned inclusions or forested ridges to provide habitat connectivity within and between LAUs.	*FW-DC-WL-04. Habitat Components for Canada Lynx* Forest successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel and denning components) with landscape pattern that is consistent with the historical range of variability. *FW-GDL-WL-03. Unique Habitats* Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands,

	deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance. *FW-GDL-WL-09. Canada Lynx – Habitat Connectivity within the Kettle-Wedge Core Area* Large, permanent openings (generally greater than 300 feet wide with less than 10 percent overstory canopy) should not be created in prey habitat within lynx analysis units. When temporary openings (resulting from vegetation management treatments) are proposed, adequate forested habitat should be retained between these openings and natural openings to contribute to habitat connectivity.
• <u>Identify linkage areas</u> where needed to maintain connectivity of lynx populations and habitat. Factors such as topographic and vegetation features and local knowledge of lynx movement patterns should be considered. Retain lynx habitat and linkage areas in public ownership and acquire land to secure linkage areas where needed and possible. On private lands in proximity to federal lands, agencies should strive to work with landowners to develop conservation easements, explore potential for land exchanges or acquisitions, or identify other opportunities to maintain or facilitate lynx movement.	*FW-DC-LSU-01. Lands and Special Uses* Achieve a land ownership pattern and right-of-way acquisition pattern that improves resource management and administration, and provide for uses that are in the public interest and cannot be provided on private land. *FW-STD-LSU-01. Land Acquisition, Conveyance, and Exchange* The Forest has a consolidated land ownership pattern that contributes to ecosystem resilience, allows reasonable public and/or Forest Service administrative access where suitable, and improves land management efficiencies. There is a downward trend in the number of isolated, non-Federal inholdings that occur within the proclaimed Forest boundaries. Congressionally designated areas lack private inholdings.

• Minimize large-scale developments that would substantially increase habitat fragmentation, reduce snowshoe hare populations, or introduce new sources of mortality.	[Large portions of the Kettle-Wedge Core Area would be in the Kettle Crest Recreation Area, Backcountry, and Recommended Wilderness Management Areas.] *MA-DC-KCRA-03. Wildlife (Kettle Crest Recreation Area)* The recreation area contributes to conserving natural habitats and processes that sustain wildlife populations and provides opportunities to observe wildlife in their natural habitats. *FW-GDL-WL-07. Canada Lynx – Recreation and Administrative Facilities within the Kettle-Wedge Core Area* Expansion or new construction of recreation facilities and administrative facilities within a lynx analysis unit should be located in or adjacent to existing areas of development, rather than creating new developed recreation or administrative sites. Recreation developments and operations should be managed so as not to interfere with lynx movement and maintain the effectiveness of lynx habitat. *MA-DC-BC-04. Developments and Improvements (Backcountry)* Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters (see direction under Administrative and Recreation Sites Management Area) as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments. *MA-SU-RW-01. Suitable Uses (Recommended Wilderness).* Table 37 in the CNF Plan lists suitable uses for Recommended Wilderness that prohibits large-scale development.

• Give special attention to the design of highway improvements such as new road alignments, adding traffic lanes, installing Jersey or Texas barriers, or other modifications that increase highway capacity or speed. <u>Upgrading unpaved roads should be avoided in lynx habitat</u>, if the result would be increased traffic speeds and volumes or a substantial increase in associated human activity or development. Crossing structures or other techniques could be used to minimize or offset impacts (Plate 5.4).	The CNF would provide recommendations to WSDOT on the design of any improvements to highways crossing lynx range. *FW-GDL-WL-08. Canada Lynx – Transportation System within the Kettle-Wedge Core Area* Road reconstruction that results in increased traffic speed and volume should be avoided within lynx analysis units. New permanent roads should not be located on forested ridge-tops, saddles, close to forest stringers or in other areas important for habitat connectivity.
<u>Conservation measures for recreation management in core areas:</u> • Manage winter recreation activities within LAUs such that lynx <u>habitat connectivity</u> is maintained or improved where needed. • To minimize habitat loss, <u>concentrate recreational activities within existing developed and high winter use areas</u>, rather than developing new sites and facilities in lynx habitat. On federal lands in areas with low levels of recreation currently, consider limiting the future development or expansion of developed winter recreation sites or concentrated winter use areas. • Direct recreational activities and facilities away from identified <u>linkage areas</u>.	*FW-GDL-WL-07. Canada Lynx – Recreation and Administrative Facilities within the Kettle-Wedge Core Area* Expansion or new construction of recreation facilities and administrative facilities within a lynx analysis unit should be located in or adjacent to existing areas of development, rather than creating new developed recreation or administrative sites. Recreation developments and operations should be managed so as not to interfere with lynx movement and maintain the effectiveness of lynx habitat.
• Consider not expanding designated over-the-snow routes or designated play areas in lynx habitat, unless the designation serves to consolidate use.	*FW-STD-WL-04. Canada Lynx – Groomed and Designated Winter Routes within the Kettle-Wedge Lynx Core Area* Allow no net increase in groomed or designated over-the-snow routes into lynx habitat at the lynx analysis unit scale. Access to non-recreation uses, such as mineral and energy exploration and development sites, will be comprised of designated routes or designated over-the-snow routes. This does not apply to areas within permitted ski area boundaries, winter logging, trails that are rerouted for public safety, or to accessing private in-holdings.

Conservation measures for minerals and energy development in core areas: • To minimize loss of lynx habitat resulting from minerals and energy development, locate facilities and roads outside of lynx habitat and linkage areas where possible. Minimize the footprint of developments within lynx habitat. • Use existing roads and utility corridors to the fullest extent possible for all activities involving exploration and development. • If upgrading existing access roads, design the roads to the minimum standard needed. • To the extent possible, restrict public access on roads that were built or used for mineral and energy exploration and development in lynx habitat. • Encourage remote monitoring to reduce need for and frequency of site visits in lynx habitat. • Develop reclamation plans for abandoned mine lands to fully rehabilitate and restore as nearly as possible to original contours and native vegetation as habitat for lynx.	*FW-DC-MIN-01. Mineral Materials Availability* Saleable mineral materials are available to Federal, State or local governments for public works, and to the public at the discretion of the authorized officer based upon agency needs, public interest and community needs, material availability, resource protection and capability. Production and administration of mineral material would meet the demand consistent with the management of other surface resources as long as the benefits derived exceed the cost and impacts of resource disturbance. *FW-DC-MIN-02. Reclamation and Extraction* Approved mining operations include concurrent, interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats; and scenic integrity objectives. The following guidelines pertain to the Recommended Wilderness Management Area. *MA-GDL-RW-10. Mineral Leasing (Recommended Wilderness)* Mineral leasing would be subject to stipulations developed by the Forest in a Consent analysis. If the decision is made by the Department of the Interior to issue a lease in the recommended wilderness area a *No Surface Occupancy* stipulation may be made. Alternatively, the Forest may also recommend a *No Leasing* consent decision be made the Department of the Interior for recommended wilderness. *MA-GDL-RW-11. Locatable Minerals (Recommended Wilderness)* Mining exploration and operations must be conducted to protect and maintain the social and ecological characteristics that provide the basis for wilderness.

Conservation measure for forest/backcountry roads and trails in core areas: • Avoid forest/backcountry road reconstruction or upgrades that substantially increase traffic volume and speed. If traffic volume and speed are of concern, incorporate appropriate mitigation such as traffic calming measures in the project design.	*FW-GDL-WL-08. Canada Lynx – Transportation System within the Kettle-Wedge Core Area* Road reconstruction that results in increased traffic speed and volume should be avoided within lynx analysis units. New permanent roads should not be located on forested ridge-tops, saddles, close to forest stringers or in other areas important for habitat connectivity.
Conservation measure for livestock grazing in core areas: • Manage livestock grazing within riparian areas and willow carrs in lynx habitat to maintain conditions that support snowshoe hares by maintaining a preponderance of mid or late-seral stages.	*FW-GDL-LG-02. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments* If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey.
Sources: **Canada Lynx Conservation Assessment and Strategy (Aug 2013 p. 96)** ***Conservation Measures for Secondary/Peripheral Areas***	**How the Colville National Forest Revised Forest Plan addresses these conservation measures**
Vegetation management in secondary / peripheral areas: • Provide a mosaic of forest structure that includes dense early-successional coniferous and mixed-coniferous-deciduous stands, along with a component of mature multi-story conifer stands. Flexibility in the amounts and arrangement of various successional stages is acceptable, provided that a mosaic can be sustained. Vegetation treatments should be designed with consideration of historical landscape patterns and disturbance processes. • Design timber harvest, planting, and thinning to include some representation of young densely-stocked regenerating stands in the mosaic for snowshoe hare production areas.	*FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species. *FW-DC-WL-04. Habitat Components for Canada Lynx* Forest successional stages within lynx analysis units provide a mosaic of lynx habitat (including foraging, travel and denning components) with landscape pattern that is consistent with the historical range of variability. *FW-GDL-WL-03. Unique Habitats* Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance.

<u>Recovery Outline Objective 3:</u> Ensure that habitat in secondary areas remains available for continued occupancy by lynx. **<u>Recovery Actions from Recovery Outline</u>** 5. Ensure that habitat in secondary areas remains available for occupancy by lynx. 5.1. Conduct surveys to determine whether any of the unsurveyed secondary areas support lynx populations that have not been recently documented. Based on results, adjust core and secondary area designations as appropriate. 5.2. Conduct research to determine the role of secondary areas in ensuring the persistence of lynx in both the contiguous United States and individual core areas. Based on results, adjust recovery objectives and criteria as appropriate. 5.3. In secondary areas, monitor amount and condition of habitat and conduct surveys (at least once every 10 years during population peaks) to document occurrence of lynx. 5.4. Identify and implement management efforts as necessary to provide lynx habitat in secondary areas. Use the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000) as habitat management guidance in secondary areas. 5.5. Determine whether dispersal occurs between core areas and secondary areas and develop and implement management agreements with key landowners to conserve these habitats if necessary.	
Source: **Canada Lynx Conservation Assessment and Strategy (August 2013 p. 97-98)** ***Monitoring Objectives***	

<u>The objectives of a long-term monitoring program ideally would include:</u> • Detecting changes in lynx population distribution, adult female survival, mortality factors, and population productivity; • Snowshoe hare abundance and population trend, including changes in hare abundance in response to different types of vegetation management and landscape patterns in boreal forests; and • The effects of climate change on lynx and their habitat, addressing important aspects of lynx habitat such as the depth, density, and duration (annual) of snow cover, and changes in snowshoe hare population density and distribution. National monitoring design and sampling protocols that are adaptable to regional differences should be established that will enable a cost-effective program to be implemented and coordinated with multiple agencies and partners. **<u>Recovery Actions from Recovery Outline</u>** 6. Identify population and habitat limiting factors for lynx in the contiguous United States. 6.1. Continue and complete studies necessary to gather basic information on the ecological requirements, distribution, population size and trends in each of the core areas and as possible for secondary areas. 6.2. Identify the risk to lynx populations posed by forest management techniques and human induced mortality from factors such as roads, trapping and hunting. Address these factors as necessary to ensure the long-term persistence of lynx populations in core areas. 6.3. Continue and complete studies to assess the role of potential competitors (bobcat, coyotes) and predators	***Chapter 4 Monitoring*** MON-VEG-01: To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags. MON-AQH-02: Are management actions improving conditions within Riparian Management Areas where livestock grazing is permitted? MON-FLS-01: To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives? MON-FLS-01-02: Canada lynx: changes in lynx habitat as a result of moving towards the desired conditions for vegetation through providing a mosaic of lynx habitat with landscape pattern that is consistent with the historical range of variability

(fisher, mountain lions) in limiting persistence of lynx populations in core areas; if determined to be limiting factors address as necessary. 6.4. Research the role hybridization between lynx and bobcats may have in limiting the persistence of lynx populations in core areas; if determined to be a limiting factor address as appropriate. 6.5. Monitor the effects of climate change on boreal forest habitat in each of the core areas. Modify the delineation of core areas and adjust management strategies if necessary. 7. Develop a post-delisting monitoring plan that will be in place and ready for implementation prior to delisting to ensure the continuing effectiveness of the recommended recovery actions and allow for adaptive management, as necessary.	

Appendix B5. List of recovery or conservation strategies for Yellow-billed Cuckoo that are addressed by the Colville National Forest Revised Land Management Plan

Recommended Recovery or Conservation Strategies for Yellow-billed Cuckoo that can be addressed by CNF Forest Plan ***Sources:*** ***Wiles, G. J., and K. S. Kalasz. 2017. Draft Status Report for the Yellow-billed Cuckoo in Washington. Washington Department of Fish and Wildlife, Olympia, Washington. 32+ iv pp.*** ***Knutson, K. L., and V. L. Naef. 1997. Management recommendations for Washington's priority habitats: riparian. Washington Department of Fish and Wildlife, Olympia, Washington. 181 pp.***	How the Colville National Forest Revised Forest Plan addresses these threats / priority actions / conservation actions. **DC = Desired Condition** **OBJ = Objective** **GDL = Guideline** **STD = Standard**
<u>Management Recommendations for protection of Cuckoo habitat:</u> Do not remove riparian vegetation, avoid bank stabilization and channelization projects, and exclude livestock from areas used by cuckoos	*FW-DC-WR-02. Hydrologic and Aquatic and Riparian Habitat Connectivity* National Forest System lands contribute to uninterrupted physical and biological processes within and between watersheds. Floodplains, groundwater-dependent systems, upslope areas, headwater tributaries, and intact habitat refugia provide vertical, horizontal, and drainage network connections. These network connections provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic, riparian-dependent, and many terrestrial species of plants and animals. Subbasin scale is used for Forest planning, and watershed or subwatershed scale is used for project planning. *FW-DC-WR-03. Self-Sustaining Native and Aquatic and Riparian-Dependent Species* National Forest System lands contribute to habitat and ecological conditions that are capable of supporting self-sustaining populations of native aquatic and riparian-dependent plant and animal species. Subbasin

	scale is used for Forest planning and watershed or subwatershed scale is used for project planning. *FW-DC-WR-04. Physical Integrity of Aquatic and Riparian Habitat* National Forest System lands provide aquatic habitats in which the distribution of conditions (e.g., bank stability, substrate size, pool depths and frequencies, channel morphology, large woody debris size and frequency) in the population of watersheds on the Forest is similar to the distribution of conditions in the population of similar, reference condition watersheds. Reference Conditions can be drawn from the Forest or Provincial scales. Conditions assessed at the subbasin scale for forest and project planning. *FW-DC-WR-05. Water Quality* National Forest System lands contribute to water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality is within the range that maintains the biological, physical, and chemical integrity and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities, and meets appropriate Washington State water quality standards. Subbasin scale is used for forest planning and watershed or subwatershed scale is used for project planning. *FW-DC-WR-07. In-stream Flows* National Forest System lands contribute to in-stream flows and groundwater sufficient to create and sustain riparian, aquatic, and wetland habitats, retain patterns of sediment, temperature, nutrient, and wood routing, and provide for (permitted or certificated) consumptive uses. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows functions in concert with local geology, valley types, soils and geomorphology. Subbasin scale is used for Forest planning and watershed or subwatershed scale is used for project planning. *FW-DC-WR-12. Aquatic Invasive and Non-Native Species* Aquatic invasive species do not occur as a component of lake, stream, and other riparian-related ecosystems or compete with native species for

	critical resources. Subbasin scale is used for Forest planning. Watershed or subwatershed scale is used for project planning. *FW-DC-WR-14. Resiliency to Climate Change* Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin is scale is used for Forest planning and watershed scale is used for project planning. *FW-DC-WR-18. Key Watershed Integrity* Key watersheds have high watershed integrity and contribute to resilient aquatic and riparian ecosystems. *FW-DC-WR-19. Focus and Priority Watershed Network* Focus and priority watersheds contribute to the sustainability of aquatic and riparian systems and species and provide resilient, productive habitat and high water quality. *FW-OBJ-WR-05. Key Watershed Restoration Prioritization* Management in key watersheds focuses on restoration or preservation of watershed, aquatic, and riparian function and recovery of threatened and endangered species. Improve watershed condition class in key watersheds that are a priority for restoration within 15 years of forest plan implementation. Key watersheds that are a priority for restoration include: East Branch LeClerc Creek, West Branch LeClerc Creek, Deadman Creek, Barnaby Creek, Harvey Creek, North Fork Deadman Creek, North Fork Sullivan Creek, Sullivan Creek, Ruby Creek, Tonata Creek, Upper Sherman Creek, and South Fork Sherman Creek subwatersheds. Additional key watersheds that are a priority for restoration will be identified, as appropriate, through the life of the plan through the WCF process. *FW-OBJ-WR-07. Key Watershed Range Infrastructure Improvements* Improve hydrologic and aquatic function through range infrastructure

	improvements, including riparian fencing, movement and improvement of watering troughs, and other acceptable treatments over 240 acres within 15 years of plan implementation. *FW-STD-WR-01. Properly Functioning Watersheds* When aquatic and riparian desired conditions are being achieved and watersheds are functioning properly, projects shall maintain those conditions. When aquatic and riparian desired conditions are not yet achieved or watersheds have impaired function or are functioning-at-risk 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 be acceptable when they support long-term recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. *FW-STD-WR-07. Hydroelectric and Other Water Development Authorizations in Key Watersheds* Hydroelectric and other water development authorizations shall include requirements for in-stream 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 *FW-DC-LG-02. Economic and Social Contributions* Rangelands and forestlands provide forage for use by both livestock and wildlife. Grazing continues to be a viable use of vegetation on the Forest. Availability of lands identified as suited for this use contributes to providing animal products, economic diversity, open space, and promotes cultural values and a traditional local life style. Allotments are generally grazed on an annual basis. Consistent with sustaining other resource desired conditions, a viable

	level of forage is available for use under a grazing permit system where use generally occurs on an annual basis generally between June and October. Riparian and upland areas within allotments reflect ecological conditions supporting the desired conditions, including those described in the Wildlife, Aquatic and Riparian, Soil, and Vegetation Desired Conditions. *FW-GDL-LG-01. Threatened and Endangered Species Habitat in Riparian Areas in Grazing Allotments* If livestock grazing occurs within areas used by threatened and endangered species, manage for conditions for the species or its prey. *FW-DC-MIN-02. Reclamation and Extraction* Approved mining operations include concurrent, interim and post-operation reclamation measures to ensure the long-term function and stability of resources including, but not limited to, soil; vegetation; water quality; aquatic, riparian and upland habitats; and scenic integrity objectives. *MA-DC-RMA-03. Livestock Grazing* Livestock grazing of riparian vegetation retains sufficient plant cover, rooting depth and vegetative vigor to protect stream bank and floodplain integrity against accelerated erosional processes, and allows for appropriate deposition of overbank sediment. *MA-STD-RMA-01. Aquatic and Riparian Conditions* Riparian Management Areas include portions of watersheds where aquatic and riparian-dependent resources receive primary management emphasis. When RMAs are properly functioning and aquatic and riparian desired conditions are being achieved, projects shall maintain those conditions. When RMAs have impaired function or are functioning-at-risk or if aquatic and riparian desired conditions are not yet being achieved and to the degree that project activities would contribute to those conditions, projects or permitted activities shall restore or not retard attainment of desired conditions . Short-term adverse effects from project activities may be acceptable when they support long-term

	recovery of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service authorities are limited. In those cases, project effects towards attainment of RMA desired conditions shall be minimized and not retard attainment of desired conditions to the extent possible within Forest Service authorities. *MA-STD-RMA-03. Personal Fuelwood Cutting* Personal fuelwood cutting shall not be authorized within riparian management areas or source areas for large woody debris. *MA-STD-RMA-04. Timber Harvest and Thinning* Timber harvest and other silvicultural practices can occur in riparian management areas only as necessary to attain desired conditions for aquatic and riparian resources. Vegetation in riparian management areas will not be subject to scheduled timber harvest. *MA-STD-RMA-09. Management of Livestock Grazing to Attain Desired Conditions* Manage livestock grazing to move toward aquatic and riparian desired conditions. Where livestock grazing is found to prevent or retard attainment of aquatic and riparian desired conditions, modify grazing management. If adjusting practices is not effective, remove livestock from that area using appropriate administrative authorities and procedures. *MA-STD-RMA-10. Recreational and Permitted Grazing Management-Livestock Handling, Management, and Water Facilities* New and replaced livestock handling and/or management facilities and livestock trailing, salting, and bedding are prohibited in riparian management areas unless they do not prevent or retard attainment of aquatic and riparian desired conditions, inherently must be located in an RMA, or are needed for resource protection. *MA-STD-RMA-11. Permitted Grazing Management □ Allotment Management Planning* During allotment management planning, negative impacts to water

quality and aquatic and riparian function from existing livestock handling or management facilities located within riparian management areas shall be minimized to allow conditions to move toward the desired condition.

MA-STD-RMA-12. Wildland Fire and Fuels Management □ Minimum Impact Suppression Tactics
Use minimum impact suppression tactics (MIST) during wildland fire suppression activities in riparian management areas.

MA-STD-RMA-16. Lands and Special Uses Authorizations
Authorizations for all new and existing special uses that result in adverse effects to habitat conditions and ecological processes essential to aquatic and riparian-dependent resources shall require mitigation that results in re-establishment, restoration, mitigation, or improvement of those conditions and processes. These authorizations include, but are not limited to, water diversion or transmission facilities (e.g., pipelines, ditches), energy transmission lines, roads, hydroelectric, and other surface water development proposals.

MA-STD-RMA-17. Hydroelectric - New Support Facilities
Locate new support facilities outside of riparian management areas. Support facilities include any facilities or improvements (workshops, housing, switchyards, staging areas, transmission lines, etc.) not directly integral to the production of hydroelectric power or necessary for the implementation of prescribed protection, mitigation, or enhancement measures.

MA-STD-RMA-18. Mineral Operations in RMAs
For operations in RMAs, ensure operators take all practicable measures to maintain, protect, and rehabilitate water quality and habitat for fish and wildlife and other riparian-dependent resources affected by the operations. Ensure operations do not retard or prevent attainment of aquatic and riparian desired conditions. Exceptions to this standard include situations where Forest Service has limited discretionary authorities. In those cases, project effects shall be minimized and shall not prevent or retard attainment of aquatic and riparian desired

	conditions to the extent possible within those authorities. *MA-STD-RMA-19. Operating Plans for Existing Activities* Work with operators to adjust their mineral operations to minimize adverse effects to aquatic and riparian-dependent resources in RMAs. Require BMPs and other appropriate conservation measures to mitigate potential mine operation effects. *MA-STD-RMA-22. Leasable Exploration and Development* Consent decisions to allow mineral leasing will provide Bureau of Land Management (BLM) stipulations for lease management. Once leased, the Forest will actively coordinate and consult with BLM regarding lease exploration and development activities. In consultation with the BLM, the Forest will recommend BMPs and mitigation as Conditions of Approval to support attainment and maintenance of aquatic and riparian desired conditions. *MA-STD-RMA-23. Saleable Minerals* Prohibit saleable mineral activities such as sand and gravel mining and extraction within RMAs unless no alternatives exist and if the action(s) will not retard or prevent attainment of aquatic and riparian desired conditions. *MA-STD-RMA-24. Inspection and monitoring of mineral plans, leases, and permits* Conduct inspections, monitor, and annually review required monitoring for mineral plans, leases, and permits. Evaluate inspection and monitoring results and require mitigations for mineral plans, leases, and permits as needed to eliminate impacts that retard or prevent attainment of aquatic and riparian desired conditions. *MA-GDL-RMA-11. Annual Grazing Use Indicators* The purpose of this guideline is to manage livestock grazing to help attain and maintain aquatic and riparian desired conditions over time. Specifically, it is intended to maintain or improve vegetative and stream conditions, help ensure the viability of aquatic species, provide important

	contributions to the recovery of ESA-listed species, and facilitate attainment of State water quality standards. The annual livestock use and disturbance indicators described below should be applied to help achieve, over longer timeframes, conditions at site and watershed scales that enable attainment and maintenance of desired conditions. The values specified below are starting points for management. Only those indicators and numeric values that are appropriate to the site and necessary for maintaining or moving towards desired conditions should be applied. Specific indicators and indicator values should be prescribed and adjusted, if needed, in a manner that reflects existing and natural conditions for the specific geo-climatic, hydrologic and vegetative setting in which they are being applied . Indicators and 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 ESA consultation documents, may be used if they are based on best available science and monitoring data and meet the purpose of this guideline. 3. In subwatersheds that are functioning properly for water quality, aquatic habitat, and riparian and wetland vegetation, maintain those conditions by managing annual livestock grazing use and disturbance as follows : • maintain a minimum of 6-inch residual herbaceous stubble height on the greenline , except for sites in late-seral conditions being managed under any grazing system that supports a late-seral ecological stage, where a minimum of 4-inch to 6-inch stubble height should be maintained • utilize no more than 30-45% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area • Allow no more than 20-25% streambank alteration

	• limit use of woody species to no more than 30-40% of current year's leaders along streambanks and, as needed, in other critical portions of the riparian management area 4. In subwatersheds that are functioning-at-risk or that have impaired function for water quality, aquatic habitat, and/or riparian and wetland vegetation and where grazing contributes to those conditions, enable recovery by managing annual livestock grazing use and disturbance as follows: • maintain a minimum of 6-inch to 8-inch residual herbaceous stubble height on the greenline • on sites with late-season grazing and where willow is or should be an important component of the riparian vegetation community, maintain a minimum of 8-inch residual herbaceous stubble height • utilize no more than 30-35% of deep-rooted herbaceous vegetation in the active floodplain and, as needed, in other critical portions of the riparian management area • Allow no more than 20-25% streambank alteration • limit use of woody species to no more than 20-30% of current year's leaders along streambanks and, as needed, other critical portions of the riparian management areas More conservative values, within and potentially beyond the ranges described above, should be used when: (1) relevant indicators (e.g., water quality, aquatic habitat, riparian vegetation) are highly departed from desired conditions and not improving due to livestock influence; (2) ESA-listed aquatic species or critical habitat sensitive to grazing impacts are present and conditions are not improving; or (3) grazing-related requirements of water quality restoration plans for impaired waters (e.g., site potential shade) are not being met and conditions are not improving. Implement other applicable actions contained in ESA Recovery Plans

	and water quality restoration plans. *MA-GDL-RMA-12. Recreational and Permitted Grazing Management – Livestock Handling Activities* Livestock trailing, bedding, loading, and other handling activities should be avoided in riparian management areas, except for those that inherently must occur in a riparian management area. *MA-GDL-RMA-16. Wildland Fire and Fuels Management – Temporary Fire Facilities* Temporary fire facilities (e.g., incident bases, camps, staging areas, helispots, and other centers) for incident activities should be located outside riparian management areas. When no practical alternative exists, all appropriate measures to maintain, restore, or enhance aquatic and riparian-dependent resources should be used. *MA-GDL-RMA-17. Water Drafting Sites* Water drafting sites should be located and managed to minimize adverse effects on stream channel stability and in-stream flows needed to maintain riparian resources, channel conditions, and fish habitat. *MA-GDL-RMA-21. Hydroelectric – Existing Support Facilities* Existing support facilities that are located within riparian management areas should be operated, maintained, or removed to restore or enhance aquatic and riparian-dependent resources.
Do not use insecticides near riparian areas occupied by cuckoos	*FW-GDL-WR-05. Chemical Fire Suppression* Whenever practical, as determined by the fire incident commander, use water or other less toxic wildland fire chemical suppressants for direct attack or less toxic approved fire retardants in areas occupied by riparian and aquatic-dependent threatened, endangered, proposed, candidate, or sensitive species, or their habitats. *FW-STD-IPM-02. Pesticide Use and Risk Assessment* Pesticides (including herbicides) may be considered, as appropriate, within all management areas, to respond to native and invasive pests as part of an integrated pest management plan. Minimize use of

	formulations or tank mixes involving plausible harm to human health, soil organisms, water quality, non-target plants, non-target animals (including invertebrates), amphibians or fish. Use best available science in pesticide risk assessments to inform decisions about pesticide use. *FW-GDL-IPM-01. Minimize Reliance on Pesticides* Pest management should be planned and conducted to minimize reliance on pesticides by using a combination of effective treatment options and treating pest outbreaks in a timely manner. *MA-STD-RMA-02. Chemical Application* Apply herbicides, insecticides, piscicides and other toxicants, other chemicals, and biological agents only to maintain, protect, or enhance aquatic and riparian resources and/or native plant communities.

Appendix B6. List of recovery or conservation strategies for Whitebark Pine that are addressed by the Colville National Forest Revised Land Management Plan

Recommended Recovery or Conservation Strategies for Whitebark Pine that can be addressed by CNF Forest Plan **Source:** **USDA Forest Service. 2008. Whitebark Pine Restoration Strategy for the Pacific Northwest Region 2009-2013. Portland, OR.**	**How the Colville National Forest Revised Forest Plan addresses these threats / priority actions / conservation actions.** **DC = Desired Condition** **OBJ = Objective** **GDL = Guideline** **STD = Standard** **Colored font=clarifying notes by CNF.**
Goal Restore and conserve a network of viable populations of whitebark pine and associated species across the Pacific Northwest.	*FW-DC-WL-02. Habitat Conditions for Threatened and Endangered Species* Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-04 and 05) and contribute to the recovery of federally listed threatened and endangered species. *FW-DC-WL-05. Grizzly Bear Recovery Area – Key Habitat Components for Grizzly Bear* Key grizzly bear habitat components (such as whitebark pine, riparian habitats, berry-producing shrubfields, natural meadows, and forest cover) are available within core areas and in quantities that contribute toward a recovered bear population. *FW-DC-VEG-09. Threatened, Endangered and Sensitive Plant Species – Special and Unique Habitats* Special and unique habitats support threatened, endangered, and sensitive plant species populations and contribute to high quality suitable habitat for these species. Degraded or diminished special and unique habitats are restored within their natural range of variation. *FW-DC-VEG-10. Threatened, Endangered and Sensitive Plant Species – Management-Related Disturbance*

	Ecological conditions and processes that sustain the habitats currently or potentially occupied by threatened, endangered, or sensitive plant species are retained or restored. The geographic distributions of sensitive plant species in the Forest Plan area are maintained. This includes sufficient seed or vegetative reproduction to maintain existing plant populations and associated native plant community biodiversity. Soil disturbance is managed to avoid degradation of threatened, endangered and sensitive plant species and their habitat as well as plant community composition, structure, and productivity. *FW-DC-VEG-11. Threatened, Endangered and Sensitive Plant Species – Habitat and Population Trends* Population trends, amount of occupied habitat, and amount of unoccupied suitable habitat are stable or increasing for threatened, endangered, and sensitive plant species.
<u>The Four Threats to Whitebark Pine</u> • **White pine blister rust**: Since its introduction, the pathogen has caused unprecedented decline and mortality of susceptible hosts in Oregon and Washington as well as other parts of the West. • **Mountain pine beetle**: Between 2005 and 2007 an estimated 600,000 whitebark pines were killed by mountain pine beetles in Washington and Oregon.	*FW-DC-IPM-01. Integrated Pest Management* Unwanted plant, animal (vertebrate and invertebrate) and pathogen species are prevented, suppressed, contained, controlled or eradicated. Native insects and plant and animal disease pathogens exist at endemic levels. Forests are managed for resilience to pests and pathogens and to maintain native plant communities. Proactive pest response plans are prepared, or existing plans reviewed, in cooperation with partners, to facilitate rapid response to new pest outbreaks and infestations. *FW-OBJ-IPM-01. Integrated Pest Management* Damaging plant, animal, insect and plant and animal disease pest outbreaks are prevented, suppressed, contained, controlled or eradicated in a timely manner in accordance with proactive pest response plans. New outbreaks are addressed within one year of detection through the life of the plan. Mountain pine beetles are endemic to forest ecosystems & western white pine blister rust, although an introduced disease, is now endemic. It will not be possible to reach the above objectives, but through proper

	management of stands, impacts from mountain pine beetles to whitebark pine stands can be reduced, & blister rust resistance genotypes can be introduced into stands through planting of rust resistant seedlings. *FW-STD-IPM-01. Integrated Pest Management* Use an integrated pest management approach to design projects to minimize or eliminate risks of adverse effects from treatment while effectively responding to the pest. Cooperate with other federal, state, and county agencies and other citizens to take an all lands approach to pest management. Intervention may occur when native and non-native pests (insects and disease pathogens) are not operating in their characteristic role or when site-specific objectives (ex: impacts to key watersheds, increased wildfire hazard, potential impacts to the recovery of threatened or endangered species, or maintaining late and old forest structure) are at risk from native or invasive species. The great majority of whitebark pine stands on the Forest are in the following management areas. *MA-GDL-WCD-09. Invasive Plants (Congressionally Designated Wilderness)* Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants. Treatments would need to be carried out by measures that have the least adverse impact on the wilderness resource and are compatible with wilderness management objectives. The most viable approach to restoring whitebark pine on the forest is to plant blister rust resistant seedlings in areas where whitebark pine will survive & grow well. However, the forest is not allowed to plant whitebark pine seedlings in designated wilderness areas. The forest has a number of whitebark pine trees whose offspring have tested resistant to blister rust. Many of these resistant parent trees are located in the Salmo-Priest wilderness area.

	MA-GDL-RW-08. Invasive Plants (Recommended Wilderness) Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants. Treatments should be carried out by measures that have the least adverse impact on the recommended wilderness resource and are compatible with potential wilderness designation. *MA-GDL-KCRA-04. Invasive Species (Kettle Crest Recreation Area)* Manual, biological, cultural, mechanical or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive species within all recreation opportunity spectrum classes of the recreation area. *MA-GDL-BC-07. Invasive Plants (Backcountry)* Manual, biological, cultural, or chemical treatments may be authorized to eradicate, reduce, or control populations of invasive plants.
• **Fire**: Large high-severity fires have the potential to severely reduce or even eliminate cone-bearing whitebark pine across an extensive landscape. The forest has already had stand replacing fires in whitebark pine stands (e.g. the Kettle Crest, Mankato Mountain, North & South Baldy). Some of the trees lost in these fires had offspring that showed resistance to blister rust in tests conducted at the Forest Service, Dorena Genetic Resources Center & the Coeur d'Alene Nursery test center. These tree's rust resistant genotypes need to be preserved through collection of scion material which is grafted onto rootstock & planted in areas which will be protected from fire. The existing whitebark pine stands need to have the highest priority for protection from fires. When these stands are lost, their individual rust resistant tree genotypes are lost.	The great majority of whitebark pine stands on the Forest are in the following management areas: Congressionally Designated Wilderness, Recommended Wilderness, Kettle Crest Recreation Area, and Backcountry. *MA-GDL-WCD-07. Wildland Fire (Congressionally Designated Wilderness)* Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role or to achieve wilderness desired conditions. Wildfires should be managed for the benefit of wilderness resources. A full suppression strategy may be used where or when a wildfire: • would adversely affect an ESA-listed species. *MA-STD-RW-05. Fire (Recommended Wilderness)* Objective(s) and strategies for all unplanned ignitions shall be identified at the time of the fire. Fire management activities shall be conducted in a manner compatible with maintaining wilderness characteristics (minimum impact

When used under controlled conditions, prescribed fire can be used to reduce fire hazards, reduce competition to whitebark pine from other plant species, & prepare areas where Clark's Nutcrackers can cache seeds. Unretrieved seed from these seed caches results in whitebark pine regeneration.	suppression tactics). Use planned ignitions only in situations that meet all of the following criteria: 4) There is an unnatural buildup of fuel. 5) The treatment would increase the probability of accepting naturally occurring fire. 6) Strategies use minimum suppression techniques and are designed to maintain and restore the vegetation conditions that are characteristic of wilderness. *MA-GDL-KCRA-03. Fire (Kettle Crest Recreation Area)* Use of planned and management of unplanned fire ignitions may be authorized. Fire should be allowed to play its natural ecological role in the semi-primitive non-motorized and semi-primitive motorized recreation opportunity spectrum classes of the KCRA. The preferred strategy for managing unplanned fires is to manage for the benefit of resources. A full suppression strategy may be used where or when a fire: • would adversely affect the long-term recovery of ESA listed species. *MA-GDL-BC-05. Fire (Backcountry)* Wildland fire should generally be allowed to play its natural role of influencing natural processes and scenic values. Trail infrastructure should be protected. Planned ignitions should be considered to create favorable conditions that enable naturally occurring fires to return to their historic role.
• **Global Climate Change**: The predicted impacts of warming temperatures include a severe decline in suitable habitat; increased mountain pine beetle activity; an increase in the number, intensity, and extent of wildfires; and perhaps an increase in	*MON-VEG-01* To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.

white pine blister rust-related mortality.	
<u>Conservation Strategies for Seed Zone 3, NE Washington</u> Three conservation areas separated by at least 30 miles are located on the Okanogan and Colville National Forests. Most whitebark pine habitat is outside of designated wilderness except for the northeast corner of conservation area 303. Round Top Mt., also in conservation area 303, is a designated research natural area. Most habitat in this seed zone is in small patches on isolated peaks and ridges. Blister rust infection rate was recorded at 18 to 35 percent & is increasing. Mountain pine beetle activity is high. • Post-fire & general reforestation planting is needed to regenerate conservation areas 302 and 303 (CNF); these are established cone collection areas but additional seed is needed for testing for rust resistance & then sowing the rust resistance seed for growing seedlings to be planted in appropriate whitebark pine habitat. There are a number of trees across the forest that show resistance to blister rust in tests conducted at the Forest Service's Region 6, Dorena Genetic Resources Center & Region 1, Coeur d'Alene Nursery test center. The forest has some of the highest concentrations of rust resistant trees in Region 6. These trees need to be protected from mountain pine beetle attack (verbenone treatments)	**Guidelines related to Whitebark Pine** *FW-GDL-VEG-01. Threatened, Endangered and Sensitive Plant Species – Disturbance in Occupied Habitat* Soil and habitat disturbance should be managed within occupied and suitable habitat to the extent practicable to maintain or enhance threatened, endangered, and sensitive plant populations and avoid invasive plant species establishment or spread. Consequently, occupied habitat should not be used for timber harvest, fuel breaks or developments associated with wildfire suppression, delivery of fire retardant or petroleum products, placement of stock-handling facilities, recreation, or special use developments. A 100-foot buffer between the occupied habitat and these management activities should be maintained. Whitebark pine has occupied a larger area on the mountain tops & ridges across the forest than it currently occupies. These areas can be recognized & identified by the whitebark pine snags still standing in areas that are lower in elevation than the current distribution of whitebark pine. Mortality from mountain pine beetle attacks & competition from other plant species have contributed to the reduction in area for whitebark pine. Trees in occupied habitat that are felled for safety reasons should be retained on site as needed to maintain, protect, or enhance habitat unless such action is detrimental to the threatened, endangered, and sensitive species population or habitat and represents a threat through physical impacts or potential uncharacteristic wildfire. All new road and trail construction should be designed to avoid the occupied habitat of threatened, endangered, and sensitive plant species

& fire. These tree's rust resistant genotypes need to be preserved through collection of scion material which is grafted onto rootstock & planted in areas which will be protected from fire & mountain pine beetles. The existing whitebark pine stands on the forest need to have the highest priority for protection from fires. When these stands are lost, their individual rust resistance tree genotypes are lost. To increase the genetic base for blister rust resistance, more whitebark pine trees across the forest need to have seed collected from them, seedlings grown from this seed & these seedlings tested for rust resistance at the Dorena Genetic Resources Center. • Tree thinning also is needed in both these areas to reduce competition.	(minimum 100-foot buffer). Use of prescribed fire should be avoided in occupied habitat except in areas occupied by fire-dependent or fire-tolerant species. Slash piles and other fuels should be managed to avoid the occupied habitat of threatened, endangered, and sensitive species (minimum 100-foot buffer). Slash piles and other fuels should be managed to avoid the occupied habitat of threatened, endangered, and sensitive species (minimum 100-foot buffer). Grazing management (including timing, intensity, duration, frequency of use, and type and class of livestock) should allow for completion of threatened, endangered, and sensitive plant species annual life cycle and development and dispersal of reproductive materials like seed and spores. Salting or water developments should not be authorized or allowed such that they reduce threatened, endangered, or sensitive plant populations. Mining operations shall be conducted to minimize adverse environmental impacts on National Forest surface resources. Operations approved in a Plan of Operations shall avoid threatened, endangered, and sensitive plant species and their habitat to the extent practicable. *FW-GDL-VEG-03. Large Tree Management* Management activities should retain and generally emphasize recruitment of individual large trees (greater than 20 inches diameter at breast height) across the landscape. Exceptions where individual large trees may be removed or destroyed include the following: • Trees need to be removed to promote special plant habitats (such as, but not limited to, aspen, cottonwood, whitebark pine) • [other exemptions are listed in CNF Plan] **Identified Management Actions Related to Whitebark Pine** *Appendix B: Proposed and Possible Management Action; Vegetation*

	• Planting white pine blister rust resistant western white pine or whitebark pine; • Maintenance or restoration of rare plant habitat and special and unique natural communities; • Management or treatment of insects and diseases using integrated pest management techniques.
• Collect whitebark pine seed samples across the Pacific Northwest and **protect** in long-term storage. • **Increase** levels of genetic resistance to blister rust infection in whitebark pine populations through tree selection, resistance screening, and wise use of seed from resistant trees to regenerate whitebark pine in appropriate areas.	*FW-GDL-VEG-02. Plant Material Collection for Conservation Purposes* Commercial or non-commercial permits or authorizations should generally be issued for collection of seed or plant materials when project objectives are consistent with rare species conservation practices (these practices could include seed storage in recognized seed banks, or collection of plant material for restoration and rehabilitation purposes, or scientific research that benefits species viability). The CNF collects whitebark pine seed from distinct populations of trees on the Forest whenever practicable. Seed is sent to the Dorena Genetic Resources Center in central Oregon, for blister rust resistance screening. The CNF has conducted planting trials of seedlings with proven rust resistance. More seed needs to be collected from individual whitebark pine on the forest that have shown resistance to blister rust so that rust resistant seedlings can be planted across the forest.
• **Evaluate** units where health, stand condition, and restoration needs are unknown. Work collaboratively with research scientists and land managers in other agencies to **increase** understanding of the complex and synergistic impacts of blister rust, fire, mountain pine beetle and climate change on present and future health and distribution of whitebark pine plant communities.	*FW-STD-VEG-02. Threatened, Endangered and Sensitive Plant Species – Surveys* Surveys for threatened, endangered, and sensitive plant species shall be conducted in suitable habitat on National Forest System lands before habitat-disturbing activities to identify and protect vulnerable populations. All existing sites are identified and managed to support rare species recovery on National Forest System lands. Suitable habitat shall be managed to enhance or maintain rare species occurrences on the Forest. *MA-GDL-WCD-04. Research, Studies, and Data Gathering (Congressionally Designated Wilderness)*

	Non-manipulative research or data gathering may be authorized where such use is reliant on a wilderness setting, and does not detract from wilderness character. Markings should be unobtrusive and not be viewed from trails or occupied areas. Permanent markings should only be authorized when there is a long-term need to relocate the site with a high degree of precision where other technologies are not sufficient. Other than unobtrusive markings, permanent installations should not be authorized. All whitebark pine from which seed has been collected need to be identified with small aluminum tags at the base of each tree, on the downhill side of the tree. This will allow positive identification of these trees for future seed collections, scion collections, & protection from insects & fire. This is especially true for trees whose offspring have shown rust resistance in rust tests. *MON-FLS-01: Federally listed species* To what extent is forest management contributing to the conservation of federally listed species and moving toward habitat objectives?

Appendix B7. List of recovery or conservation strategies for Wolverine that are addressed by the Colville National Forest Revised Land Management Plan

Recommended Recovery or Conservation Strategies for Wolverine that can be addressed by CNF Forest Plan **Source:** Washington Department of Fish and Wildlife State Wildlife Action Plan (September 2015 p. A1-55).	**How the Colville National Forest Revised Forest Plan addresses these.** **DC = Desired Condition** **GDL = Guideline** **STD = Standard** **MON = Monitor** **Blue font=clarification by the CNF or FWS.**
Initiate or extend current monitoring activities into the central Cascades (especially north and south of the I-90 corridor) and the southern Cascades. Surveys in northeastern Washington would also be valuable.	In 2013 and 2014, the CNF contracted with Tim Layser, Wildlife Biologist with the Selkirk Conservation Alliance, to conduct winter aerial surveys on the east zone of the Forest. He located no wolverines or sign (tracks, dens) on high ridge systems in Pend Oreille County during that survey. There are no specific CNF Plan components requiring surveys.
Source: USFWS Candidate Species Assessment, 2007, 2011	**How the Colville National Forest Revised Forest Plan addresses the primary threats to wolverines.**
The primary threat to the DPS is from habitat and range loss due to climate warming (Factor A) (USFWS 2011 p.22-27). An important climate change adaptation that has been recommended for wolverine is to reduce the negative effects of non-climate related stressors such as the effects of roads (and trails) on habitat (Gaines et al. 2012, Lawler et al. 2014).	*FW-DC-WR-14. Resiliency to Climate Change* Aquatic and riparian ecosystems are resilient to the effects of climate change and other major disturbances. Subbasin is scale is used for Forest planning and 5th field watershed scale is used for project planning. *MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)* … Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with little human disturbance are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest. *MA-DC-RW-04. Wildlife (recommended wilderness)* Recommended wilderness contributes to preserving natural behaviors and processes that sustain native wildlife populations.

	MA-DC-BC-02. Habitat (backcountry) These areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness). *FW-DC-WL-03. Habitat Conditions for all Surrogate Species* Habitat conditions (amount, distribution, and connectivity of habitat) are consistent with the historical range of variability (see also FW-DC-VEG-05 and 05) and contribute to the viability of surrogate species and associated species. *FW-GDL-WL-04. Federally Listed Species* Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery. *MON-VEG-01* To what extent are management activities and natural disturbance processes trending toward desired conditions for structure/structural stage and fire regime condition class (FRCC), increasing resistance and resiliency to disturbance factors including climate change. This includes vegetation size classes, down wood, snags.
<u>Human Use and Disturbance. Dispersed recreation</u> is likely to affect wolverines, at least in local areas where this activity occurs at high intensity in wolverine habitat. (USFWS 2011 p.28-30)	*MA-DC-WCD-03. Ecological Processes (Congressionally designated wilderness)* … Wilderness contributes to preserving natural behaviors and processes that sustain wildlife populations. Large remote areas with <u>little human disturbance</u> are retained and contribute habitats for species with large home ranges such as wide-ranging carnivores (i.e. grizzly bear) and species found primarily in these habitats. Habitat conditions within these management areas contribute to wildlife movement within and across the Forest. *MA-DC-RW-02. Retention of Wilderness Characteristics (recommended wilderness)* Visitor use does not reduce the quality of wilderness character (untramelled, undeveloped, natural, outstanding opportunities for solitude or a primitive and unconfined type of recreation) or other features of value associated with the existing condition identified in the forest plan wilderness evaluations.

	MA-DC-BC-02. Habitat (backcountry) These areas contribute to preserving natural behaviors and processes that sustain wildlife populations, provide connectivity and contribute aquatic, plant, and wildlife habitat conditions for species that benefit from low human use (e.g., these areas provide a high level of habitat effectiveness). *FW-GDL-WL-03. Unique Habitats* Limited Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance. The Selkirk Mountains Woodland Caribou Recovery Area contains much of the best quality den habitat for wolverines on the Forest. The following management framework related to winter recreation in caribou habitat is directly applicable to maintaining seclusion for wolverines during the denning period *FW-DC-WL-09. Woodland Caribou Habitat – Winter Recreation* Winter recreation is managed so that woodland caribou are not displaced from suitable habitat and the caribou can make full use of existing habitat in the recovery area. *FW-STD-WL-11. Woodland Caribou and Snowmobiles* Restrict over-the-snow vehicle use to designated routes within the Selkirk Mountain Woodland caribou recovery area. (These routes avoid high elevation ridges and glacial cirque basins).
Infrastructure development may affect wolverines directly by eliminating habitats, or indirectly, by displacing wolverines from suitable habitats near developments. The latter effect tends to be most detrimental to sensitive wildlife, because the area of displacement may be much larger than the area of direct habitat loss. (USFWS 2011 p.30-31)	*MA-DC-WCD-02. Human Developments (Congressionally designated wilderness)* Wilderness is undeveloped except for those facilities deemed necessary for administration of the area as wilderness or essential for accommodating provisional uses. *MA-STD-RW-01. Existing and Proposed Uses (recommended wilderness)* Management actions must maintain the wilderness characteristics of the recommended wilderness areas that were identified in the 2009 wilderness evaluations for the Abercrombie Hooknose, Salmo-Priest Adjacent, and Bald Snow recommended wilderness

	areas prior to designation or release from wilderness consideration by Congress. *MA-DC-BC-04. Developments and Improvements (backcountry)* Facilities (whether Forest Service or under permit) are those necessary to protect resources, provide for safety, public benefit, or to enhance semi-primitive recreation experiences. Facilities are few and include such things as fire lookouts, radio repeaters, administrative buildings, trailheads, trails, signs, bridges, and shelters (see direction under Administrative and Recreation Sites Management Area) as well as facilities needed for resource protection such as toilets, stock containment systems, fences, or water developments. *FW-GDL-WL-03. Unique Habitats* Unique habitats, such as cliffs (greater than 25 feet in height below 5,000 feet in elevation), caves (including mines), talus, ponds, marshes, wetlands, deciduous forest (including aspen stands greater than 1 acre in size), natural meadows and areas of colony nesting species should be maintained or protected from activities that result in habitat loss or disturbance. *FW-GDL-WL-04. Federally Listed Species* Habitat for federally listed wildlife species within designated recovery areas that occur on National Forest System lands should be retained in public ownership and managed to support recovery.

<u>Transportation corridors</u> may affect wolverines if located in wolverine habitat or between habitat patches. If located in wolverine habitat, transportation corridors result in direct loss of habitat and possibly displacement of wolverines for some distance. Direct mortality due to collisions with vehicles is also possible. (USFWS 2011 p.31-32) Transportation corridors provide access to areas otherwise not affected by humans, which exacerbates the effects of human disturbance from a variety of activities. Outside of wolverine habitat, transportation corridors may affect wolverines if they present barriers to movement between habitat patches or result in direct mortality to dispersing wolverines. Because wolverines are capable of making long-distance movements between patches of suitable habitat, transportation corridors located many miles away from wolverine home ranges may affect their ability to disperse or recolonize vacant habitats after local extirpation events.	*MA-DC-FR-02. Habitat (focused restoration areas)* These areas contribute important habitat for plant, wildlife, and aquatic species that benefit from areas with <u>relatively low road density</u> and high habitat effectiveness (e.g., relatively low level of human disturbances). *FW-DC-WL-10. Risk Factors for all Surrogate Species* Risk factors (e.g., <u>roads</u>, uncharacteristic wildfire, unregulated livestock use, introduced species, invasive species, etc.) for all surrogate species <u>are reduced</u> to contribute to the viability of surrogate species. *FW-STD-WL-07. Grizzly Bear Recovery Area -Road Densities* Within the grizzly bear recovery area, Federal actions shall not result in a net reduction of core habitat below the levels in the following table. Discrete core areas shall remain in place for a minimum of 10 years in order for bears to find and use these areas. Federal actions shall not result in a net increase in open or total road densities above the levels in **table 10. grizzly bear habitat standards for the shared gbmus of the cnf and idaho panhandle national forests (from ba table 24 p. 147).** . Total road densities do not include physically undrivable roads (e.g., bermed, brushed-in). **Table 17. Grizzly bear habitat standards for the shared BMUs of the Colville and Idaho Panhandle**

National Forests

Bear Management Unit	Maximum Open Roads >1 mi/sq. mi.	Maximum Total Roads >2 mi/sq. mi	Minimum Percent Core Habitat
Salmo-Priest (99% NFS land)	33%	26%	64%
Sullivan-Hughes (99% NFS land	23%	18%	61%
LeClerc (64% NFS land)	**48%**	**60%**	**27%**

FW-GDL-WL-01. Hiding Cover for Wildlife

Where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to created openings. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments.