Nez Perce–Clearwater National Forests
Forest Plan Assessment

18.0 Potential Species of Conservation Concern

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18.1 POTENTIAL WILDLIFE SPECIES OF CONSERVATION CONCERN

18.1.1 *Introduction*

In cooperation with the Nez Perce-Clearwater National Forests (Forests) and Idaho Department of Fish and Game (IDFG), the Regional Forester has identified Species of Conservation Concern (SCC) as per the 2012 Planning Rule (36 CFR 219) and consistent with guidance in Chapter 10, The Assessment, of the Proposed Planning Directives (FSH 1909.12).

Identifying SCC is necessary for the development of Forest Plan components (36 CFR 219.7) that help maintain the diversity of plant and animal communities and the persistence of native species in the Plan area (36 CFR 219.8, Sustainability and 36 CFR 219.9, Diversity of Plant and Animal Communities).

Using best available science, this section discusses the ecological relationship and rationale for the development of Plan components for 13 terrestrial wildlife SCC in the planning area, as identified by the Regional Forester on September 9, 2013.

Additionally, the 2012 Planning Rule recognizes that it may not be possible to maintain a viable population of some at-risk species within the plan area due to circumstances beyond the authority of the Forest Service or due to limitations in the inherent capability of the land. Examples include migratory species whose viability is primarily affected in other locations, or where the Plan area has limited ecological capacity to provide sufficient habitat to sustain the species.

Terrestrial wildlife species rely upon and utilize a variety of forested and non-forest landscapes at various scales. To help establish the ecological context for the wildlife species identified and selected as SCC across the Forests, an "all lands" approach was used to examine the quantity and distribution of ecological systems for these species. A range of scales was used to assess terrestrial ecosystems that support identified terrestrial SCC wildlife species and their habitats in context at appropriate ecological scales, ranging from the Interior Columbia River Basin to the state of Idaho, and then to the planning area and geographic areas within the planning area. Therefore, the ecosystems and habitats that these species are associated with will be summarized at three landscape scales—broad (basin and regional), mid (state and Forests) and fine (Habitat-type froups and other habitats).

At the broad-scale, information contained in the Interior Columbia Basin Ecosystem Management Project (ICBEMP) (Wisdom et al. 2000) and the Idaho Comprehensive Wildlife Conservation Strategy (CWCS) (IDFG 2005) will be summarized. These two broad-level assessments disclosed wildlife habitat information similarly, but some landscape information differs based on how each assessment was organized. These two broad-level assessments should be referenced for more detailed information.

In 2003, the U.S. Department of Agriculture Forest Service (Regions 1, 4 and 6); U.S. Department of Interior Bureau of Land Management (BLM) (Oregon, Washington, Idaho and Montana); U.S. Department of Interior Fish and Wildlife Service (FWS) (Regions 1 and 6); Environmental Protection Agency (Region 10); and National Marine Fisheries Service (Northwest Region) signed an Interagency Memorandum of Understanding whose purpose was to cooperatively implement *The Interior Columbia Basin Strategy* (Strategy) (USDA Forest Service 2003a).

A specific component of the Strategy is“Terrestrial Source Habitats Maintenance and Restoration” (USDA Forest Service 2003b). This component states the following (USDA Forest Service et al. 2003b, p. 6):

> Management Plans shall address ways to maintain and secure terrestrial habitats that are comparable to those classified by the science findings as “source” habitats (Wisdom et al. 2000) that have declined substantially in geographic extent from the historical to the current period and habitats that have old forest characteristics. Direction should address opportunities to re-pattern these habitats when and where necessary, maintain and guide expansion of the geographic extent and connectivity of source habitats that have declined where they can be sustained.

It goes on to state,

> Individual forest and resource plan analyses will describe how multi-scale analysis, based on the local situation, has been used in the amendment or revision process. Forest and resource plan analyses will also describe the rationale and context for how multi-scale analysis will be used for subsequent project level decisions.

At the mid-scale, assessments of wildlife habitats and/or wildlife SCC have been developed for all or portions of Idaho. These mid-scale assessments included statewide strategies, regional assessments, and subbasin planning documents. Strategies, actions, or practices to address restoration of declining habitats and/or the conservation of species of concern were typically included in these assessments (USDA Forest Service 2010a). The relevant state-wide strategies and subbasin planning documents include information and relevant data provided by the Idaho CWCS (IDFG 2005), *Clearwater River Basin (ID) Climate Change Adaptation Plan* (Nez Perce Tribe 2011), and Northwest Power and Conservation Council (NPPC) Clearwater and Salmon sub-basin assessments and plans.

At the Forests portion of the mid-scale, landscapes are actively or passively managed based on whether they are outside or within Wilderness or Idaho Roadless portions of the National Forest. Within these landscapes, a variety of habitat conditions can occur based on climatic, topographic, and geologic conditions with some changes occurring over relatively short distances. Forest-level information was developed from modeling for the Forest Plan revision effort, as well as existing Forest species information.

At the fine-scale, this assessment will reference available habitat management guidance, methods, and opportunities for SCC. The Forsests have developed Habitat-Type Group guidance that directly applies to wildlife habitat management for several wildlife species, including several identified SCC, in vegetation management projects.

Potential Plan components will be based on habitat needs identified in the ICBEMP (Wisdom et al. 2000), the Idaho CWCS (IDFG 2005), and other known best available science. In addition, the “Habitat-Type Group” guidance previously developed by the Nez Perce–Clearwater National Forests could offer potential Plan components, as identified by the interdisciplinary team involved in that development.

18.1.1.1 The Coarse-Filter / Fine-Filter Approach

Modern designs for conserving biological diversity combine the concepts of managing for broad ecosystem characteristics (coarse-filter approach) with species-specific management (fine-filter approach) (Hunter et al. 1988, Hunter 2005, Noon et al. 2003, Roloff and Haufler 2002, Samson et al. 2003, Scott et al. 2002, Theobald and Hobbs 2002, USDA Forest Service 1996,Wisdom et al. 2000).

Coarse-filter strategies are based on the following:

- Providing a mix of ecological communities across a planning area
- Providing for ecological integrity/biological diversity at an appropriate landscape scale
- Looking at how to maintain or restore the composition, structure, function, diversity, and connectivity of ecosystems
- Providing for a range of species habitat conditions at a variety of spatial scales over the long term, while maintaining biological diversity for the vast majority of species
- Understanding past, current, and projected future conditions

These elements of the coarse-filter concept tie directly to the conservation principle that species well distributed across their range are less susceptible to extinction than species confined to small portions of their range.

Coarse-filter plan components (desired conditions and suitability of lands) can provide for the majority of wildlife species because many species utilize a wide variety of broad ecosystem habitat conditions (pers. comm. Kuennen). Even with a coarse-filter approach in place, a fine-filter approach may also be necessary for species for which ecological conditions needed to maintain populations may not be completely provided for by maintaining ecosystem diversity (Samson et al. 2003, Proulx 2004, Roloff and Haufler 2002). Fine-scale strategies can be focused on the few species whose habitat requirements are not fully captured by coarse-filter attributes (Hunter 2005, Scott et al. 2002, Theobald and Hobbs 2002).

For example, species associated with fine-scale ecosystem components (Hunter 2005, Samson et al. 2003, Scott et al. 2002), or species and/or their habitats that are tangibly influenced by human interference, such as roads (Hollenbeck et al. 2013, Proulx 2004, Wisdom et al. 2000), may not be adequately addressed by a broad-scale assessment of vegetation conditions (Hunter 2005, USDA Forest Serive 1996). Wisdom et al. (2000) stated that because of the scale of the coarse-filter ICBEMP analysis and the fine-scale nature of species-specific habitats, the results of the coarse-filter ICBEMP analysis does not likely reveal the true status of important habitat components for some wildlife species, such as the mountain quail (*Oreortyx pictus*). Proulx (2004) considered the fisher (*Pekania pennanti*) to be a species that is sensitive to forest management and requires an integration of coarse- and fine-filter habitat management.

Therfore, a desired future condition (DFC) or suitability of lands assessment may be too general to describe how to maintain or restore the composition, structure, function, and connectivity of ecosystem characteristics needed by species with more specialized habitat requirements (Hunter 2005, Proulx 2004, Roloff and Haufler 2002).

In these cases, a species-specific approach to the analysis and establishment of Plan components may be necessary. The assessment of individual species is a “fine-filter” approach to conservation (Hunter 2005, Samson et al. 2003). Fine-filter conservation addresses individual species that are assumed to be inadequately protected by coarse-filter conservation measures. Examples include protecting specific raptor nest sites and closing caves and/or mines to protect bat roosts. Coarse- and fine-filter management overlap when conserving a fine-filter species involves conserving entire ecosystems or landscapes that constitute its habitat (Hunter 2005).

The National Environmental Policy Act (NEPA) of 1969 and other regulatory mechanisms require the assessment of impacts to wildlife species. Species-specific plan components may be included as objectives, standards and/or guidelines because these categories are intended to attain or accomplish a goal or specific need at project- or site-specific levels.

18.1.1.2 Mesofilter

Mesofilter conservation is a complementary approach to the coarse- and fine-filter approaches that conceptually lies between a coarse filter and fine filter. The core idea is to conserve critical elements of ecosystems that are important to SCC and other species, especially those overlooked by the coarse- and fine-scale filter approaches (Hunter 2005). These include species that use ecosystem attributes but no specific requirements are known. Mesofilter conservation enables many species to be protected without considering them individually (Hunter 2005). Examples of the mesofilter concept include providing direction to conserve legacy trees, logs and snags, riparian vegetation, vernal pools, seeps and other wetlands, rock outcrops, native grass, and shrub and herb communities.

Mesofilter and fine-filter conservation can overlap when a species that is the target of fine-filter management provides resources needed by other species (Hunter 2005). For example, when a species is concerved that excavates cavities in trees and/or snags that are later used by other species. This example illustrates fine-filter conservation for the cavity producer and mesofilter conservation for the secondary cavity user (Hunter 2005). Mesofilter conservation is compatible with adaptive management on National Forests that are managed for both commodity production and biodiversity.

Mesofilter management for the SCC in this Assessment was identified by examining the best available science for SCC species in conjunction with identifying coarse- and fine-filter habitat requirements. For the selected SCC, potential Plan components will be a mix of coarse-, meso, and fine-filter based elements directed at known habitat requirements; but the Plan components will also benefit other non-SCC. These elements are addressed in this Assesssment at the mid-(Forest) and fine-scale (Project) levels.

18.1.1.3 Monitoring

The 2012 Planning Rule states,”Ecosystem plan components would be required for ecological integrity and diversity, along with additional, specices-specific plan components where necessary to provide the ecological conditions to contribute to the recovery of federally-listed threatened and endangered species, conserve proposed and candidate species, and maintain viable populations of species of conservation concern.” The 2012 Planning Rule also requires monitoring of select ecological and watershed conditions to assess progress towards meeting diversity and ecological sustainability requirements (Fed. Reg. Vol. 77, No. 68, Rules and Regulations, pg. 21167)

Broad-scale and Forest-level monitoring plans will be developed as part of the Forest Plan. Inherent limitations exist for monitoring coarse-, meso and fine-filter SCC Plan components. Coarse-filter Plan components can only be monitored using Forest Inventory and Assessment (FIA) data to the 5th HUC watershed-level due to data resolution limits. Some meso and fine-filter Plan components (e.g., seeps and springs, bat roosts, bird nest trees) cannot be measured using FIA.

Therefore, while coarse- and some mesofilter Plan components that support SCC can be monitored at the multi-unit and Forest/large watershed-levels using FIA data, other meso and fine-filter components will have to be monitored at smaller 6th HUC watershed and project levels, during and after project implementation. These SCC-related factors would have to be integrated into broad-scale and Forest-level monitoring plans developed for the Forest Plan.

Monitoring plans for coarse-, meso and fine-filter Plan components developed for SCC meet the intent of the 2012 Planning Rule to assess progress towards meeting habitat diversity and sustainability requirements for SCC.

Existing Regulatory Mechanisms

This Assessment is consistent with the statutory authority and responsibility for enforcing the following Federal laws, executive orders, and policies and regulations, as applicable, to conserve, restore, and enhance wildlife species and manage wildlife, fish, and plant resources on National Forests and Grasslands:

- Endangered Species Act of 1973 (16 USC 1531-1544, 87 Stat.884)
- National Forest Management Act (NFMA) of 1976 (Pub.L. 94-588)
- National Environmental Policy Act of 1969 (P.L. 91-190) (42 U.S.C. 4321–4347)
- Multiple-Use, Sustained-Yield Act of June 12, 1960 (74 Stat. 215, as amended)
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703–712)
- Migratory Bird Treaty Reform Act of 2004 (MBTRA) (Pub. L. 108–447, 118 Stat. 2809, 3071–72)
- Executive Order 13186—Responsibilities of Federal Agencies to Protect Migratory Birds, January 10, 2001 (Federal Register Vol. 66, No. 11, January 17, 2001)
- Revised List of Migratory Birds: Final Rule (50 CFR Parts 10 and 21; Federal Register, Vol. 78, No. 212, Friday, November 1, 2013, U.S. Fish and Wildlife Service, Dept. of the Interior)
- Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 742l)
- Fish and Wildlife Act of 1956 (16 U.S.C. 742a–j)
- Fish and Wildlife Coordination Act (16 U.S.C. 661–666c)
- Sikes Act of September 16, 1960, (16 U.S.C. 670a)

- Forest Service Manual (FSM) 2601.1—Laws and Orders
- Forest Service Manual (FSM) 2601.2—Departmental Regulation 9500-4
- Forest Service Manual (FSM) 2670.12—Departmental Regulation 9500-4

In addition, this Assessment is consistent with the State of Idahos'authority and responsibility to preserve, protect, perpetuate, and manage all wildlife within the state of Idaho as per Idaho Statutes, Title 36-103. In support of Idaho Statute 36-103, the State of Idaho has identified wildlife species and proposed conservation actions for for the species listed in the Idaho CWCS (IDFG 2005).

The Idaho CWCS is considered a key element of the best available science used in this Assessment. Twelve of the 13 identified SCC are considered Species of Greatest Conservation Need (SGCN) in the Idaho CWCS (IDFG 2005).

The Idaho CWCS displays the distribution of these species, as modeled, using data available from the U. S. Geological Survey (USGS) GAP Analysis Program (GAP) (IDFG 2005). GAP modeling was used to represent the predicted distribution of terrestrial species that regularly breed in Idaho. Point locations of species sightings are also depicted on these species accounts maps in the Idaho CWCS (IDFG 2005). These data are displayed in the species range figures from the Idaho CWCS.

18.1.1.4 Quantifying Wildlife Habitat

For 8 SCC, modeling results are used to display and understand patterns of species habitats at a Forest scale. Wildlife habitat in this Assessment is quantified by querying vegetation characteristics desirable to each species. Given the Forest's area of approximately 4.0 million acres, patterns of species habitat are believed to be accurate.

A separate existing condition modeling process was used for the fisher based on a spatial model described by Olsen et al. (2013) since this model is the best available science. For the remaining 7 SCC, vegetation characteristics were described at a coarse-scale that included the following elements:

- Habitat type group (indicative of potential vegetation)
- Cover type(s) that recognize up to four species cohorts on a piece of ground
- Tree size class range (five categories)
- Vertical stand structure (single, two-story, and multi-story)
- Canopy closure (four categories)
- Elevation information for the species (if available)

Existing vegetation conditions were derived several data sources. Cover type, size class, and density were derived from Region 1 Vegetation Mapping Program (VMAP) (Chew et al. 2012). VMAP is derived from satellite imagery and on-the-ground calibration to create a continuous vegetation layer. Vertical structure was assigned to VMAP classes based on on-the-ground knowledge of the forest, and habitat type group was from the PVT layer maintained by Region 1 (Chew et al. 2012).

Projected future and simulated past vegetation conditions were determined with the SIMPPLLE landscape simulation model (Chew et al. 2012). SIMPPLLE accounts for tree growth dynamics and disturbance processes (such as fire and insects) to project possible vegetation conditions. Conditions are projected spatially for a set of pixels that represent the landscape. This exercise used a 150-meter pixel. The same level of vegetation detail is maintained by the SIMPPLLE model so that the habitat queries used for the current condition can be applied to projected conditions.

The following limitations should be considered due to the relatively coarse nature of the data and model parameters, thus increasing the possibility of over-estimation of habitat:

- Wildlife queries do not define a relevant patch size. The queries select all acres of a cover type/size class/canopy closure regardless of patch size, which may result in undesirable, small, isolated patches that contribute to overall habitat amounts.
- Vegetation data may not be sensitive to microhabitat features (e.g., snags or down woody debris) that are important to some species. The relationship between the cover type/size class/canopy closure attributes is used to temper the assumption that other microhabitat attributes are present. However, these microhabitat components may be absent in some areas, and the habitat may not be suitable.
- The acres shown do not account for territorial behavior of certain species when defending their habitat; these behaviors may limit the availability and use of habitat.
- Habitat patches that are too small to support a species based on its life-cycle needs may be included.
- Suitable habitat for a species appear to be present, but the species is at the edge of its range and potential habitat elsewhere has cannot provide permanent occupancy.

Overall, it is important to note that quantifying and mapping potentially available habitat does not mean that habitat is properly functioning and/or contains the conditions needed for species persistence. The resolution of broad-scale data can be resolved at a fine-scale at the watershed and/or project level.

18.1.2 *Potential Species of Conservation Concern*

The 2012 Planning Rule states, “Ecosystem plan components would be required for ecosystem integrity and diversity, along with additional, species-specific plan components where necessary to provide the ecological conditions to contribute to the recovery of federally-listed threatened and endangered species, conserve proposed and candidate species, and maintain viable populations of species of conservation concern”. The 2012 Planning Rule also requires the monitoring of select ecological and watershed conditions and focal species to assess progress towards meeting diversity and ecological sustainability requirements (Fed. Reg./Vol. 77, No. 66. p. 21167).

The 2012 Planning Rule defines SCC as, “Any species, other than federally-recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the Regional Forester has determined that the best available scientific information indicates a substantial concern about the species capability tp persist over the long-term in the plan area" (36 CFR 219.9, Directives. Chapter 10, Section 12.52).

The approach used to identify SCC is documented in the project record, and summarized below:

Step 1—Identify species

Step 2—Screen species for further consideration in the planning process

Step 3—Group species where possible and identifying habitat associations

Step 4—Identify potential Plan components for species identified as potential SCC

Step 5—Select SCC based on coarse- and fine-filter needs of the species evaluated

The guidance documents and supporting information used to accomplish the above steps are summarized below:

- The 2012 Planning Rule and Chapter 10, Section 12.52, "Identifying Potential Species of Conservation Concern," of the proposed Forest Service Directives were used as primary guidance Criteria listed in the proposed directives Chapter 10, Section 12.52 were used to filter species that were clearly common and not at risk.
- The Idaho CWCS, The Idaho Natural Heritage Program (IDNHP), NatureServe Explorer database, and Forest Service database were queried to obtain a list of all possible terrestrial wildlife species (100+) known or expected to occur in any county that contains a portion of the Forests. The majority of the Forests are contained within Clearwater and Idaho counties with smaller portions in Shoshone, Latah, and Benewah counties.
- The global (G) and Idaho state (S) NatureServe conservation rankings for each species (Table 18-1). Species with a state status rank of S1, S2, or S3 were carried forward for consideration as SCC. No species with a global ranking of G1 or G2 are known to occur on the Forests.
- A working group of Regional Office personnel, Forest wildlife biologists, and contractors evaluated information on species ecology, preferred habitat condition, known stressors, and trends to further refine the species lists via onsite and video meetings, conference calls, and individual discussions starting in late 2012
- The working group further refined the species list to determine which species have requirements that could be addressed by coarse-filter attributes versus species that have meso and fine-filter attributes
- By the end of July 2013, the working group examined preliminary habitat modeling information and defined a short list of potential SCC
- After final discussions, 13 SCC (Table 18-2) were selected by the Regional Forester on September 9, 2013

Table 18-1. NatureServe global (G) and state (S) rankings

Global	State	Definition
G1	S1	At high risk because of extremely limited and/or rapidly declining population numbers, range and/or habitat, making it highly vulnerable to global extinction or extirpation in the state.
G2	S2	At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state.
G3	S3	Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas.
G4	S4	Apparently secure, though it may be quite rare in parts of its range, and/or suspected to be declining.

Table 18-2. Species of Conservation Concern and habitat associations

Name	ICBEMP Family/ Species Group	Nez Perce-Clearwater Habitat Type Groups	Existing USFS and ID CWCS Status	Notes
White-headed woodpecker	1/1	Dry Mixed Conifer	RFSS SGCN	Limited to lower Salmon River area and associated with low-elevation old ponderosa pine dry forests
Pygmy nuthatch	1/1	Dry/Moist Mixed Conifer	RFSS SGCN	Associated with low-mid elevation old ponderosa pine dry forests
Lewis' woodpecker	1/2	Dry Mixed Conifer	SGCN	Associated with low-elevation old ponderosa pine dry forests
Fisher	2/5	Moist Mixed Conifer	RFSS SGCN MIS	Associated with mid-elevation large diameter, old & complex structure forests
Flammulated owl	2/5	Dry/Moist Mixed Conifer	RFSS SGCN	Associated with low-elevation old ponderosa pine dry forests
Mountain quail	3/17	Dry Mixed Conifer/riparian shrub	RFSS SGCN	Limited to lower Salmon River area and associated with Forest/riparian mosaics
California myotis	-/-	Dry/Moist Mixed Conifer	SGCN	Species not identified in an ICBEMP Family or Group; grouped with other bat species in Family 7. No habitat modeling.
Fringed myotis	7/26	Dry/Moist Mixed Conifer	RFSS SGCN	No habitat modeling
Townsend's big-eared bat	7/27	Dry/Moist Mixed Conifer	RFSS SGCN	No habitat modeling
Boreal owl	2/7	Subalpine mixed conifer	SGCN	Associated with higher elevation forests
American three-toed woodpecker	2/11	Subalpine mixed conifer	SGCN	Associated with higher elevation forests
Coeur d'Alene salamander	none	No Habitat Type Group	RFSS SGCN	Limited distribution; associated with site-specific riparian conditions
Bighorn sheep (Rocky Mountain)	5/22	No Habitat Type Group	RFSS MIS	Discussed separately in the Ecosystem Services section of the Assessment (also as big game)

Note: RFSS = USFS Regional Forester Sensitive Species, MIS = Nez Perce-Clearwater Management Indicator Species, SGCN = Idaho CWCS Species of Greatest Conservation Concern

Broad-scale family groups, as well as meso and fine-scale biophysical settings, habitat type groups, and a non-habitat type group are used for describing SCC habitat associations and conditions based on best available science.

Five of the 13 identified SCC require site-specific plan guidance for conservation : the California myotis, fringed myotis, Townsend's big-eared bat, Coeur d'Alene salamander (*Plethodon idahoensis*), and bighorn sheep (*Ovis canadensis*). However, these species will also benefit from ecosystem-based Plan components developed for the other SCC. The remaining 8 SCC require guidance that is integrated with other forest, nonforested, and other resource management guidance in the Forest Plan. These species are fisher, flammulated owl (*Otus flammeolus*), pygmy nuthatch (*Sitta pygmaea*), white-headed woodpecker (*Picoides albolarvatus*), Lewis's woodpecker (*Melanerpes lewis*), boreal owl (*Aegolius funereus*), American three-toed woodpecker (*Picoides tridactylus*), and mountain quail.

Also, 9 of the 13 SCC are currently Regional Forester designated sensitive species, and 2 are designated as Management Indicator Species (MIS) under the "current" Forest Plans for either or both the Nez Perce and Clearwater National Forests.

The California myotis (*Myotis californicus*) was not identified in the ICBEMP evaluation, but this species was identified at the Idaho CWCS level. It will be discussed with other bat species since it was identified as a Species of Greatest Conservation Need (SGCN) in that State plan. Other wildlife species not selected as SCC are also known to or expected to use these Family/Group habitat associations and habitat type groups.

18.1.2.1 Species Accounts

White-headed Woodpecker—Picoides albolarvatus

Conservation Status

ESA:	**No status**
USFWS:	**Bird of Conservation Concern - Idaho**
USFS:	**Sensitive in Regions 1, 4 and 6**
BLM:	**Peripheral (Type 4)**
IDFG:	**Species of Conservation Concern (SGCN)**

NatureServe rankings: Rangewide: G4—Apparently Secure

Statewide Idaho: S2—Imperiled, non-game.

ICBEMP Family 1, Group 1

Intermountain West Joint Venture: Priority Bird Species

NPCC Clearwater Subbasin Assessment—Focal species

NPCC Salmon Subbasin Assessment—Species of Concern

Distribution and Abundance

The white-headed woodpecker is found in portions of the Interior Columbia River Basin, and in the Blue Mountains and central Idaho mountains ecological reporting units (ERUs) (Wisdom et al. 2000) (Figure 18-1). White-headed woodpeckers are scarce and occur locally in western Idaho. Suitable habitat for the species is typically fragmented, making accurately estimating range difficult. The species is uncommon or rare in Idaho with an estimated population size of approximately 320 individuals (IDFG 2005).

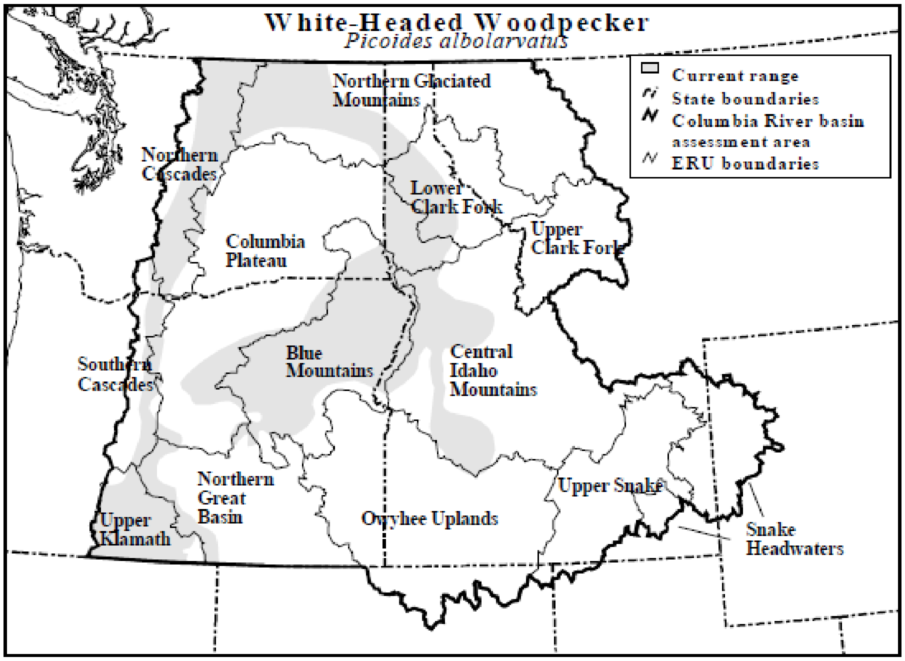

Figure 18-1. White-headed woodpecker range in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

The species range in Idaho is limted to westcentral Idaho on the western portions of the Nez Perce-Clearwater, Payette, and Boise National Forests. In Idaho, white-headed woodpeckers have been recorded in Adams, Benewah, Boise, Elmore, Idaho, Kootenai, Latah, Lewis, Nez Perce, and Washington Counties (NatureServe 2013, Blair and Servheen 1995, Dixon 2010). On the Nez Perce-Clearwater National Forests, the species occurs primarily in the lower Salmon River Canyon. Some irregular incidental sightings exist in the lower South Fork Clearwater River area (Figure 18-2).

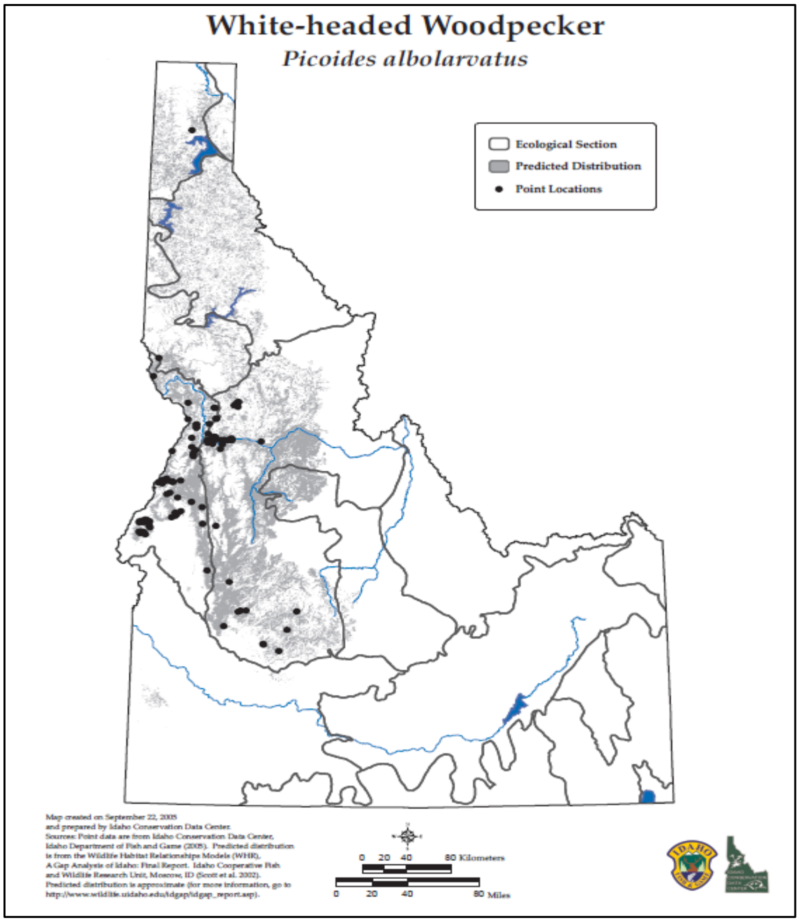

Figure 18-2. White-headed woodpecker distribution in Idaho (IDFG 2005)

Population Trend

No Breeding Bird Survey (BBS) data are available for Idaho for this species. BBS data for the Northern Rockies indicate detection increases for the white-headed woodpecker over the long term (1966–2011) (0.7% per year) and the more recent short term (2001–2011) (0.6% per year) (Sauer et al. 2012). However, these data are in a credibility category that reflects data with a deficiency. In particular, the regional abundance is <1.0 birds/route (low abundance), the sample is based on <14 routes for the long term (small sample size), or the results are so imprecise that a 3% per year change (as indicated by the half-width of the credible intervals) would not be detected over the long term (quite imprecise).

No IDFG trend data exists for Idaho, but the Idaho CWCS estimates the population size is approximately 320 individuals (IDFG 2005). No population estimates exist for the Forests. In general, woodpeckers are not well suited for trend monitoring using BBS protocols (IDFG 2005).

However, systematic occupancy monitoring for white-headed woodpeckers is occuring on adjacent Forests in Regions 4 (Payette National Forest) and 6 (Wallowa-Whitman National Forest) in cooperation with the Rocky Mountain Research Station (pers. com. Mellen-McLean et al. 2013). This effort is also designed to determine the effectiveness of silviculutural and prescribed fire treatments for fuels reduction and to improve dry forest wildlife habitat.

Habitat and Ecology

The white-headed woodpecker uses open-grown stands of large mature and older ponderosa pine and, less frequently, mixed Ponderosa pine and Douglas-fir.

The open grown, large mature and older ponderosa pine ecosystem has declined significantly from historical conditions in the Interior Columbia River basin and Idaho. (IDFG 2005; Mehl and Haufler 2001; Wisdom et al. 2000). Mehl and Haufler (2001) identified over 14,000 acres with a resoration potential; over 12,000 acres of these have a high potential for restoration in the near future in Idaho. An additional 57,000 acres in Idaho is estimated to have a good restoration potential.

Ponderosa pine restoration opportunities are estimated at 15,627 acres on the Nez Perce National Forest portion of the planning area (Mehl and Haufler 2001). Not all of these acres may be suited for this species based on location. Mehl and Haufler (2001) estimate that there may only be a 20-year window to restore the remaining old-growth ponderosa pine to historic conditions.

This species is a primary excavator, creating cavities for itself and other species, and may play a role in seed dispersal by transporting seeds short distances from source trees to anvil sites (Frederick and Moore 1991, Garrett et al. 1996).

The presence of white-headed woodpeckers generally indicates high-quality ponderosa pine habitat, since ponderosa pine trees are used for all aspects of the species' life cycle (IDFG 2005). White-headed woodpecker densities have been shown to increase relative to the presence of old forest ponderosa pine (Dixon 2010). Live and dead ponderosa pine trees in the largest diameter classes are typically used for nest sites, roost sites, and foraging substrates either for insect gleaning or seed collection from cones (Frederick and Moore 1991, Blair and Servheen 1995, Dixon 2010, and Mellen-McLean et al. 2013).

The white-headed woodpecker is a primary consumer of seeds and a secondary consumer of terrestrial invertebrates (Casey et al. 2007, 2011, 2012; Blair and Seervheen 1995; Frederick and Moore 1991; Mellen-McLean et al. 2013). They feed mainly on seeds from ponderosa pine, particularly during fall and winter, and forage for insects on tree surfaces (IDFG 2005, Frederick and Moore 1991). The species forages on insects during spring and summer, gleaning rather than excavating insects from foliage and bark and occasionally feeding in flight (Blair and Servheen 1995).

White-headed woodpeckers forage primarily on large, live trees. In Oregon, 80% of white-headed woodpecker foraging was on live trees with a preference for trees with diameters >25 centimeters (cm) (10 inches) (Mellen-McLean et al. 2013). Larger trees are likely preferred because of the greater surface area and deeper crevices in the bark that could shelter insects. These trees are also the best seed producers (Mellen-McLean et al. 2013). Beginning in late summer and lasting through winter, the large seeds of ponderosa pine are the species' primary food source, seeds comprise 60% of the white-headed woodpecker's diet, unlike most woodpeckers that subsist primarily on insect larvae. Preferred foraging trees are typically >24 inches (61 cm) diameter at breat height (d.b.h.) and, in west-central Idaho, average 27 inches

(70 cm) d.b.h. (Frederick and Moore 1991). In general, smaller size classes have less surface area and cracks/crevices in the bark to support insects and would be expected to produce fewer cones.

Home ranges for white-headed woodpeckers vary significantly according to habitat quality. In central Oregon, the home range for white-headed woodpeckers in contiguous ponderosa pine habitat was 425–924 acres (172–374 hectare [ha]), with a median home range of 523 acres (212 ha). In fragmented mixed coniferous habitat, the home range was 264–1,740 acres (107–704 ha), with a median home range of 845 acres (342 ha) (Dixon 2010).

The species' dispersal movements are not well known, but individuals have been known to travel up to 8 miles (13 kilometers [km]) to preferred foraging areas (Garrett et al. 1996).

A central Oregon study found mean nest and roost tree sizes to be 31 inches (80 cm) d.b.h. and 24 inches (60 cm) d.b.h., respectively, with mean canopy closure as 24% at nest sites and 44% at roosts with most nest and roost trees in ponderosa pine forest types having <57% canopy closure (Dixon 2010). Other studies have documented mean nest tree sizes of 22 inches (56 cm) d.b.h. in west-central Idaho (Dixon 2010, Kozma 2009 and 2011).

Casey et al. (2007, 2011 and 2012) identified the following attributes to describe optimal ponderosa pine breeding habitat for white-headed woodpecker: late-successional forest in patches >100 ha (250 ac) with moderately open canopy cover (20%–60%); <40% shrub cover; and >4 snags/ha (1.6 snags/acre) >46 cm (18 inches) d. b. h. with >2.5 snags/ha (1 snag/acre) >71 cm (28 in) d. b. h.

Using the SIMPPLLE process (Chew et al. 2012), a mid-scale habitat model using vegetative parameters capable of being modeled across the entire forest and best fitting the characteristics of habitat described in the best available science has been developed for the Forest (SIMPPLLE SCC models 2013).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Bull et al. 1997, Casey et al. 2011 and 2012, Crist et al. 2009, Blair and Servheen 1995, Dixon 2010, Frederick and Moore 1991, Garrett et al. 1996, Hollenbeck et al. 2013, IDFG 2005, IWJV 2013, Nez Perce Tribe 2011, Mehl and Haufler 2001, Mellen-McLean et al. 2013, NPCC 2003, Wisdom et al. 2000):

- Disrupted fire ecology leading to stand replacement fires
- Out-of-balance forest age distribution and structure
- Stand treatments to create open-canopy habitat with dead standing trees and improving nesting habitat potential.
- Restoration of ponderosa pine habitat that retains large trees and snags and creates a more open overstory canopy appears to positively benefit this species
- Essential habitat components such as large-diameter pine trees with prolific seed production, a relatively open canopy, available snags and or nest cavities, and understory/ground cover appropriate for open-grown forests

- Reduction in the amount of old-forests and associated structures (snags, logs, and cavities), particularly within montane and lower montane forests
- Negative effects resulting from higher road densities in source habitats where an increased risk of snag loss associated with firewood collection may be present and higher along open roads.
- Possible unsustainable conditions of existing old forests where large transitions from shade-intolerant to shade-tolerant tree species have occurred. This trend stems from excluding fire from many forested communities, which has resulted in increased susceptibility to stand-replacing fires.

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Pygmy Nuthatch—Sitta pygmaea

Conservation Status
ESA—No status
USFWS—Bird of Conservation Concern - Idaho
USFS—Sensitive in Regions 1, No status in Region 4
BLM—Watch List (Type 5)
IDFG—Species of Conservation Concern (SGCN)
NatureServe rankings—Rangewide: G5—Secure
Statewide Idaho: S1— Critically Imperiled, non-game
ICBEMP Family 1, Group 1
NPCC Salmon Subbasin Assessment—Species of Concern

The pygmy nuthatch is primarily associated with ponderosa pine forests and woodlands, but this species may also inhabit other dry forest habitat types such as Douglas-fir.

Distribution and Abundance:

In the Interior Columbia River Basin (Figure 18-3) the pygmy nuthatch is a year-round resident in ponderosa pine and other similar pine habitats. Its range extends from south-central British Columbia to the mountains of the western United States and central Mexico. Throughout this range, the patchy distribution of pine habitat dictates the patchy distribution of the nuthatch. The species is less common in the west-central mountains of Idaho (Figure 18-4) (IDFG 2005).

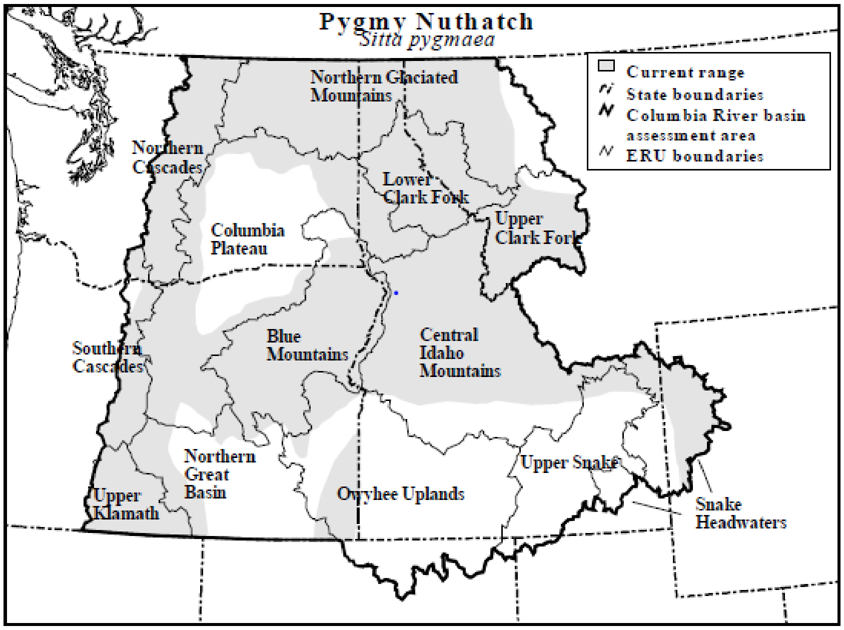

Figure 18-3. Species Range of Pygmy nuthatch in the Interior Columbia River Basin (Volume 2 in Wisdom et al. 2000)

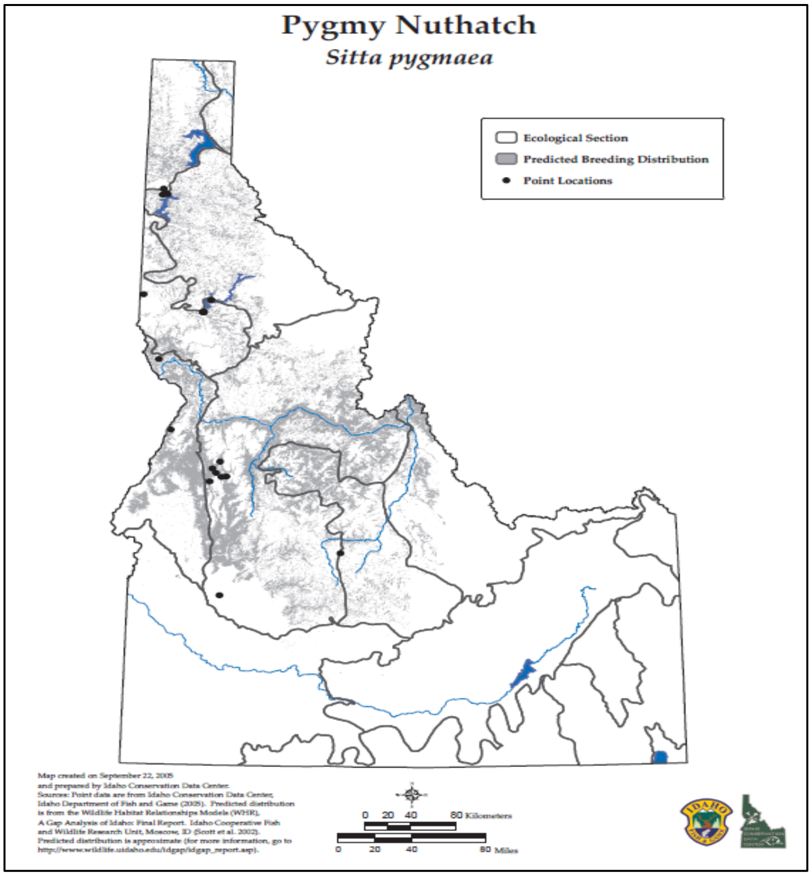

Figure 18-4. Pygmy nuthatch distribution in Idaho (IDFG 2005)

Population Trend

No BBS data are available for Idaho for this species. BBS data for the Northern Rockies indicates detection increases for the pygmy nuthatch during both long term (1966–2011) (3.0% per year) and short term (2001–2011) (6.9 % per year) (Sauer et al. 2014). However, these data are in a credibility category that reflects data with the following deficiencies:

- The regional abundance is <1.0 birds/route (low abundance)
- The sample is based on <14 routes for the long term (small sample size)
- The results are so imprecise that a 3% per year change (as indicated by the half-width of the credible intervals) would not be detected over the long term (quite imprecise)

The Idaho Species of Special Concern State Ranking Review states the pygmy nuthatch population is probably declining due to the loss of mature and old-growth ponderosa pine forests (Wisdom et al. 2000; IDFG 2001). The Idaho CWCS estimates there are approximately 5,300 individuals on a year-round basis in Idaho (IDFG 2005). No population estimates exist for the Forests.

Habitat and Ecology

Pygmy nuthatch show a strong and almost exclusive preference for ponderosa pine habitat, especially older (mid to late seral) stands that are fairly open (<70% canopy coverage). Secondary habitats include interior Douglas fir and aspen (Hutto 1989, IDFG 2001, Johnson and O'Neill 2001, USDA Forest Service 2003c). The species reliance on mature and older ponderosa pine forests and numerous snags indicates the species may be one of the best indicators of health in these forests. The species feed on pine seeds and insects extracted from the bark of trees (IDFG 2005, Ritter 2000).

The open grown, large, mature, and older ponderosa pine ecosystem has declined significantly from historical conditions in the Interior Columbia River Basin and Idaho. (IDFG 2005, Mehl and Haufler 2001, Wisdom et al. 2000). Mehl and Haufler (2001) identified over 14,000 acres with a resoration potential; over 12,000 of these acres have a high potential for restoration in the near future in Idaho. An additional 57,000 acres in Idaho is estimated to have a good restoration potential.

High priority ponderosa pine restoration opportunities are estimated on 15,627 acres on the Nez Perce National Forest portion and 2,075 acres on the Clearwater National Forest portion of the planning area (Mehl and Haufler 2001). Not all of these acres may be suited for this species based on location. Mehl and Haufler (2001) estimated that only a 20-year window my exist to restore the remaining old-growth ponderosa pine to historic conditions.

Pygmy nuthatch abundance correlates directly with snag density and foliage volume but inversely with trunk volume, which indicates the species is dependent on snag and nest cavity availability (Bull et al. 1997, Hutto 1989, IDFG 2001, Ritter 2000, USDA Forest Service 2003c).

Preferred nest trees average 23 inches d.b.h. (range 9–33 inches) with pygmy nuthatches having a stong preference for large diameter (≥19 inches) snags for nesting and foraging (Hutto 1989, IDFG 2001, Ritter 2000, USDA Forest Service 2003c). The pygmy nuthatch prefers mature/old-growth forest where snags and natural cavities are more prevalent, forest structure is relatively consistent, and a relatively open canopy occurs. The species tolerates a wide range of canopy closure and nests in dead trees. Nearly all foraging is in live canopy. Large, hollow ponderosa pine snags are important as winter roost sites; as many as 150 individuals have been reported roosting in a single tree (Casey et al. 2011 and 2012, Crist et al. 2009).

Casey et al. (2011, 2012) identified the following attributes to describe optimal ponderosa pine breeding habitat for pygmy nuthatch: moderately open-to-closed canopy (30%–70% canopy cover) in mature or old-growth forest with well-developed live canopies for feeding and >3 snags/ha (1.2 snags/ac) >53 cm (>21 in) d.b.h., including at least one large, hollow pine snag per ha (0.40/ac) for roosting.

Using the SIMPPLLE process (Chew et al. 2012), a mid-scale habitat model using vegetative parameters capable of being modeled across the entire forest and best fitting the characteristics of habitat described in the best available science has been developed for the Forest (Appendix X).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Casey et al. 2011 and 2012, Crist et al. 2009, Hollenbeck et al. 2013, IDFG 2005, IWJV 2013, Mehl and Haufler 2001, Mellen-McLean et al. 2013, Nez Perce Tribe 2011, NPCC 2004a and 2004b, Wisdom et al. 2000):

- Restoration of ponderosa pine habitat that retains large-diameter pine trees with prolific seed production, a relatively open canopy, and available snags large snags appears to positively benefit this species.
- Where stand densities are compatible with fuel loading that allows for low severity fire, fire can benefit this species by creating open-canopy habitat with dead standing trees and improving nesting habitat potential.
- Partially cut stands with moderate-to-heavy stocking of large pine trees, or open forested lands with remnant large-sized pine trees can provide suitable nesting and foraging habitat.
- Reduction in the amount of old-forests and associated structures (snags, logs, and cavities), particularly within montane and lower montane forests threaten this species.
- Negative effects resulting from higher road densities in source habitats include an increased risk of snag loss associated with firewood collection, especially along open roads.
- Possibly unsustainable conditions of existing old forests where large transitions from shade-intolerant to shade-tolerant tree species have occurred threaten this species. This trend stems from excluding fire from many forested communities, which has increased susceptibility to stand-replacing fires.

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Lewis' Woodpecker—Melanerpes lewis

<u>Conservation Status</u>

ESA—No status

USFWS—Bird of Conservation Concern - Idaho

USFS—Sensitive in Regions 1, No status in Region 4

BLM—Watch List (Type 5)

IDFG—Species of Conservation Concern (SGCN)

NatureServe rankings: Rangewide: G5 - Secure

Statewide Idaho: S1— Critically Imperiled

ICBEMP Family 1, Group 2 (Migratory population)

Intermountain West Joint Venture: Priority Bird Species

Lewis's woodpeckers are a somewhat atypical woodpecker in that they flycatch during the breeding season and store mast (e.g., acorns and corn) during the winter (Tobalske 1997). The species is also a primary consumer of seeds and fruits and a secondary consumer of terrestrial invertebrates (Tobalske 1997, Johnson and O'Neil et al. 2001).

Distribution and Abundance

In the Interior Columbia River Basin (Figure 18-5), Lewis' woodpecker occurs primarily in the western United States and is generally associated with open-canopy forests, particularly ponderosa pine but also cottonwood (*Populus* spp.) stands and burned or logged mixed coniferous forests (Tobalske 1997, Abele et al. 2004). Lewis' woodpecker breeds from southern British Columbia, south through Washington into California, and east to Colorado and the Black Hills of South Dakota (Tobalske 1997). In winter, individuals may sporadically wander south of their breeding range into northern Mexico. This species is often classified as a specialist in burned pine forest habitat, although suitability of burned areas as habitat may differ with postfire age, size and intensity of burn, and geographic region (Saab and Dudley 1998).

Their breeding distribution is strongly associated with the distribution of ponderosa pine in western North America (Wisdom et al. 2000). This species is generally considered to be nomadic in the majority of the basin (Figure 18-5) (Wisdom et al. 2000). Lewis' woodpecker breeds throughout Idaho except for portions of southern Idaho (Figure 18-6) (IDFG 2005).

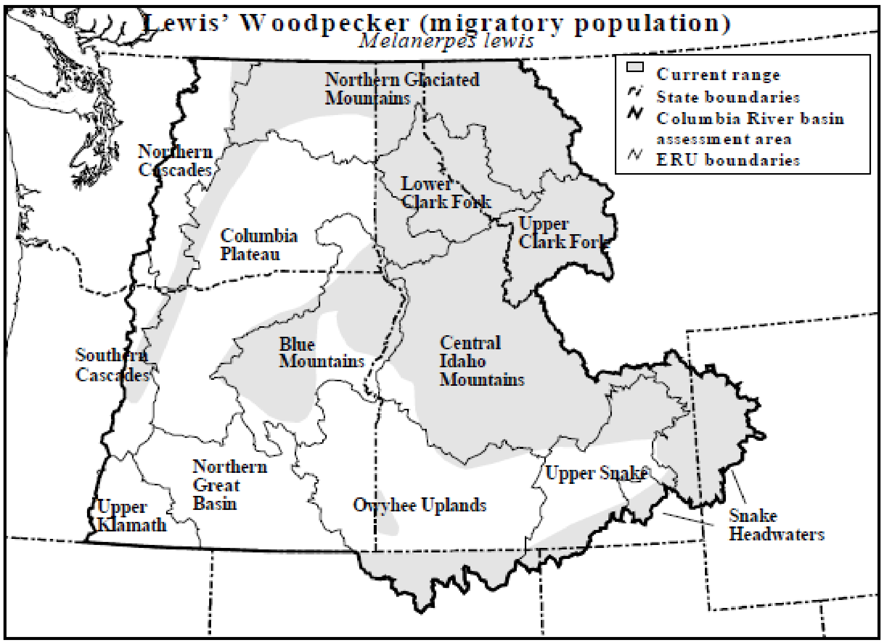

Figure 18-5. Species range of Lewis's woodpecker in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

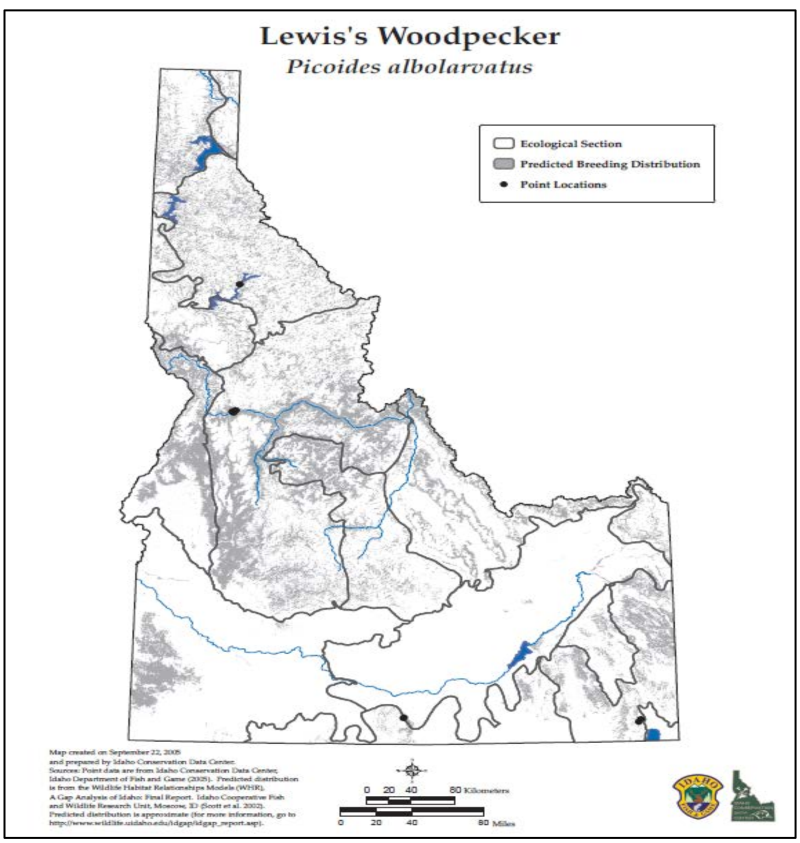

Figure 18-6. Lewis's woodpecker distribution in Idaho (IDFG 2005)

Population Trend

Limited evidence suggests Lewis' woodpeckers are undergoing rangewide population declines, but caution should be used when examining localized data since birds occur sporadically within their range (IDFG 2005, Saab and Rich 1997). The nomadic nature of the Lewis' woodpecker makes estimating populations difficult. The Idaho CWCS (IDFG 2005) reports declines in Idaho that mirror rangewide declining trends but also cautions that the Idaho trend estimates are based on scant data. Low sample size and low relative abundance data for Lewis' woodpecker limit the usefulness of the data (IDFG 2005).

BBS data are available for Idaho for this species. BBS data for Idaho indicate detection decreases and increases for the Lewis's woodpecker during both the long term (1966–2011) (–1.5 % per year) and the more recent short term (2001–2011) (2.1% per year) (Sauer et al. 2014). However, these data are in a credibility category that reflects data with a deficiency:

- The regional abundance is <1.0 birds/route (low abundance)
- The sample is based on <14 routes for the long term (small sample size)
- The results are so imprecise that a 3% per year change (as indicated by the half-width of the credible intervals) would not be detected over the long term (quite imprecise)

Therefore, caution should be used when interpreting trends in these data. Dramatic abundance cycles may be related to local habitat changes and to the nomadic behavior of Lewis' woodpeckers in search of burned forests for nesting habitat. Saab and Rich (1997) indicated that while BBS data are technically sufficient, the ecology and behavior of this species indicate that specialized monitoring will provide more accurate information.

Habitat and Ecology

Habitats of Lewis'woodpecker include old forest, single-storied structural stages of ponderosa pine and multi-storied stages of Douglas-fir, western larch (*Larix occidentalis*), and riparian cottonwood woodlands (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000). Breeding sites generally occur in burned ponderosa pine forests, riparian forests, aspen groves, and oak woodlands (Wisdom et al. 2000).

Lewis' woodpecker is considered a species of high concern under future basin-wide management because of the bird's affinity for declining old-forest stages of ponderosa pine (Casey et al. 2007, 2011, 2012; Saab and Rich 1997; IWJV 2013; Wisdom et al. 2000).

The open grown, large mature, and older ponderosa pine ecosystem has declined significantly from historical conditions in the Interior Columbia River Basin and Idaho. (IDFG 2005, Mehl and Haufler 2001,Wisdom et al. 2000). Declines of up to 90% of the historic pine forests and deciduous riparian habitats in western states have been estimated (Crist et al. 2009), these being the two major breeding habitats for Lewis's woodpeckers (IDFG 2005). Historically, ponderosa pine forests maintained by frequent nonlethal fire events would have had open overstories, light penetration to the forest floor, and development of understory vegetation capable of supporting diverse insect communities (Crist et al. 2009, Tobalske 1997). In these dry forests, successful fire exclusion and harvesting has allowed dense stands of grand fir (*Abies grandis*), Douglas-fir, and small ponderosa pine to develop (Jain and Graham 2005). While these conditions lead to large-scale wildfire events in the short term, these dense forest conditions are not representative of healthy ponderosa pine forests and thereby reduce the long-term habitat suitability for Lewis' woodpecker.

Mehl and Haufler (2001) identified over 14,000 acres with a resoration potential; over 12,000 of these acres have a high potential for restoration in the near future in Idaho. An additional 57,000 acres in Idaho is estimated to have a good restoration potential. High-priority ponderosa pine restoration opportunities are estimated on 15,627 acres on the Nez Perce National Forest portion and 2,075 acres on the Clearwater National Forest portion of the planning area (Mehl and Haufler 2001). Not all of these acres may be suited for this species based on location. Mehl and Haufler (2001) estimated that only a 20-year window may exist to restore the remaining old-growth ponderosa pine to historic conditions.

The Lewis'woodpecker is an aerial insectivore and requires openings for foraging maneuvers. Burned ponderosa pine forests created by stand-replacing fires seem to be highly productive source habitats compared to unburned pine or cottonwood riparian forest. However, research indicates that openings in partially logged, burned forests likely provide greater opportunities for aerial foraging (Saab and Dudley 1998). Fire suppression has resulted in higher densities of small diameter trees, which are unsuitable for this species (Wisdom et al. 2000). Stand-replacing fires appear to create highly productive source habitats (Tobalske 1997).

The Lewis' woodpecker is closely associated with recent burns and responds favorably to stand-replacing fires (Tobalske 1997), whereas habitat for other Family 1 species is usually maintained by frequent, low-intensity burns that retain large and old forest habitat (Appendix 1, Table 2 in Wisdom et al. 2000).

Lewis' woodpeckers are generally associated with snags and decadent trees >20 inches (51 cm) d.b.h. in forested and shrubland/grassland habitats. They utilize the dead parts of live trees, as well as existing tree cavities (Bull et al. 1997, Johnson and O'Neil et al. 2001). Snags are a special habitat feature for this species (Volume 3, Appendix 1, Table 2 in Wisdom et al. 2000). Lewis'woodpeckers requires large snags in an advanced state of decay or trees with soft sapwood for cavity excavation. Snags and trees used for nesting are generally larger in diameter and more heavily decayed than that expected based on availability of such snags (Saab and Dudley 1998).

In western Idaho, Lewis' woodpeckers select nest sites (n = 208 nests) with higher snag densities compared to random sites, suggesting a preference for snags distributed in clumps rather than those in distributed uniformly (Saab et al. 2002). In western Idaho, Lewis' woodpeckers nested in higher densities in salvage-logged units rather than unlogged units (Saab and Dudley 1998); preferred snags in a clumped distribution (Saab et al. 2002); and selected areas with snags that were >9 inches (23 cm) d.b.h. at densities averaging 24 snags/acre (59 snags/ha), but specifically selected for snags >21 inches (53 cm) d.b.h. at densities averaging 6.3 snags/acre (16 snags/ha) (Saab and Dudley 1998).

This species appears to prefer nesting in large snags in relatively open forests with a well-developed understory (Saab and Vierling 2001). Lewis' woodpeckers are weak excavators and rarely excavate their own cavity. Lewis' woodpeckers require large snags in an advanced stage of decay or trees with sapwood to easily excavate cavities (Saab et al. 2002, Saab et al. 2006, Tobalske 1997). They readily usurp occupied cavities, reuse old cavities created by strong excavators (e.g., hairy and black-backed woodpeckers), or use naturally occurring cavities (Tobalske 1997).

Nest sites are generally associated with an abundance of flying insects, open-canopy forest, or tree clumps, snags, and dense ground cover in the form of shrubs, downed material, and grasses (Saab and Dudley 1998, Tobalske 1997). Average home range size for Lewis' woodpecker is estimated to be 15 acres/pair (6.1 ha/pair) (Tobalske 1997). Nest tree species are typically ponderosa pine, cottonwood, and, less commonly, aspen, lodgepole pine (*Pinus contorta*), juniper, willow, or paper birch (*Betula papyrifera*) (Tobalske 1997). Several habitat characteristics that appear important for nest site selection include snags (soft or in later stages of decay), clumped snag distributions, down woody material, litter, ground cover, and canopy cover. In general, a reduction of large snags in breeding habitats may limit reproduction (Tobalske 1997).

Linder and Anderson (1998) found nest sites have less small down wood (<11.8 inches [<30 cm]); more large down wood (12.2–35.4 inches [31–90 cm] and >91 cm [>35.8 inches]); more litter (18.7% versus 9%); and a tendency toward less grass and forb cover than random sites. Understory litter, down wood, and grass and forb conditions likely influence insect production (Linder and Anderson 1998).

Casey et al. (2007, 2011, 2012) identified the following attributes to describe optimal ponderosa pine breeding habitat for Lewis's woodpecker: open ponderosa pine forest with <30% canopy cover; >50% shrub cover; >3 soft snags/ha (>0.40 soft snags/acre) that are between >53 cm (>21 inches) d.b.h. and >81 cm (>32 inches) d.b.h.

Using the SIMPPLLE process (Chew et al. 2012), a mid-scale habitat model using vegetative parameters capable of being modeled across the entire forest and best fitting the characteristics of habitat described in the best available science has been developed for the Forest (Appendix X).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Bull et al. 1997, Casey et al. 2011 and 2012, Crist et al. 2009, Hollenbeck et al. 2013, Mehl and Haufler 2001, Mellen-McLean et al. 2013, Nez Perce Tribe 2011, Saab et al. 2002, Saab et al. 2006, Wisdom et al. 2000).

- Basin-wide decline in old forests of interior ponderosa pine and western larch
- Decline in availability of large snags and trees for foraging and nesting
- Declines in shrub understories of montane and lower montane forests
- Fire suppression in pine forests has promoted high densities of small diameter trees, creating unsuitable conditions since the species relies on relatively open habitats
- Prescribed fire can benefit this species by creating open habitat with dead, standing trees and improving cavity creation as long as fuel loading is reduced to manageable levels

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Fisher—Pekania pennanti

Conservation Status

ESA: No status, petitioned for listing 2009, 2013

USFS: Sensitive in Regions 1 and 4

BLM: Regional/State imperiled (Type 3)

IDFG: Species of Conservation Concern (SGCN), furbearer—no season

NatureServe rankings: Rangewide: G5—Secure

Statewide Idaho: S1—Critically Imperiled

ICBEMP Family 2, Group 5

NPCC Clearwater Subasin Assessment—Focal Species

NPCC Salmon Subasin Assessment—Species of Concern

The fisher (*Pekania pennanti*) is a forest-dependent, medium-sized mammal native to North America. The fisher is predator, with prey that includes snowshoe hare, squirrels, mice, and porcupines (Center for Biological Diversity et al. 2013, NatureServe 2013, USDI 2011 and IDFG 2005).

Distribution and Abundance

The current distribution of fishers in the northern Rocky Mountains is similar to the presumed historical range; actual occurrence data may differ from the range depicted in Figure 18-7 and Figure 18-8 (Wisdom et al. 2000, Lofroth et al. 2011, Raley et al. 2012, and USDI 2011). In the northern Rocky Mountains, fishers are distributed in northwest and westcentral Montana and northern and north-central Idaho with rare detections further south in the state (Figure 18-9) (IDFG 2005, USDI 2011 and 2013, Raley et al. 2012).

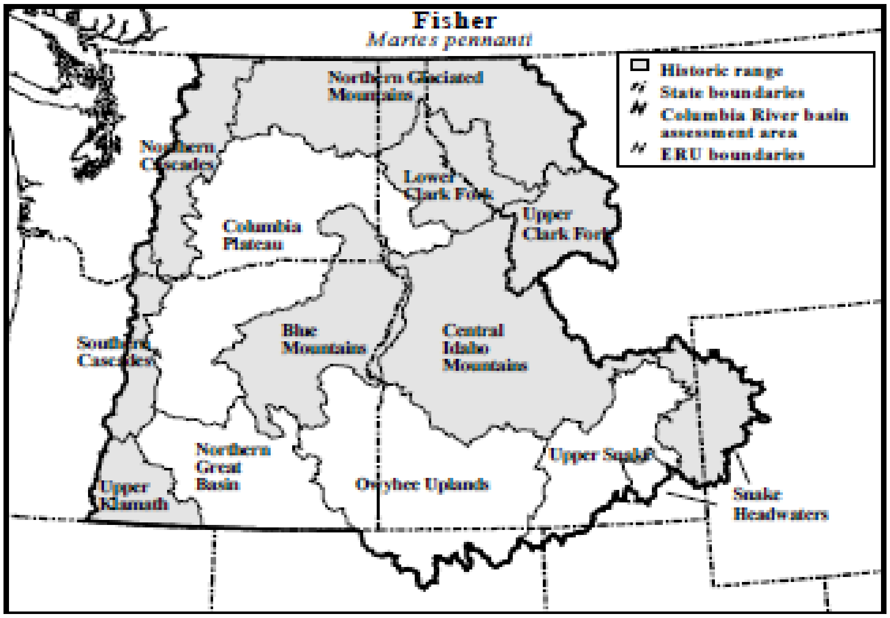

Figure 18-7. Species Range of fisher in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

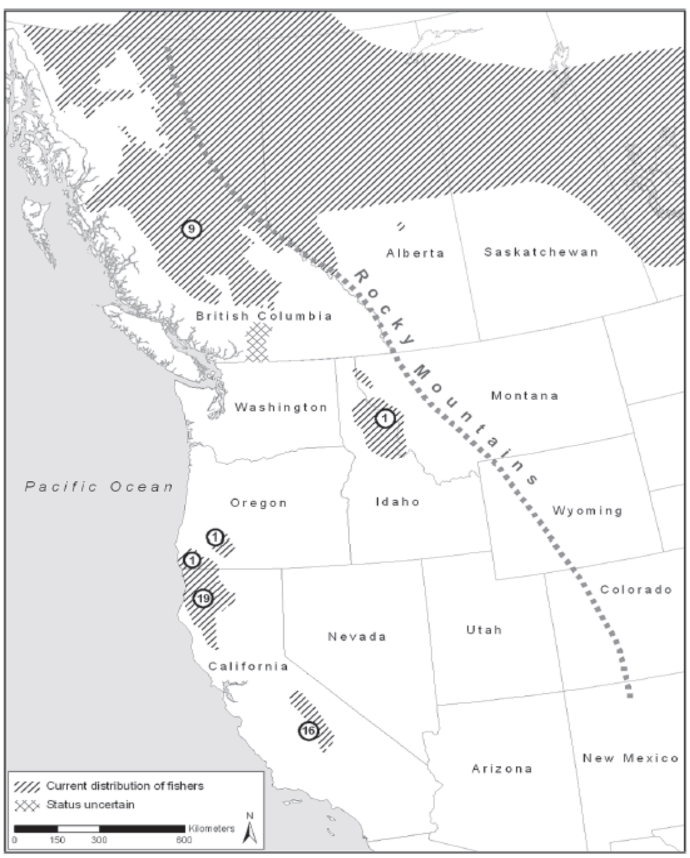

Figure 18-8. Current Fisher distribution based on best available science (Raley et al. 2012)

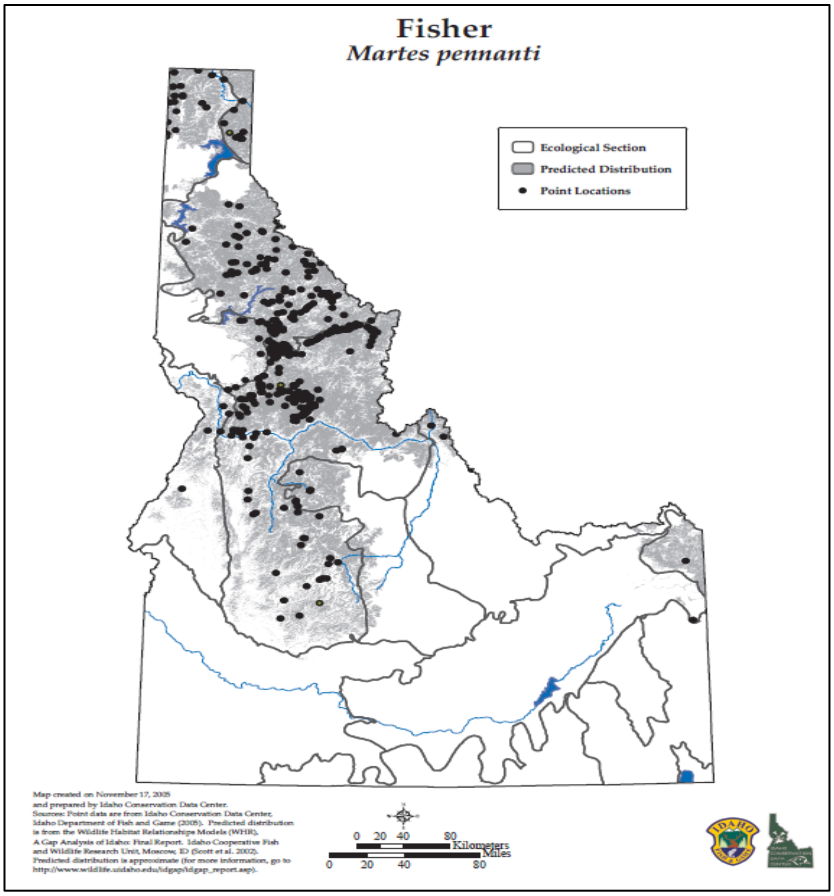

Figure 18-9. Fisher distribution in Idaho (IDFG 2005)

Population Trend

Neither the State of Idaho nor recent researchers have specific estimates, either historical or current, on population levels of fisher in Idaho (IDFG 2005; USDI 2011; per. comm. Sauder 2013). No estimate of population trend for Idaho exists (IDFG 2005). None of the recent fisher research in Idaho was designed to determine trends. Therefore, no empirical data exist on species trend. However, the species has been extensively surveyed for in the planning area since 2004 (per. comm. Lewis 2013, per. comm. Sauder 2013, per. comm. Schwartz 2013). In addition, the State of Idaho (IDFG 2005, State of Idaho 2010) has documented other fisher observations (indirect and direct) at multiple locations across the state and in the planning area (Figure 18-9).

The planning area is contained within Idaho Fish and Game Region 2 (Clearwater Region). Fisher researchers have estimated that the overall northern Rocky Mountain fisher population is greater than 500 but less than 1,000 individuals (per. comm. Sauder 2013). In spite of extensive surveys since 2004, the overall number of fisher within the planning unit is undetermined (per. comm. Sauder 2013). However, 50% to 75% of the fisher in Idaho is estimated to occur in the Clearwater Region (IDFG Region 2), and the actual number of fisher is probably closer to the higher end of that range, with most of those on the Nez–Perce Clearwater National Forests (per. comm. Sauder 2013).

Wider distribution of the species may be limited due to these factors. Drier habitats (ponderosa pine and lodgepole pine) and areas of heavier snowpack conditions likely limit fisher abundance and distribution (Olsen et al. 2013 and USDI 2011). Therefore, unsuited habitat and climatic conditions may inherently limit fisher population abundance and distribution elsewhere on the National Forests of the western USFS Region 1.

Based on the review of the best available science and discussions with key researchers, the Nez Perce-Clearwater National Forests and southern Idaho Panhandle National Forests are the critical areas that support fisher in the U.S. Forest Service Northern Region (Raley et al. 2012, per. comm. Sauder 2013, per. comm. Schwartz 2013). The Lolo, Bitterroot and Kootenai National Forests, immediately adjacent to the Idaho–Montana border, are on the fringes of the key population center of fisher concentrated in Idaho. Habitat issues and management options for the fisher are described below and elsewhere in this Assessment.

Habitat and Ecology

The fisher is a forest-dependent species that evolved in the northern Rocky Mountains in a complex landscape mosaic shaped by regularly occurring environmental influences to its preferred habitat, such as fire, tree disease, and wind-throw. Fishers are associated with areas of high cover and structural complexity in large tracts of mature and old-growth forests (Meyer 2007, Powell and Zielinksi 1994, Sauder and Rachlow 2013, Schwartz et al. 2013). Other site characteristics that can be important include presence of nearby water, slope, elevation, and snow characteristics (Meyer 2007, Olsen et al. 2013, USDI 2011).

Fishers generally avoid early and/or prefer late successional stages, but in some cases, they use fairly young forests extensively. In Idaho, the species occurs in a mosaic of mesic conifer forests. Forested riparian habitat is important, and stream courses may be used as travel corridors (IDFG 2005, Sauder and Rachlow 2013). Mature and older forests are used during summer, and young and older forests are used during winter (IDFG 2005, Sauder and Rachlow 2013). Proulx (2004) considered the fisher as a fine-filter species that is sensitive to forest management and requires an intergrattion of coarse and fine-filter habitat needs in landscape planning.

Fishers in northcentral Idaho exhibit seasonal shifts in habitat use to forests with younger successional structure, plausibly linked to a concurrent seasonal shift in habitat use by their prey species (USDI 2011). In northcentral Idaho, the species did not use habitats in proportion to their spatial availability (Jones and Garton 1994, Lofroth et al. 2011). Predominantly, grand fir and subalpine fir (*Abies lasiocarpa*) stands categorized as pole-sapling age or younger were rarely used in summer or winter. In summer, mature forest and older forests were preferred, but in winter, young grand fir forests were preferred (Jones and Garton 1994, Lofroth et al. 2011). Olsen et al. (2013) and Buck et al. (1994) indicate that fisher use dry habitat forests, such as ponderosa pine and lodgepole pine, much less than moist mixed conifer types. In northcentral Idaho forests, research has demonstrated the fisher's preference for riparian areas (Jones and Garton 1994, Olsen et al. 2013, Sauder and Rachlow 2013). Summer fisher locations were significantly closer (223 feet) to water than random sites (400 feet) (Jones and Garton 1994, Lofroth et al. 2011). Long-distance movements have been documented for dispersing juveniles and relocated individuals before they establish a home range (NatureServe 2013; USDI 2011).

Resting and denning habitat are key fine-filter attributes for fisher. Aubry et al. (2013) identified fine-filter attributes that are associated with fisher resting sites. They found that fishers selected for areas on steeper slopes, in cooler microclimates, with dense overhead cover, in stands with greater volume of logs and with a greater number of large trees and snags (Aubrey et al. 2013). Schwartz et al. (2013) found that female fisher consistently selected stands of mature forests with both large and smaller trees, thereby consistent with other evidence (Jones and Garton 1994, Lofroth et al. 2011, 2012) that fishers need cover for hunting efficiency or predator escape purposes.

Naney et al. (2012) indicates that vegetation diversity contributes to habitat for a wide variety of fisher prey species (Lofroth et al. 2011). The reduction in vegetation diversity can decrease the variety of tree species available to provide cavities (for fisher denning and resting habitat), reduce the resilience of forests to insects and diseases, and reduce the diversity of environments capable of supporting fisher prey species. The reduction in vegetation diversity can result from uncharacteristically severe wildfire or vegetation management practices (Naney et al. 2012). Hahn and Lewis (2014) conducted a GIS query to spatially identify fisher habitat across Region 1 using the spatial model criteria described in Olsen et al. (2013). The results from the GIS exercise constitute a broad-scale quatification of habitat using the full set of climatic, topographic, and vegetative variables ("full" model vs. the "climate only" model also described in Olsen et al. [2013]). The "full model" includes landcover variables, which results in a predicted distribution more likely to include river and valley bottoms across the entire forest and best predicts suitable habitat in older forests with large trees.

The application of Olsen et al. (2013) is the best available science that quantifies "potential" fisher habitat for the Northern Region (Region 1) forests to date. This information is disclosed in the mid-scale (Forest-level) section of this Assessment. Figure 5-55 depicts the distribution of estimated suitable habitat in the planning area, and Figure 5-56 and Figure 5-57 depict the distribution of the 6,314,511 acres of estimated suitable habitat in Region 1 for the species as modeled (USDA Forest Service 2014). Further refinement of this data is ongoing.

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Aubry et al. 2013, Buck et al. 1994, Hollenbeck et al. 2013, IDFG 2005, Jones and Garton 1994, Lofroth et al. 2011 and 2012, Naney et al. 2012, Nez Perce Tribe 2011, NPCC 2003, NPCC 2004a and 2004b, Olsen et al. 2013, Powell and Zielinksi 1994, Sauder and Rachlow 2013, Schwartz et al. 2013, USDA Forest Service 2014; Wisdom et al. 2000):

- Reduction in the amount of old-forests and associated structures (snags, logs, and cavities), particularly within the montane and lower montane community groups
- The species use of dry forest conditions is much less than of moist forest conditions
- Higher road densities in source habitats results in increased trapping pressure, and loss of snags and logs associated with firewood collection may be higher along open roads

- Possible unsustainable conditions of existing old forests where large transitions from shade-intolerant to shade-tolerant tree species have occurred. This stems from the exclusion of fire from many forested communities, which has resulted in increased susceptibility to stand-replacing fires.
- Timber management practices that result in open stands, an abundance of hardwoods, and dry forest conditions over large areas create unsuitable conditions
- Incidental trapping of fishers may be an important source of mortality, particularly where populations are small and fragmented

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Flammulated owl—Otus flammeolus

Conservation Status

ESA—No status

USFWS—Bird of Conservation Concern - Idaho

USFS—Sensitive in Regions 1 and Region 4

BLM—Regional/State imperiled (Type 3)

IDFG—Species of Conservation Concern (SGCN), protected non-game

NatureServe rankings: Rangewide: G4—ApparentlySecure

Statewide Idaho: S3B— Vulnerable breeding

Intermountain West Joint Venture: Priority Bird Species

ICBEMP Family 2, Group 5

NPCC Salmon Subbasin Assessment – Species of Concern

NPCC Clearwater Subbasin Assessment –Focal species

Distribution and Abundance

The flammulated owl breeds in montane forests from southern British Columbia to southern Mexico, generally west of the Rocky Mountains. One of the most highly migratory owls in North America, it winters from central Mexico to Central America. Flammulated owls are broadly distributed throughout the montane forested portions of the state including the Lower Clark Fork, Blue Mountains, and Central Idaho Mountains ERUs (Figure 18-10 and Figure 18-11) (IDFG 2005, Saab and Rich 1997, Wisdom et al. 2000).

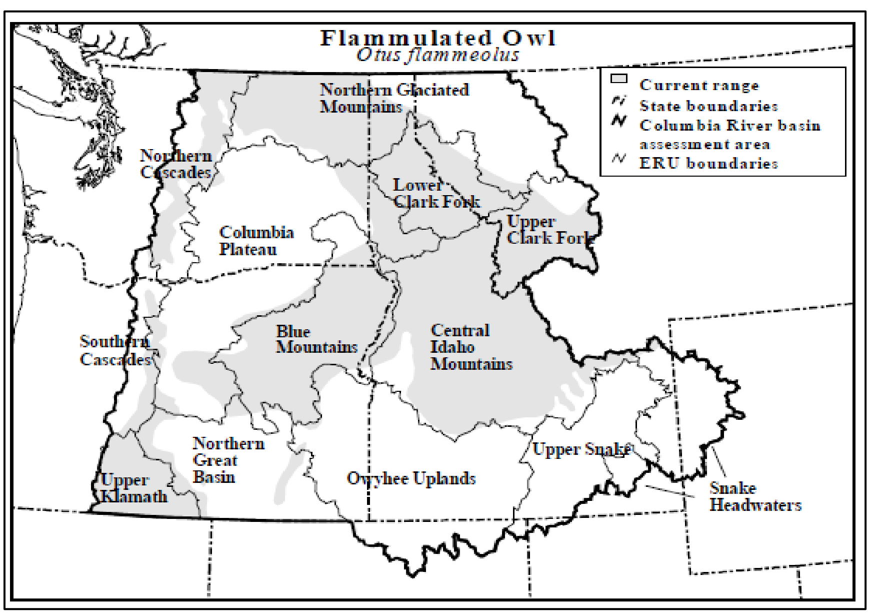

Figure 18-10. Species Range of flammulated owl in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

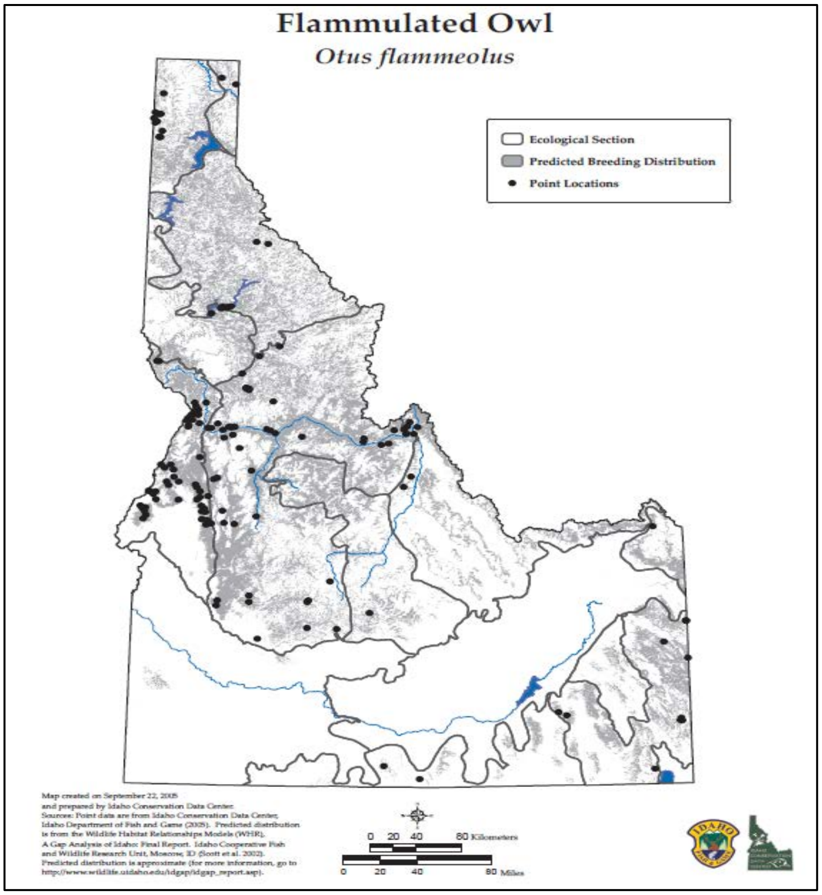

Figure 18-11. Flammulated owl distribution in Idaho (IDFG 2005)

Population Trend

No BBS trend data exists for the species (Sauer et al. 2014). Flammulated owls are almost strictly nocturnal, and BBS data are inadequate to establish trends. Saab and Rich (1997) indicate that BBS data are insufficient for this species. Because of the ecology and natural history of this species, it is unlikely that the sample size would increase with more BBS routes. The Nez Perce–Clearwater National Forests have conducted surveys for the species to determine occupancy information (pers. comm. Bonn 2013).

Habitat and Ecology

In Idaho, flammulated owls occupy mid-elevation old-growth or mature stands of open ponderosa pine and Douglas-fir and stands co-dominated by these two tree species (IDFG 2005). In the northern Rocky Mountains, they occupied relatively open, multi-storied Douglas-fir, ponderosa pine, and mixed conifer stands with some mature trees usually present (Wright et al. 1997).

The open-grown, large, mature, and older ponderosa pine ecosystem has declined significantly from historical conditions in the Interior Columbia River Basin and Idaho. (IDFG 2005, Mehl and Haufler 2001, Wisdom et al. 2000). Mehl and Haufler (2001) identified over 14,000 acres with a resoration potential with over 12,000 acres of this with high potential for restoration in the near future in Idaho. An additional 57,000 acres in Idaho is estimated to have a good restoration potential. Restoration opportunities exist for this species in the planning area.

High priority ponderosa pine restoration opportunities are estimated at 15,627 acres on the Nez Perce National Forest portion and 2,075 acres on the Clearwater National Forest portion of the planning area (Mehl and Haufler 2001). Not all of these acres may be suited for this species based on location. Mehl and Haufler (2001) estimated that there may only be a 20-year window to restore the remaining old-growth ponderosa pine to historic conditions.

Flammulated owl habitat combines open, mature montane pine forests for nesting; scattered thickets of saplings or shrubs for roosting and calling; and grassland edge habitat for foraging (Crist et al. 2009, IDFG 2005, Saab and Rich 1997). Source habitats for this are species are late seral stages of montane forest communities. Unmanaged young forests also are source habitats because late-seral stages that contain sufficient large-diameter snags and logs needed for the various life functions of species are present (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000). Managed young-forest stages that lack remnant large trees and snags do not provide source habitat. In these dry forests, successful fire exclusion and harvesting have allowed dense stands of grand fir, Douglas-fir, and small ponderosa pine to develop (Jain and Graham 2005) and thereby reduce habitat suitability for flammulated owl.

Old forests consisting of ponderosa pine and Douglas-fir are a key component of flammulated owl home ranges (Reynolds and Linkhart 1992). Home ranges composed of at least 75% old ponderosa pine / Douglas-fir forest were occupied more continuously than home ranges consisting of <75% in this forest type (Reynolds and Linkhart 1992, Linkhart et al. 1998).

Variability in the structure of these old stands seems important to support life functions of flammulated owls. However, roosting occurs in fairly dense stands or patches within stands, with tree densities immediately surrounding roost trees averaging 2,016 per ha (816 per acre). Overall home ranges average 589 trees per ha (238 per acre) (McCallum 1994). In contrast, relatively open stands seem to be selected for foraging, and open, mature stands are selected for nest sites (McCallum 1994). In two Oregon studies, mean diameter at breast height of nest trees was 56.3 cm (22.2 in) and 72.0 cm (28.4 in) (Bull et al. 1990).

Casey et al. (2007, 2011 and 2012) identified the following attributes to describe optimal ponderosa pine breeding habitat for flammulated owl: relatively open (20%–50% canopy cover) mature forests with >3 snags/ha (>1.2 snags/ac) that are >46 cm (18 in) d.b.h.; small patches of dense saplings and/or young trees for roosting or calling; 10%–30% shrub layer cover substrate for production of insect prey; and small grassy openings <2 ha (4.9 ac) or adjacent to similar larger grasslands for foraging.

Using the SIMPPLLE process (Chew et al. 2012), a mid-scale habitat model using vegetative parameters capable of being modeled across the entire forest and best fitting the characteristics of habitat described in the best available science has been developed for the Forest.

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Casey et al. 2007, 2011 and 2012, Crist et al. 2009, Hollenbeck et al. 2013, IDFG 2005, IWJV 2013, Mehl and Haulfer 2001, Nez Perce Tribe 2011, NPCC 2003, 2004a and 2004b, Wisdom et al. 2000):

- One of the primary restoration and management activities for ponderosa pine habitat is thinning the degraded, dense, mixed-conifer forests that were historically ponderosa pine to the historic canopy and understory conditions with which the species evolved
- The fire ecology of ponderosa pine and dry interior Douglas-fir ecosystems is disrupted
- Reduction in the amount of old-forests and associated structures (snags, logs, and cavities), particularly within the montane and lower montane community groups
- Higher road densities in source habitats has increased trapping pressure, and loss of snags and logs associated with firewood collection may be higher along open roads
- Possible unsustainable conditions of existing old forests where large transitions from shade-intolerant to shade-tolerant tree species have occurred. This stems from the exclusion of fire from many forested communities, which has resulted in increased susceptibility to stand-replacing fires.

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Boreal Owl—Aegolius funereus

Conservation Status
ESA—No status
USFS—Sensitive in Region 4
BLM—Watch List (Type 5)
IDFG—Species of Conservation Concern (SGCN)
NatureServe rankings: Rangewide: G5—Secure
Statewide Idaho: S2—Imperiled
ICBEMP Family 2, Group 7
NPCC Salmon Subbasin Assessment – Species of Concern

Boreal owls are consumers of small terrestrial vertebrates, and are secondary cavity users. Snags and downed wood, for nest sites and prey habitat, are special habitat features for the boreal owl.

Distribution and Abundance

Boreal owls are circumpolar, occurring in boreal and montane forests across northern Eurasia and in Canada and Alaska, southward through the Cascade, Blue, and Rocky Mountain Ranges of the western United States into Colorado and New Mexico (IDFG 2005).

Within the Interior Columbia River Basin, the boreal owl is a year-round resident in forested portions of eastern Washington, northern and central Idaho, western Montana, and the Blue Mountains and Cascade Range of Oregon (Figure 18-12) (Volume 2, Figure 21 in Wisdom et al. 2000). Boreal owls are year-round residents within their home ranges but are known to make periodic, food-induced irruptions southward in winter (Hayward and Hayward 1993, Hayward 1994).

In Idaho, boreal owls occupy high-elevation mixed conifer forests in the north, central, and southeast portions of the state (IDFG 2005). Extensive surveys in Idaho and Montana did not find boreal owls below 1,292 m (4,239 feet), and 75% of locations were found above 1,584 m (5,197 feet) (Hayward 1994).

Boreal owls are documented on the Forest (Figure 18-13) (IDFG 2005). Boreal owl occurrences are known from the following Idaho counties: Adams, Bear Lake, Blaine, Bonner, Boundary, Caribou, Cassia, Clark, Clearwater, Fremont, Idaho, Lemhi, Shoshone, Teton, and Valley (NatureServe 2013). No estimates of abundance for boreal owls in Idaho exist. However, the Idaho CWCS (IDFG 2005) estimates abundance of boreal owls in Idaho as 1,000–3,000 individuals based on the extent of spruce-fir habitat.

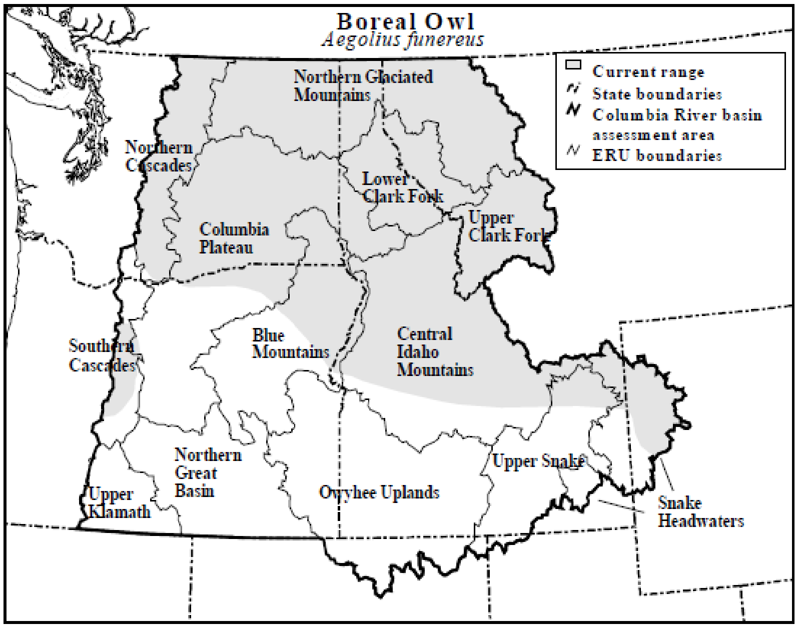

Figure 18-12. Species Range of boreal owl in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

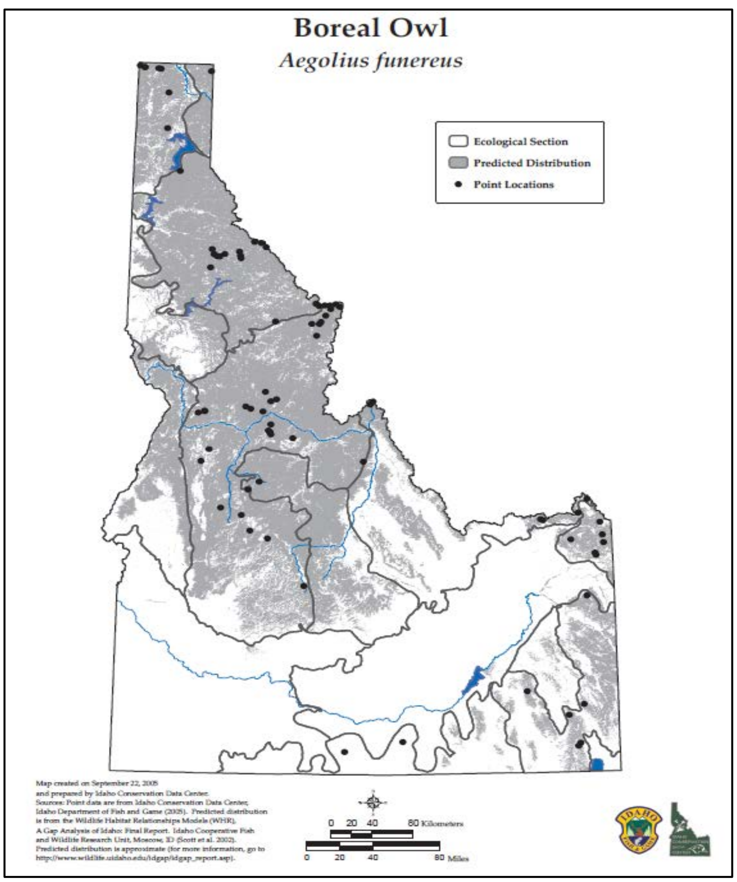

Figure 18-13. Boreal owl distribution in Idaho (IDFG 2005)

Population Trend

No reliable estimates of boreal owl population trends in North America have been established (Hayward 1994). Long-term population trends are hard to establish due to the difficulty of surveying for the species and its nomadic/irruptive behavior (IDFG 2005). No BBS survey trend data is available for the species (Sauer et al. 2014). The few boreal owl studies conducted in the United States and Canada have tended to be short term and habitat focused. The “Idaho Partners in Flight Idaho Bird Conservation Plan” (Ritter 2000) does designate the boreal owl as a Moderate Priority Breeding Bird for high-elevation mixed conifer forest and aspen habitats in Idaho but does not address population size or trend.

Habitat and Ecology

Source habitats for boreal owls include old-forest and unmanaged young-forest stages of subalpine and montane forests and riparian woodlands (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000).

Specific cover types and structural stages that provide source habitat are the old-forest multi-story stages of Engelmann spruce (*Picea engelmannii*)-subalpine fir, Pacific silver fir (*Abies amabilis*)-mountain hemlock (*Tsuga mertensiana*), and aspen, and the old forest single- and multi-forest stages of interior Douglas-fir, western larch, and lodgepole pine. Unmanaged young-forest stages of all these cover types and of grand fir-white fir also serve as source habitats if suitable large-diameter snags are present (Hayward 1994).

Habitat for boreal owls requires a juxtaposition of late-seral and young unmanaged forested habitats as well as variation in forest communities within individual territories to provide for nesting, roosting, and foraging (Wisdom et al. 2000). At the home range scale, boreal owls are adapted to patchy landscapes and use several cover types and structural stages across their home range to meet different life history requirements (Hayward 1994). Landscapes that contain various old-forest cover types may support the greatest abundance of boreal owls (Hayward and Hayward 1993).

Snags and down wood, for nest sites and prey habitat, are special habitat features for the boreal owl. Boreal owls use live trees and snags (ranging from 10 to 14 inches [25.4 to 35.6 cm] d.b.h. to >30 inches [>76.2 cm] d.b.h.) and nest in cavities. They will readily use supplemental nest boxes, artificial structures, and platforms.

Preferred habitats typically support abundant lichens and fungal sporocarps, which provide important foods for southern red-backed voles, the principal prey of boreal owls (Hayward 1994c). Voles are the preferred prey of boreal owls and may comprise as much as 75% of the boreal owl’s diet (Hayward and Hayward 1993). In Idaho, red-backed voles were found to be up to nine times more abundant in mature spruce-fir forests than other forest habitats (Hayward 1997). Both voles and lichens and fungi are associated with coarse woody debris. Prey availability may regulate owl abundance in portions of its range and influence seasonal movements and fluctuations in reproductive success (Hayward and Hayward 1993).

Nest sites for boreal owls are characterized by the availability of large trees and large snags with cavities excavated by primary cavity nesters (Hayward 1994, Volume 3, Appendix 1, Table 2 in Wisdom et al. 2000). A lack of large cavities can eliminate areas available for nesting habitat, although the forest stands may be capable of providing roosting and/or foraging habitat instead.

In an Idaho study, Hayward and Hayward (1993) found that spruce-fir forests had few cavities for nesting but abundant prey resources, while mixed conifer forests had an abundance of cavities but few prey.

Cavities excavated by pileated woodpeckers and northern flickers are the most common nest sites (Hayward and Hayward 1993). Tree and snag diameters used for nesting are generally large. For example, in Idaho, diameters of nest trees ranged from 10 to 24 inches (26 to 61 cm) with an average of 16 inches (41 cm). Of 19 nests, 10 were in snags, nine were in live trees (Hayward and Hayward 1993).

Boreal owls are sensitive to heat stress and utilize roost sites with high canopy cover and a high basal area for thermoregulation (Hayward 1997). In Idaho, spruce-fir stands—and occasionally pine—have been documented as preferred roosting habitat because these trees provided thermal and hiding cover (Hayward 1994).Canopy closures of roost sites ranged from 58%–63% in Idaho (Hayward and Hayward 1993).

Hayward and Hayward (1993) described the best foraging habitat as being in older spruce-fir stands, which provided an open forest structure that facilitated hunting and had 2–10 times greater prey populations than other sites.

Seasonality of home range use affects size of the territory, with winter home ranges typically larger than summer (Hayward et al. 1987). In central Idaho, year-round (minimum) home ranges averaged 2,048 ha ±818 ha (5061 acres ±2021 acres) (Hayward and Hayward 1993). Extensive overlap in home ranges is documented for boreal owls (up to 50% overlap, increasing up to 98% overlap following nesting) (Hayward et al. 1987). However, within a home range, only nest sites are defended (NatureServe 2013).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Bull et al. 1997, Hayward 1994 and 1997, IDFG 2005, , NPCC 2004a and 2004b, Wisdom et al. 2000):

- Altered fire regimes, resulting from fire suppression, has led to declines in large aspen trees and other forest types
- Balancing the habitat needs of species dependent on late-seral conditions with those dependent on early- and late-seral conditions
- Loss of historical landscape patterns. Fragmented distribution of source habitats resulting from harvest and/or large-scale wildfire may negatively affect population structure and persistence of boreal owls.
- Loss of large-diameter snags (>18 inches [45 cm]) d.b.h.
- Loss of preferred microenvironments for small mammal prey. Changes in forest structure and composition (i.e., loss of snags, downed wood, and fungi) could negatively affect prey populations.

- Declines in late-seral forests of subalpine and montane forests and their associated attributes such as large trees, large snags, large down logs, lichen, and fungi

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American Three-toed Woodpecker—Picoides tridactylus

Conservation Status

ESA—No status

USFS—Sensitive in Region 4

BLM—Regional/State inperiled (Type 3)

IDFG—Species of Conservation Concern (SGCN), protected non-game

NatureServe rankings: Rangewide: G5—Secure

Statewide Idaho: S2—Imperiled

ICBEMP Family 2, Group 7

NPCC Salmon Subbasin Assessment—Species of Concern

The American three-toed woodpecker is a relatively specialized species, feeding primarily on beetles within decaying and dead trees and occurring in low densities throughout their range at higher elevations.

Distribution and Abundance

American three-toed woodpecker have a wide distribution throughout the boreal forests of North America closely matching the distribution of spruce species (USDA Forest Service 2004). The distribution becomes patchy further south in the western United States, and the species reaches its southern limits in northern Arizona and central New Mexico (Johnson and O’Neill 2001, USDA Forest Service 2004).

Within the western United States, American three-toed woodpeckers occur in the Cascade and Blue Mountains of Washington; Cascade, Blue, and Wallowa Mountains of Oregon; northern and central portions of Idaho; and Rocky Mountains of western Montana (Figure 18-14 and Figure 18-15) (IDFG 2005, Leonard 2001, Wisdom et al. 2000).

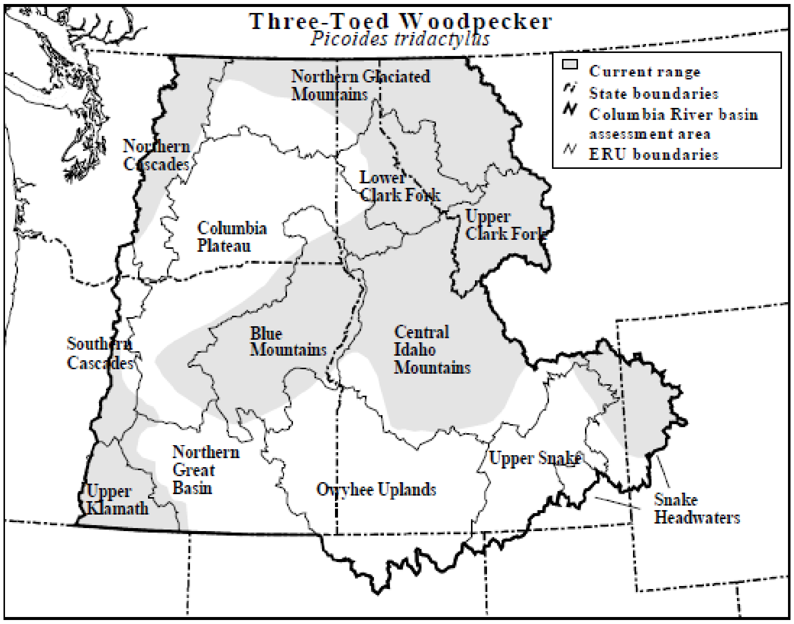

Figure 18-14. Species Range of American three-toed woodpecker in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

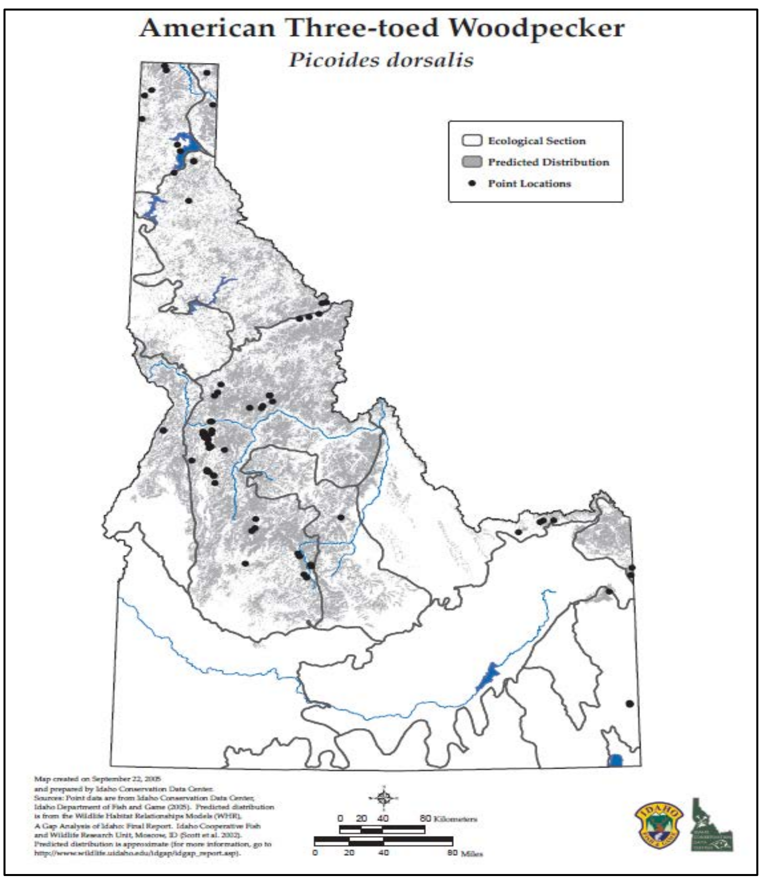

Figure 18-15. American three-toed woodpecker distribution in Idaho (IDFG 2005)

Population Trend

Their population trend is unknown in Idaho (IDFG 2005). In general, it is difficult to ascertain population abundance and trends since this species is highly irruptive and colonizes disturbed forests across the landscape (IDFG 2005, Leonard 2001).

Populations may increase significantly in areas where fires have recently burned or where other natural disturbances have caused widespread die-off within conifer stands. These disturbances typically lead to, or are preceded by, infestations of beetles, and woodpeckers may remain in these areas for up to 3 years.

No BBS data exist for the state of Idaho (Sauer et al. 2014. BBS data are available for this species for the northern Rocky Mountains. Sauer et al. (2014) note a 4.1 % increase between 1966 and 2011, and a 6.3 % increase between 2001 and 2011. However, trend data are based on extremely small sample sizes and are not statistically significant because the number of detections are so low as to lend low credibility to the trends assigned for this species (Sauer et al. 2014). The BBS data for this species reflects data with the following important deficiencies:

- The regional abundance is less than 0.1 birds/route (very low abundance)
- The sample is based on less than 5 routes for the long term (very small samples)
- The results are so imprecise that a 5% per year change (as indicated by the half-width of the credible intervals) would not be detected over the long term (very imprecise)

Users should be aware that a variety of circumstances may lead to imprecise results. Imprecise results are sometimes a consequence of a failure of the models to converge in those local areas, even though the model performs adequately in larger regions (USGS 2014).

Habitat and Ecology

American three-toed woodpeckers are generally associated with high-elevation spruce-subalpine fir forests, although their occurrence in other types of coniferous forest varies geographically (Goggans et al.1989, Leonard 2001, Wisdom et al. 2000). Kotliar et al. (2008) found that three-toed woodpeckers responded to a variety of burned forest conditions. Breeding in mixed-severity areas with both lightly and severely burned trees showed the importance of mixed-severity regimes to such fire-dependent species and the need for fire management to include a range of fire behaviors. The use of a range of fire severity conditions by this species indicates the importance of integrating wildlife needs with prescribed burning and post-wildfire management to meet mutiliple objectives.

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Goggans et al. 1989, Wisdom et al. 2000, IDFG 2005, , NPCC 2004a and 2004b, USDA Forest Service 2004, Rich et al. 2004):

- Management activities should avoid even-aged stand structure since suitable habitat for this species might be a matrix of old growth forests mixed with forests undergoing disturbances (i.e., fire) to benefit this woodpecker

- Management activities that retain large patches of dead and decaying trees for nesting and foraging are necessary for this species

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Mountain Quail—*Oreortyx pictus*

Conservation Status

ESA—No status, petitioned for listing 3/15/2000.

USFS—Sensitive in Regions 1 and Region 4

BLM—Regional/State inperiled (Type 3)

IDFG—Species of Conservation Concern (SGCN), protected non-game

NatureServe rankings: Rangewide: G4—ApparentlySecure

Statewide Idaho: S3B— Vulnerable breeding

Intermountain West Joint Venture: Priority Bird Species

ICBEMP Family 3, Group 17

NPCC Salmon Subbasin Assessment—Species of Concern

Mountain quail are the largest of six North American quail and are easily distinguished by the two long, thin head plumes and by the chestnut-colored sides boldly barred with white. Mountain quail are secretive birds that inhabit a diverse range of habitats but typically occupy dense, brushy slopes in foothills and mixed conifer forests. Water can be a serious limiting factor for mountain quail in eastern Oregon and western Idaho, as these populations tend to focus around riparian areas (USFWS 2003, 2014).

Distribution and Abundance

This species resides in southwestern British Columbia (on Vancouver Island), western and southern Washington, and central Idaho, south through Oregon to the mountains of California and northern and western Nevada to northern Baja California, Mexico (Gutiérrez and Delehanty 1999, NatureServe 2014).

Within the basin, mountain quail historically were widely distributed across the eastern two-thirds of Oregon, extreme southern Washington, and western Idaho (Figure 18-16) (Wisdom et al. 2000). The species is widely distributed in central Oregon, but only small, isolated, remnant populations occur within northeastern Oregon, central and southeastern Washington, and western Idaho (Wisdom et al. 2000).

Today, mountain quail in Idaho occur at the extreme northeastern edge of their rangewide distribution (Figure 18-17) (IDFG 2005, Wisdom et al. 2000, USFWS 2003). General information regarding the native distribution of mountain quail in Idaho is ambiguous; some evidence suggests mountain quail were present prior to European settlement (Vogel and Reese 2002, USFWS 2003). Mountain quail were successfully translocated into the state beginning in the late 1800s (USFWS 2003). Mountain quail are currently restricted to areas of west-central Idaho, with remnant populations in the Riggins area (IDFG 2005). The hunting season for mountain quail in Idaho was closed in 1984 (USFWS 2003).

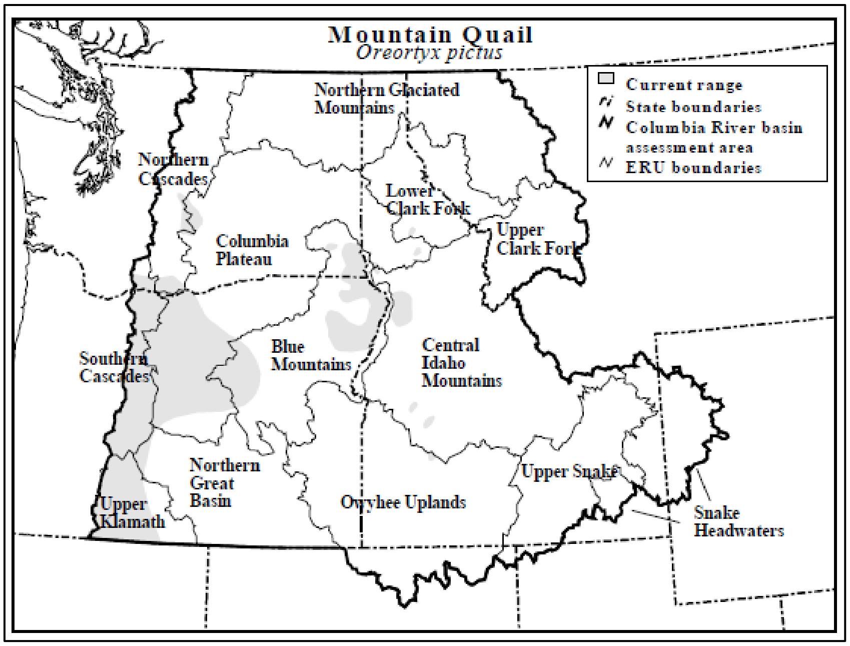

Figure 18-16. Species Range of Mountain quail in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

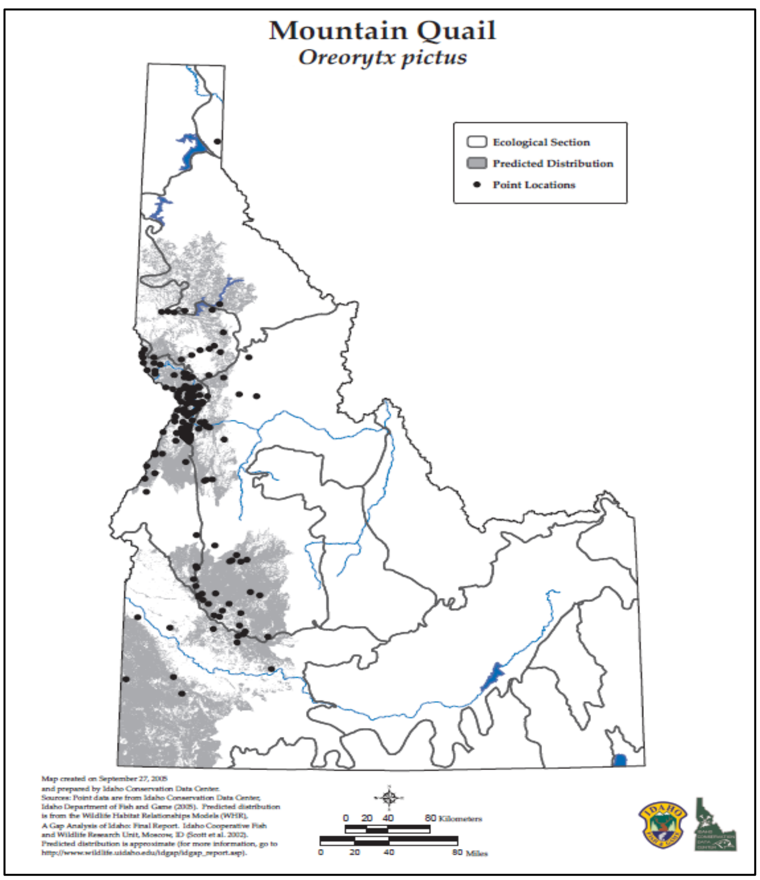

Figure 18-17. Mountain quail distribution in Idaho (IDFG 2005)

Population Trend

No known population trends exist for mountain quail in Idaho, other than the species has experienced a significant decline for the last 70 years (IDFG 2005, USDA Forest Service 2010). No population estimates exist for the Forests.

No Breeding Bird Survery (BBS) data exist for the state of Idaho (Sauer et al. 2014). BBS data are available for this species for the northern Rocky Mountains. Sauer et al. (2014) note a 5.5% decrease between 1966 and 2011, and a 5.4 % decrease between 2001and 2011. However, trend data are based on extremely small sample sizes and are not statistically significant because the number of detections are so low as to lend low credibility to the trends assigned for this species (USGS 2014). The BBS data for this species reflects data with the following important deficiencies:

- The regional abundance is less than 0.1 birds/route (very low abundance)
- The sample is based on less than 5 routes for the long term (very small samples)
- The results are so imprecise that a 5% per year change (as indicated by the half-width of the credible intervals) would not be detected over the long term (very imprecise)

Users should be aware that a variety of circumstances may lead to imprecise results. Imprecise results are sometimes a consequence of a failure of the models to converge in those local areas, even though the model performs adequately in larger regions (USGS 2014).

During the mid-20th century, the distribution and abundance of mountain quail east of the Cascade Range in Oregon showed significant declines. During the 1980s, populations in westcentral and southwestern Idaho steadily declined (USFWS 2003). Remaining populations occur in the lower Salmon River and Snake River drainages and the foothill and mountain areas of the Boise River drainage (IDFG 2005). A greater than 95% decline has occurred in occupied habitat in Idaho from 1938 to 1989, with remnant population strongholds occurring in the Riggins area (USFWS 2003, Vogel and Reese 2002).

In general, mountain quail are not well suited for trend monitoring using BBS protocols because mountain quail inhabit dense habitats and rugged terrain and populations can vary annually. Population surveys are difficult to conduct, and long-term population size and density studies are lacking (USFWS 2003).

Habitat and Ecology

Mountain quail are typically associated with forested habitats and shrub/grassland habitats (Wisdom et al. 2000, Johnson and O’Neil et al. 2001). Preferred habitat conditions contain shrub and herbaceous layers, often in interfaces between upland and riparian environments, including seeps and springs. Medium and large shrubs 0.61–5.03 m (2–16.5 feet) with dense cover are generally associated with this species’ habitat. Forbs and shrubs provide habitat for invertebrate prey species and produce seeds, fruits, bulbs, and tubers that are important food sources; fire can stimulate growth and development of these conditions, thus benefitting this species (USDA Forest Service 2010).

Source habitats for mountain quail include all structural stages, except stem exclusion, of interior Douglas-fir, interior ponderosa pine, and chokecherry–serviceberry–rose (Gutiérrez and

Delehanty1999, Wisdom et al. 2000). Source habitat is characterized by brushy slopes and shrub-dominated communities that range in elevation from 701 m to over 3,002 m (2,300 feet to over 9,850 feet). Mountain quail are most often associated with steep slopes or rugged terrain, but these characteristics are not always present in occupied habitat (Wisdom et al. 2000). Shrub-dominated habitats are important for protective cover when foraging, as well as for escape habitat, nesting habitat, and roosting and loafing (Gutiérrez and Delehanty1999).

Mountain quail are known for their seasonal movements between breeding and wintering areas. The quail typically breed at high elevations during spring and summer and avoid snow cover by migrating to lower elevations in groups called coveys (Resse et al. 2005). High-elevation aspen stands surrounded by sagebrush and shrubby riparian habitats associated with forests are also used (Wisdom et al. 2000). Fires can negatively affect source habitat in the short term but can promote growth and development of shrub habitats in the long term (Gutiérrez and Delehanty1999, Wisdom et al. 2000).

In Idaho, mountain quail distribution appears to be closely associated with riparian shrub habitats (Vogel and Reese 1995a,b; 2002). These areas, which may or may not have an associated forest canopy, typically occur along waterways and secondary drainages within a few hundred meters of water (Vogel and Reese 1995a,b; 2002). Habitat on south-facing slopes are arid and dominated by grasses, such as bluebunch wheatgrass and Idaho fescue, together with several species of forbs. In draws or on north-facing slopes, serviceberry, hawthorn, ninebark, snowberry, and wild rose are common. Moist sites have elderberry, alder (*Alnus* spp.), red-osier dogwood (*Cornus sericea*), and cottonwood, and higher elevation sites contain ponderosa pine and Douglas-fir (Vogel and Reese 1995a,b; 2002).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Gutiérrez and Delehanty1999, Wisdom et al. 2000, IDFG 2005, NatureServe 2014, NPCC 2004a and 2004b, Reese et al. 2005, Rich et al. 2004, USDA Forest Service 2010, Vogel and Reese 1995a, 1995b and 2002):

- The competitive exclusion by introduced game birds or food overlap between their young may be affecting the species
- Riparian habitat degradation due to grazing, road construction, and development in low-elevation habitats
- Irrigation withdrawals
- The establishment and spread of noxious weeds and invasive exotic plants in the Salmon River subbasin
- Reduction of intact riparian habitat with well-developed vegetation, usually with multiple canopy layers including overstory trees
- Conversion of native habitats to agricultural use and subdivisions

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Fringed Myotis—Myotis thysanodes

<u>Conservation Status</u>

ESA—No status

USFS—Sensitive in Regions 1 and Region 4

BLM—Regional/State inperiled (Type 3)

IDFG—Species of Conservation Concern (SGCN), protected non-game

NatureServe rankings: Rangewide: G4—ApparentlySecure

Statewide Idaho: S3B— Vulnerable breeding

ICBEMP Family 3, Group 26

NPCC Salmon Subbasin Assessment – Species of Concern

NPCC Clearwater Subbasin Assessment –Focal species

The fringed myotis is a moderately sized bat. Foraging behavior is highly specialized, gleaning insects from foliage. Prey species include beetles, harvestmen, crickets, spiders, and moths. This species may travel relatively long distances between roosting and foraging sites (Miller et al. 2005)

Distribution and Abundance

The fringed myotis occurs in western North America, from southcentral British Columbia south to Chiapas, Mexico, and east to the Black Hills of South Dakota (IDFG 2005). The fringed myotis occurs in the western half of the basin and in the Blue Mountains ERU (Figure 18-18) (Wisdom et al. 2000). Populations in Idaho occur in scattered localities in the northern and western parts of the state (Figure 18-19) (IDFG 2005).

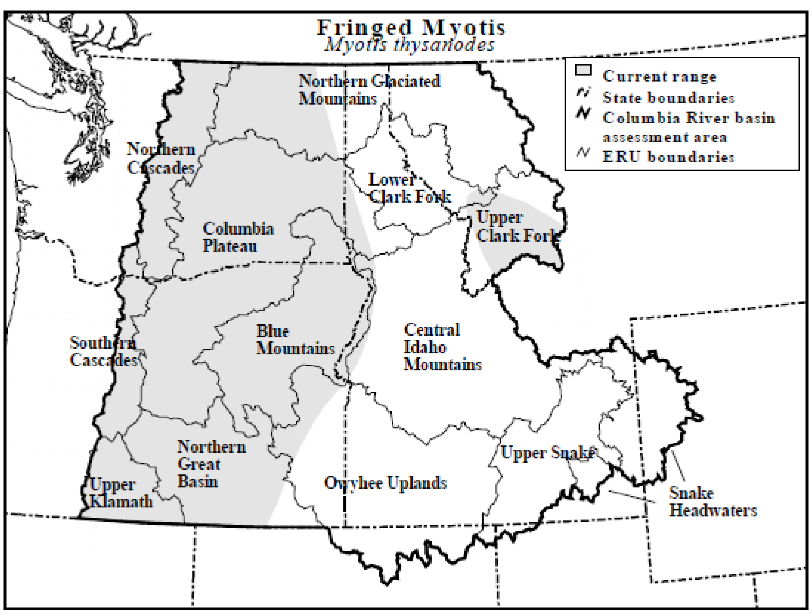

Figure 18-18. Species Range of Fringed myotis in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

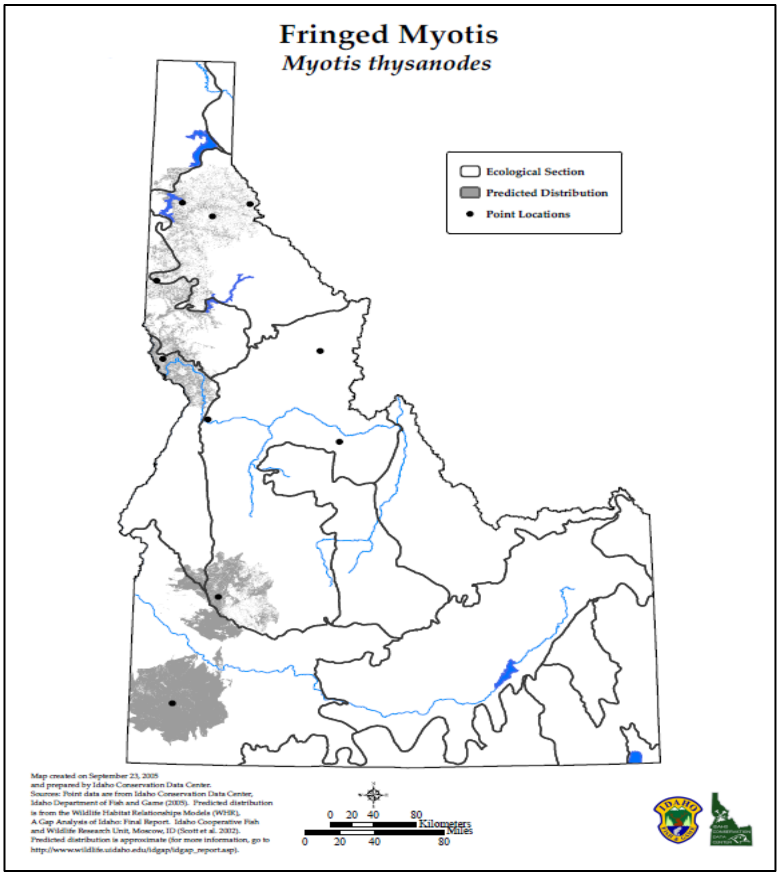

Figure 18-19. Fringed myotis distribution in Idaho (IDFG 2005)

Population Trend

The current population trend in Idaho is unknown (IDFG 2005).

Habitat and Ecology

In Idaho, the fringed myotis is associated with grasslands, xeric shrublands, ponderosa pine forests, Douglas-fir forests, mixed xeric forests, Utah juniper (*Juniperus osteosperma*), western juniper (*Juniperus grandis*), and pinyon-juniper forests. Xeric habitats, including grasslands, deserts, chaparral, desert scrub, woodland habitats, ponderosa pine and pinyon-juniper habitats, seem to be inhabited by the fringed myotis (Miller et al. 2005).

Roost trees tend to be large-diameter snags in early-to-medium stages of decay. Within the roost, individuals select open sites (O'Farrell 1999). Roosts may be abandoned in response to human disturbance. Maternity colonies, day roosts, and night roosts are found in caves, buildings, underground mines, rock crevices, tree hollows, and bridges. Conversely, hibernacula have only been located in buildings and underground mines (Miller et al. 2005). Large trees and snags for roosting habitat are a critical habitat component for the fringed myotis in interior forests (NPCC 2003).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Bull et al. 1997, IDFG 2005, Miller et al. 2005, NPCC 2003 and 2004a, Perry 2013, Spanjer and Fenton 2005, Wisdom et. al. 2000):

- The destruction of roosting structure, closure of mines and caves for safety reasons, and snag loss
- The disturbance of roosting bats, primarily by recreational activities in or near caves but also from mining, road construction, and any other activities near roosts
- Potential introduction of White-Nosed Syndrome disease to hibernacula
- The purposeful killing of roosting bats
- Reduction in the bat prey base (insect) through excessive use of insecticides
- Loss of preferred microenvironments for the bat prey base. Changes in forest structure, composition and function could negatively affect prey (insect) populations.

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Townsend's Big-eared Bat—Corynorhinus townsendii townsendii and Corynorhinus townsendii pallescens

Conservation Status

ESA: No status

USFS: Sensitive in Regions 1 and Region 4

BLM: Regional/State inperiled (Type 3)

IDFG: Species of Conservation Concern (SGCN), protected non-game

NatureServe rankings: Rangewide: G4—ApparentlySecure

Statewide Idaho: S3B—Vulnerable breeding

ICBEMP Family 3, Group 27

NPCC Clearwater Subbasin Assessment—Focal species

NPCC Salmon Subbasin Assessment—Species of Concern

Townsend's big-eared bat is a lepidopteran specialist, with a-diet consisting of >90% moths. In addition to lepidopterans, small quantities of other insects have been detected in studies of their diet. Townsend's big-eared bat is a slow-flying (2.9-5.5 m/sec), highly maneuverable bat that has been observed gleaning insects from vegetation and foraging within tree canopies (IDFG 2005, Pierson et al. 1999). Townsend's big-eared bat is a late flyer, emerging from the roost primarily after dark (Pierson et al. 1999).

Distribution and Abundance

Townsend's big-eared bat occurs throughout the interior northwest (Figure 18-20) and is distributed from the southern portion of British Columbia, south along the Pacific coast to central Mexico and east into the Great Plains, with isolated populations occurring in the central and eastern United States (IDFG 2005, Pierson et al. 1999, Wisdom et al. 2000).

Most of the state of Idaho is a zone of intergradation between *C. t. townsendii* and *C. t. pallescens* (Pierson et al. 1999) (Figure 18-21). Two subspecies reportedly occur in Idaho. The subspecies *P. townsendii pallescens* occurs in the eastern part of the state. The subspecies *P. townsendii townsendii* is expected to occur in the western part of the state, although range limits for this subspecies are not well understood (Figure 18-21) (IDFG 2005).

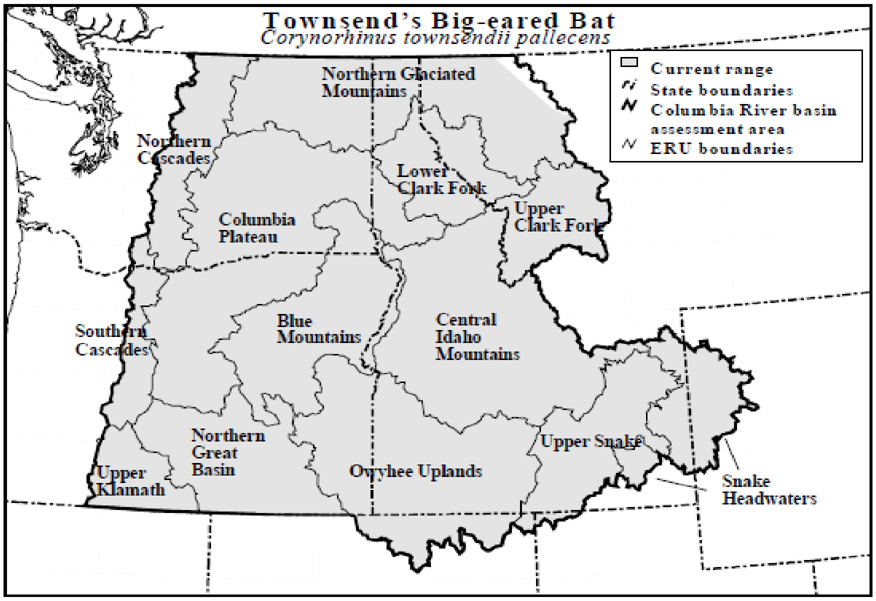

Figure 18-20. Species Range of Townsend's big-eared bat in the Interior Columbia River Basin (Wisdom et al. 2000, Volume 2)

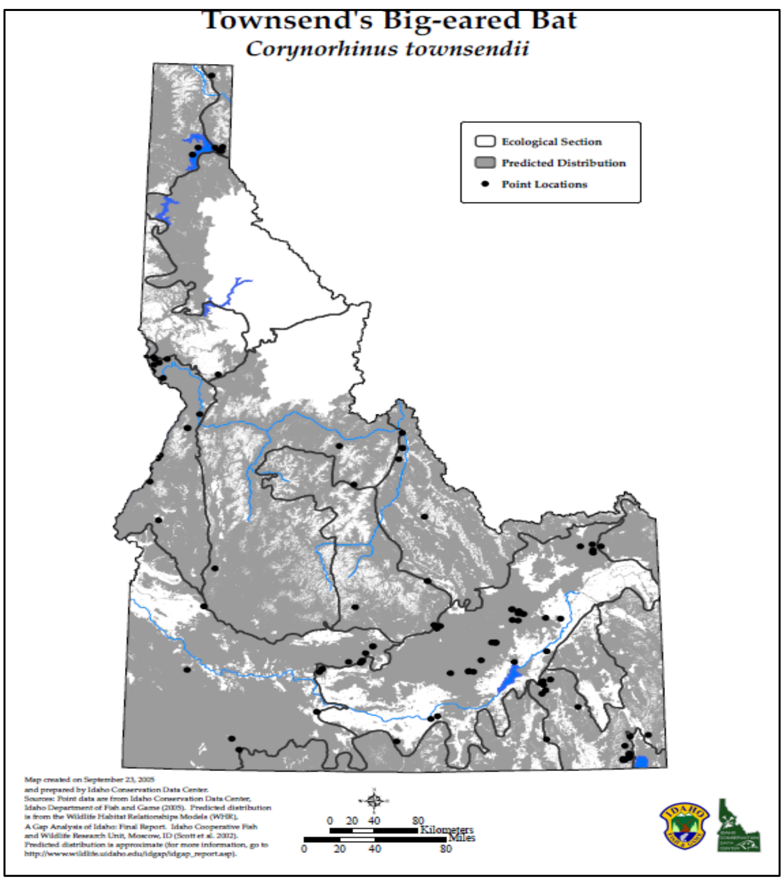

Figure 18-21. Townsend's big-eared bat distribution in Idaho (IDFG 2005)

Population Trend

Populations in the state appear to be declining (IDFG 2005).

Habitat and Ecology

Habitat associations include coniferous forests, mixed meso-phytic forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types (Wisdom et al. 2000). Radio-tracking studies have found Townsend's big-eared bat foraging in a variety of habitats, ranging from edge habitats (along intermittent streams) and open areas (pastures, crops, native grass) near wooded habitat to within forested habitat, and along heavily vegetated stream corridors (IDFG 2005, Pierson et al. 1999).

Source habitats were historically widespread across the basin. Watersheds with increasing trends include the Blue Mountains and Central Idaho Mountains ERUs (Wisdom et al. 2000).

Although the species occurs in a wide variety of habitats, its distribution tends to be geomorphically determined and is strongly correlated with the availability of caves or cave-like roosting habitat (e.g., old mines). Population concentrations occur in areas with substantial surface exposures of cavity-forming rock (e.g., limestone, sandstone, gypsum, or volcanic), and in old mining districts (IDFG 2005, Pierson et al. 1999). In Idaho, the largest known populations are associated with lava flows in the southwestern part of the state (IDFG 2005).

Big-eared bats do not roost in crevices like many other bat species but rather restrict their roosting sites to the ceilings of cavelike structures (caves, mines, and buildings), where they aggregate in large colonies (Wisdom et al. 2000). In some areas, particularly along the Pacific Coast, big-eared bats been found in old, mostly abandoned, buildings with cave-like attics and other man-made structures (e.g., water diversion tunnels and bridges). Townsend's big-eared bat is a relatively sedentary species for which no long-distance migrations have been reported (Pierson et al. 1999).

The seasonal and daily roosting patterns of Townsend's big-eared bat follow those observed for many other temperate zone bat species. The most significant roosts (i.e., those having the largest aggregations and those most critical to the survival of populations) are the winter hibernacula (both sexes) and the summer maternity roosts (entirely adult females and their young). Additionally, other types of are roosts used by bats: those used in the day time by males and nonreproductive females (usually containing no more than a few animals per roost); night roosts (generally at a different site than the day roost) used by both sexes as a place to rest and digest food during the night; and interim roosts (sites used in the spring before the young are born and in the fall before moving to hibernating sites) (Pierson et al. 1999).

This species has a high degree of site fidelity.Research has noted that the bats remained at or returned to the same banding site in subsequent winters. Pierson et al. (1999) noted that 73%–77% of the adult females returned to the same maternity roost each year. It also appears, however, that a number of colonies use multiple roosts. They may shift roosts as the season progresses, either to different localities within one structure or to different structures.

Townsend's big-eared bat is a colonial species with relatively restrictive roost requirements (Pierson et al. 1999). Unlike many species that seek refuge in crevices, Townsend's big-eared bat forms highly visible clusters on open surfaces (e.g., domed areas of caves or ceilings of old barns), making them extremely vulnerable to disturbance (Pierson et al. 1999). Maternity roosts in the eastern United States occur exclusively in caves, while those in the West are found in caves and a variety of human-made structures such as mines and old buildings (Pierson et al. 1999).

Hibernating Townsend's big-eared bat individuals have been found mainly in caves and mines. Winter roosting behavior for hibernating Townsend's big-eared bat varies throughout its distribution. Large aggregations have also been found in colder areas of the western United States (e.g., 460 were found in a cave in northern California) [Pierson et al. 1999], 1,000 in a cave in South Dakota, >300 at 2 sites in Oregon, and 400 in a lave-tube cave in southern Idaho [Pierson et al. 1999]).

Studies in the western United States have shown that Townsend's big-eared bat selects roosts with stable, cold temperatures and moderate airflow. Individuals roost on walls or ceilings, often near entrances. If undisturbed, individuals will frequently roost <3 m off the ground, and have been found in air pockets under boulders on cave floors (Pierson et al. 1999). Temperature appears to be a limiting factor in roost selection as individuals appear to be sensitive to changes in temperature and humidity. Recorded temperatures in hibernacula range from –2.0 °C to 13.0 °C, with temperatures below 10 °C being preferred (Pierson et al. 1999).

Because the distribution of Townsend's big-eared bats depends on specialized roosting requirements, alterations and disturbances of any structures used for day roosts, nursery colonies, or hibernacula (caves, mines, old buildings) could affect the persistence of individual colonies (IDFG 2005, Pierson et al. 1999, Wisdom et al. 2000).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (IDFG 2005, NPCC 2003 and 2004, Perry 2013, Pierson et al. 1999, Spanjer and Fenton 2005, Wisdom et al. 2000):

- The destruction of roosting structure, removal of old buildings, or closure of mines and caves for safety reasons
- The disturbance of roosting bats, primarily by recreational activities in or near caves but also from mining, road construction, and any other activities near roosts
- Potential introduction of White-nosed Syndrome disease to hibernacula
- The purposeful killing of roosting bats
- Reduction in the bat prey base (moths) through excessive use of insecticides
- Loss of preferred microenvironments for the bat prey base. Changes in forest structure, composition and function could negatively affect prey (moths) populations.

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California Myotis—Myotis californicus

<u>Conservation Status</u>
ESA: No status
USFS: No status
BLM: Regional/State inperiled (Type 3)
IDFG: Species of Conservation Concern (SGCN), protected non-game
NatureServe rankings: Rangewide: G4 - ApparentlySecure
Statewide Idaho: S3B— Vulnerable breeding
ICBEMP Family 3, Group 17
NPCC Salmon Subbasin Assessment – Species of Concern

California myotis is the smallest *Myotis* species in America. The species uses a variety of habitats for foraging and roosting, and often forage in forested areas near water (Miller et al. 2005).

Distribution and Abundance

This bat occurs in western North America from British Columbia south to Guatemala (Figure 18-22). The Idaho distribution is scattered and incompletely understood (Figure 18-23) (IDFG 2005, Miller et al. 2005). Most authorities consider the species to occur in the northern and extreme western parts of the state, but scattered records suggest that the species may occur statewide (IDFG 2005).

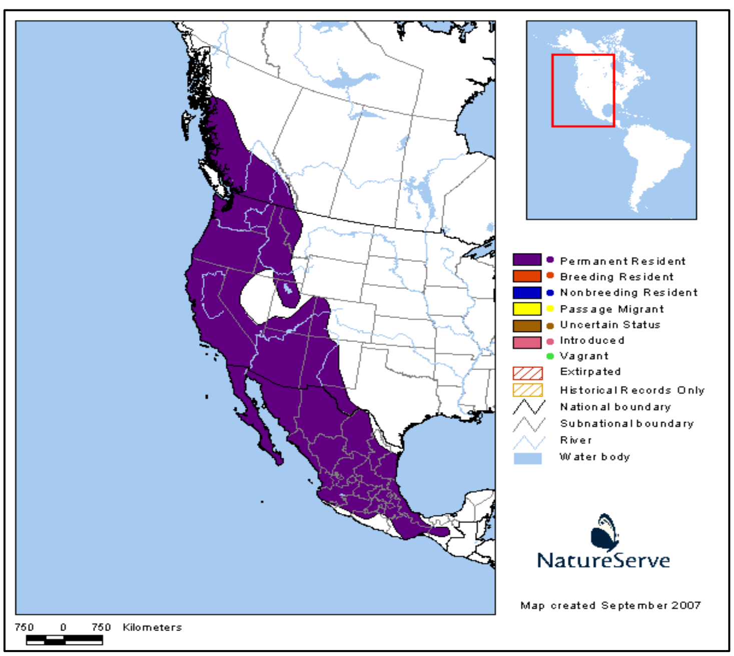

Figure 18-22. Species Range of California myotis in the Interior Columbia River Basin (NatureServe 2014)

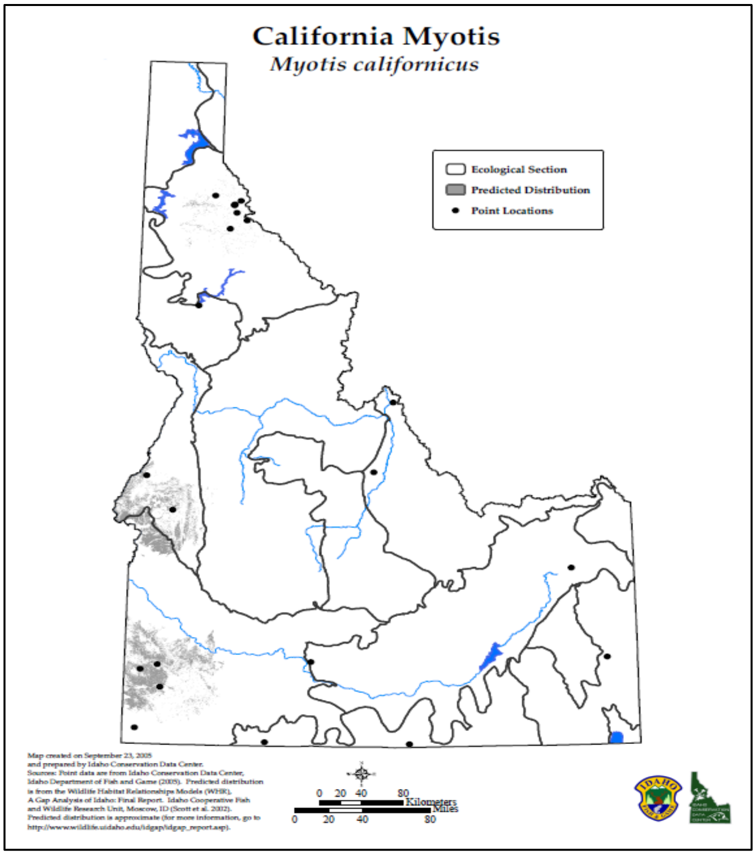

Figure 18-23. California myotis distribution in Idaho (IDFG 2005)

Population Trend

Population trends in Idaho are unknown (IDFG 2005).

Habitat and Ecology

The California myotis is found in a variety of habitats in Idaho, including grasslands, juniper forests, forested riparian areas, and exposed rock/barren land cover types. Roost sites include caves, mines, rocky hillsides, sloughing tree bark, and buildings (Miller et al. 2005). Buildings and bridges are also major roost types, and individuals are found under loose tree bark (IDFG 2005).

When foraging, this species is active within the first 2 hours of nightfall and often forage near water. Its foraging strategy consists of locating and feeding on concentrations of insects where its slow maneuverable flight allows it to capture several insects in quick succession over a short distance (Miller et al. 2005).

Maternity colonies form in the spring and a single pup is born in June or July, becoming volant after 1 month. Maternity colonies have been reported in large-diameter, intermediate-stage snags (Miller et al. 2005). In winter, small clusters of individuals have been found roosting in caves, mines, and buildings. However, this bat is active in the winter, even at temperatures well below freezing (Miller et al. 2005).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources. (Bull et al. 1997, IDFG 2005, Miller et al. 2005, NPCC 2004a, Perry 2013, Spanjer and Fenton 2005, Wisdom et. al. 2000):

- The destruction of roosting structure, closure of mines and caves for safety reasons
- Mine reclamation is a threat to roosting habitat.
- Timber harvest practices that remove large-diameter snags could be detrimental to maternity colonies and local populations
- The disturbance of roosting bats, primarily by recreational activities in or near caves but also from mining, road construction, and any other activities near roosts
- Introduction of White-nosed Syndrome disease to hibernacula
- The purposeful killing of roosting bats
- Reduction in the bat prey base (insect) through excessive use of insecticides
- Loss of preferred microenvironments for the bat prey base. Changes in forest structure, composition and function could negatively affect prey (insect) populations.

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Coeur d'Alene salamander—Plethodon idahoensis

Conservation Status
ESA: No status
USFS: Sensitive in Region 1
BLM: Regional/State inperiled (Type 3)
IDFG: Species of Conservation Concern (SGCN), protected non-game
NatureServe rankings: Rangewide: G4—ApparentlySecure
Statewide Idaho: S3B—Vulnerable breeding
ICBEMP Family 3, Group 17
NPCC Clearwater Subbasin Assessment—Focal Species

The Coeur d'Alene salamander is an amphibian that inhabits northern ldaho, northwestern Montana, and south-eastern British Columbia. It is the sole lungless salamander (*Plcthodontidae*) of the northcm Rocky Mountains (Wilson and Larsen 1998).

The primary reason that this species is an SCC is the clear risk posed by human-related disturbances to specific sites. In addition, no habitat parameters could be used to develop a model; therefore, the amount and distribution of predicted habitat has been not modeled using the SIMPPLLE process. Best available science has documented the management risks and strategies to manage for this species.

Distribution and Abundance

The Coeur d'Alene salamander occurs in forested, mountainous regions on either side of the Idaho–Montana border, from just north of the Canadian border south through the Selway River drainage (Figure 18-24). In Idaho, it is most readily encountered in the drainages of the St. Joe River and North Fork Clearwater River (Figure 18-25) (Wilson 1990).

The North Fork Clearwater River drainage is the core distribution area for Coeur d'Alene salamanders in the Clearwater River subbasin, and the Selway River drainage is the southern limit of their known range (Figure 18-25) (IDFG 2005). Many populations are small, isolated communities with little genetic influx from other populations, and high temperatures and lack of moisture likely limit distribution of the species (NPCC 2003).

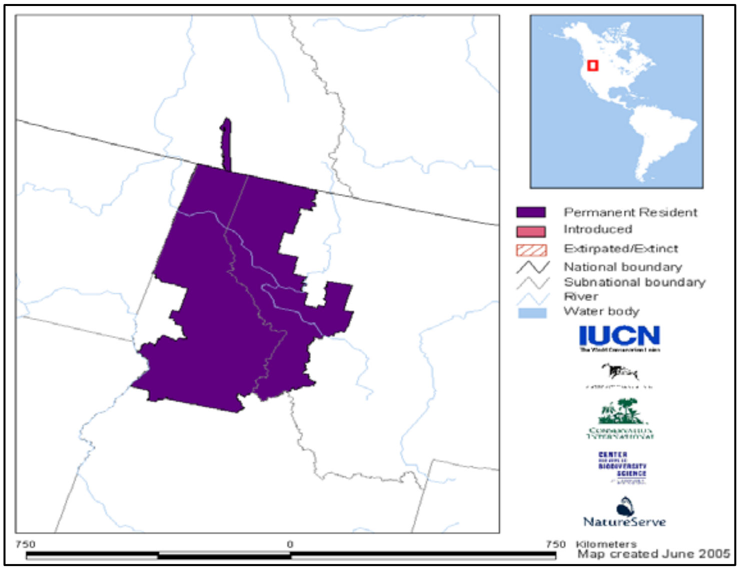

Figure 18-24. Species Range of Coeur d'Alene salamander in the Interior Columbia River Basin (NatureServe 2014)

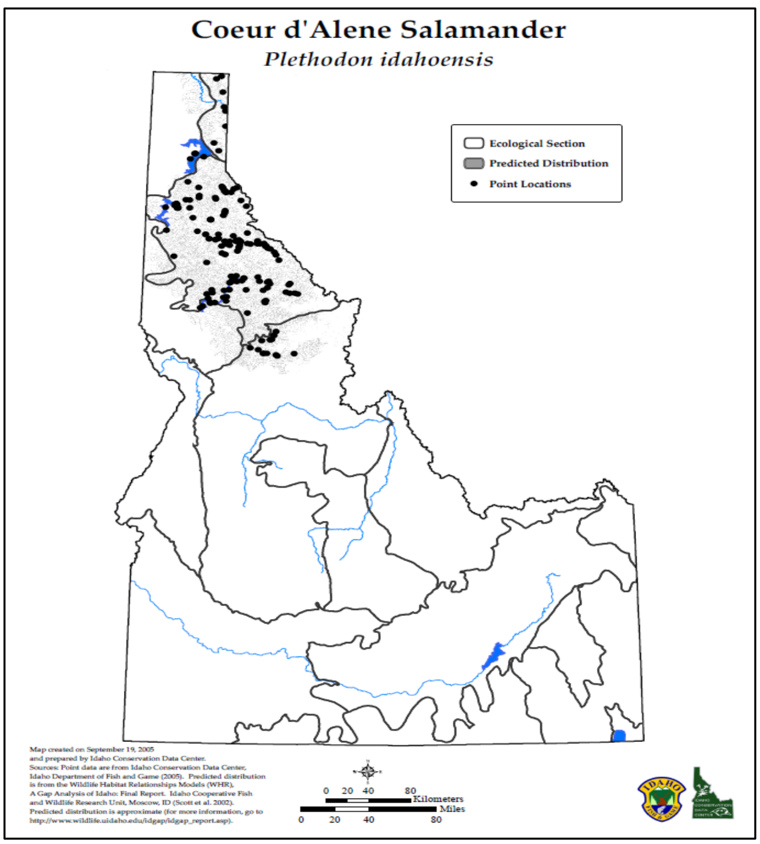

Figure 18-25. Coeur d'Alene salamander distribution in Idaho (IDFG 2005)

Population Trend

Population trends in Idaho and habitat threats are uncertain (IDFG 2005). Populations occur in small patches of suitable habitat and, thus, metapopulation dynamics may be important for maintaining population viability. However, population dynamics and dispersal patterns are poorly understood (IDFG 2005).

Habitat and Ecology

The Coeur d'Alene salamander is usually associated with riparian corridors along streams and seepages, splash zones, and streamsides near talus, but may also be found in talus away from water if the site is located on a protected north-facing slope. The Coeur d'Alene salamander occurs in harsher and colder climates than other related salamanders because of their close association with spring water. Seeps offer a stable habitat temperature and a high local humidity that allow Coeur d'Alene salamanders to extended foraging opportunities during cold or dry weather. The salamanders can also be found under forest litter, bark, or logs (Cassirer et al. 1994, IDFG 2005, NPCC 2003)

The main prey species of the Coeur d'Alene salamander are aquatic insects such as *Diptera* (larvae and adults) and *Collembola*. These benthic insects are probably caught at the water's edge when they move onto dry land to molt (Wilson and Larson 1988).

Management Issues

The following issues have been identified as a starting point for integrating potential resource objectives for this species and its source habitat with broader, ecosystem-based objectives for other resources (Cassirer et al. 1994, IDFG 2005, Nez Perce tribe 2011, NPCC 2003, Wilson and Larson 1988):

- Chemical pollution from mining, pesticide application, or road maintenance (e.g., application of substances used for dust control or road surfacing)
- Flow alteration caused by water diversion or impoundment
- Sedimentation arising from timber harvest, mining, road maintenance and improvements, trail construction, and recreational activities
- Direct impacts from road maintenance and improvements at occupied sites adjacent to roads
- Introduction of nonnative predators or competitors

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18.1.3 *Habitat Characterizations*

18.1.3.1 Broad-scale (Basin Level): Interior Columbia River Basin Ecosystem Management Project

The ICBEMP was chartered, in part, to develop an overall assessment of ecosystems within the interior Columbia River basin (Figure 18-26), to determine their status and trend, and to describe the ecological risks and opportunities associated with federal management activities. The Forests are contained within the eastcentral ICBEMP area in northcentral Idaho (Figure 18-26).

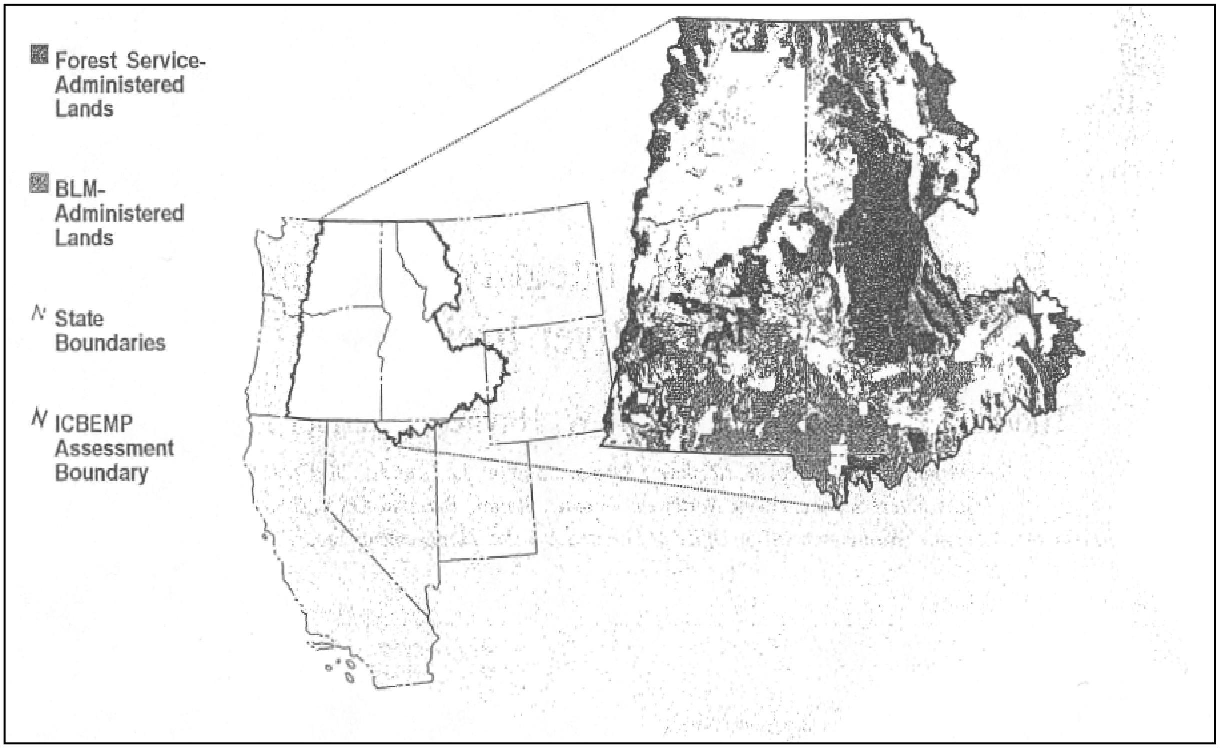

Figure 18-26. Interior Columbia Basin Ecosystem Management Project Area

Wisdom et al. (2000) identified a variety of wildlife species closely associated with habitat conditions affected by land management. Wisdom et al. (2000) identified species associated with broad-scale terrestrial vegetation community types that were grouped into Families, and to assessed changes in those habitats from historical to current periods. Several of these species/habitat "Families" are present in the planning area of the Nez Perce–Clearwater National Forests. However, some of the wildlife species associated with some habitat conditions better overlap with each other at a finer scale than the ICBEMP assessment.

Ecological Reporting Units and Trends

Wisdom et al. (2000) used and identified 13 ERUs as smaller units of measurement within the Interior Columbia River Basin (Figure 18-27).

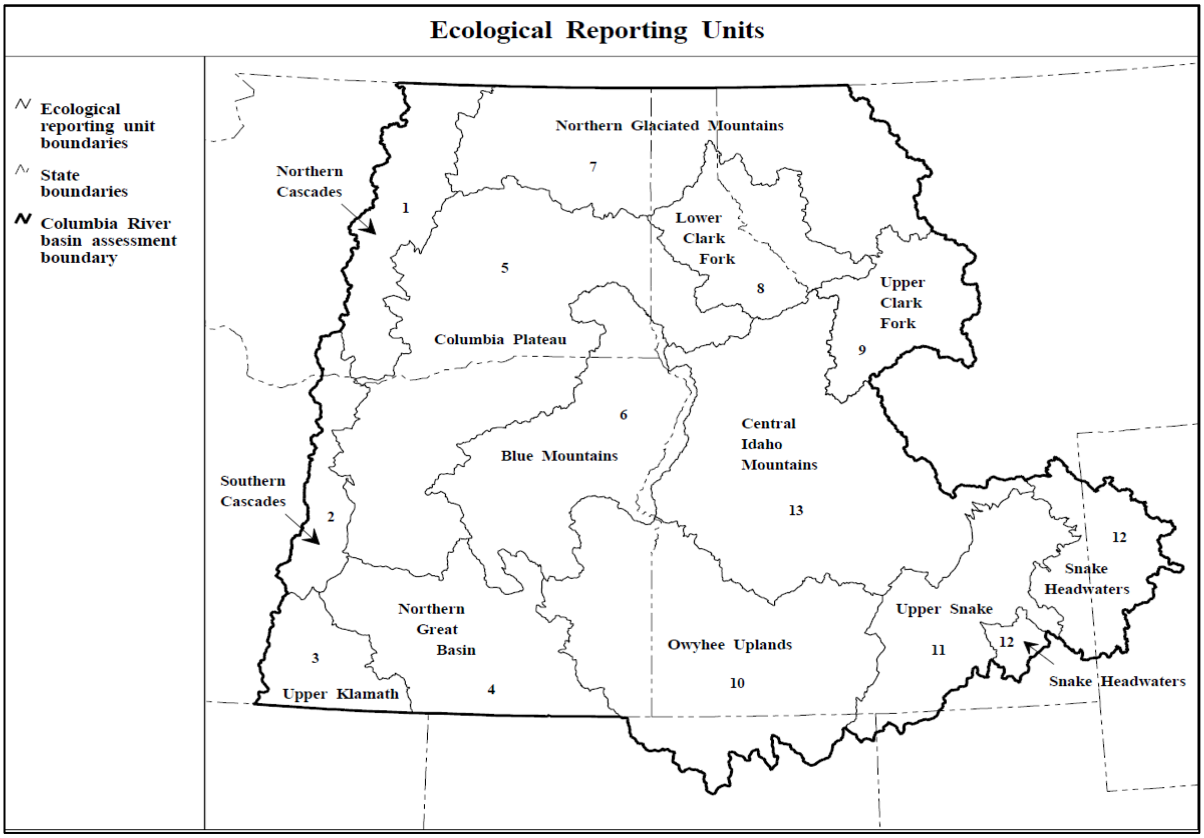

Figure 18-27. Ecological Reporting Units (ERUs)

For each of the 12 families, the ICBEMP summarized the change in percentage of area of source habitats from historical to current periods for each ERU. Each watershed was assigned to one of three trends: increasing, decreasing, or neutral. Dominant trends were summarized by family and ERU based on the percentage for each family. Table 18-3 shows the trends for the four ERUs covering all or portions of the planning area

The majority of the planning area is contained within the Central Idaho ERU 13 and Lower Clark Fork ERU 8 (Idaho portion). However, portions of the Forests are located in two other ERUs. The eastern-most extent of the Blue Mountains (ERU 6) occurs in the southwestern portion of the Forests in the lower Salmon River Canyon area. The Palouse Ranger District portion of the Forests is located within the eastern-most portion of the Columbia Plateau (ERU 5).

Table 18-3. Percentage of Watersheds (5th Hydrologic Unit Code [HUC]) in Three Trend Categories by relevant Terrestrial Habitat Family (Wisdom et al. 2000)

Ecological Reporting Unit Name and Number	Terrestrial Habitat Family		Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
	Family	Related SCC Species	Decreasing	Neutral	Increasing	
Columbia Plateau—ERU 5	1	White headed woodpecker Pygmy nuthatch Lewis' woodpecker	51	19	31	Decreasing
	2	Fisher Flammulated owl Boreal owl American three-toed woodpecker	44	10	46	Neutral
	7	California myotis Fringed myotis Townsend's big-eared bat	47	29	24	Neutral
Blue Mountains—ERU 6	1	White-headed woodpecker Pygmy nuthatch Lewis' woodpecker	67	20	13	Decreasing
	2	Fisher Flammulated owl Boreal owl American three-toed woodpecker	47	17	36	Neutral
	3	Mountain quail	7	15	78	Increasing
	5	Bighorn sheep	34	48	17	Neutral
	7	California myotis Fringed myotis Townsend's big-eared bat	23	46	31	Neutral
Lower Clark Fork—ERU 8	1	Pygmy nuthatch	95	4	1	Decreasing
	2	Fisher Flammulated owl Boreal owl American three-toed woodpecker	89	8	3	Decreasing
	7	California myotis Fringed myotis Townsend's big-eared bat	55	37	8	Decreasing

Ecological Reporting Unit Name and Number	Terrestrial Habitat Family		Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
	Family	Related SCC Species	Decreasing	Neutral	Increasing	
Central Idaho Mountains—ERU 13	1	White-headed woodpecker Pygmy nuthatch Lewis' woodpecker	57	33	10	Decreasing
	2	Fisher Flammulated owl Boreal owl American three-toed woodpecker	43	22	35	Neutral
	3	Mountain quail	21	48	31	Neutral
	5	Bighorn sheep	18	52	30	Neutral
	7	California myotis Fringed myotis Townsend's big-eared bat	34	36	30	Neutral

Note: Percentages may not add up to 100% due to rounding.
[a]ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See "Forming Families of Groups to Summarize Results among Multiple Groups" in "Methods" section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.

Broad-scale Wildlife Habitat Families

Wisdom et al. (2000) used and identified families of species groups to complete a hierarchical system evaluating the similarities of groups of species into clusters comprising 12 families using generalized vegetative themes. Table 18-4 displays this clustering of broad-scale species groups into 12 vegetative families. Table 18-4 also discloses the Nez Perce–Clearwater National Forests SCC representation in each ICBEMP Family.

Table 18-4. Interior Columbia Basin Ecosystem Management Project (ICBEMP) Families and Species of Conservation Concern (SCC) representation

Family	Terrestrial Family Name	Nez Perce-Clearwater National Forests SCC
1	Low-elevation old forest	3 species
2	Broad-elevation old forest	4 species
3	Forest mosaic	1 species
4	Early-seral montane and lower montane	No species
5	Forest and range mosaic	1 species
6	Forests, woodlands, and montane shrubs	No species
7	Forests, woodlands, and sagebrush	3 species[a]
8	Rangeland and early- and late-seral forest	No species
9	Woodland	No species
10	Range mosaic	No species
11	Sagebrush	No species
12	Grassland and open-canopy sagebrush	No species

Note: No ICBEMP representation for Coeur d'Alene salamander
[a]California myotis not listed in ICBEMP but added to be part of Family 7 which contains all bats.

At the broad-scale, Wisdom et al. (2000) defined Families, the causes of habitat change, and the issues and strategies for conservation. The findings for Families 1–3, 5, and 7 relevant to the Nez Perce-Clearwater National Forests, are summarized below.

Family 1

All species in Family 1 are associated with late-seral, lower-montane, multi- and single-story forests as source habitats as defined by Wisdom et al. (2000). Some Family 1 species also use large and old forest cover types in the upper montane, riparian woodlands, and upland woodlands community groups. Species of Family 1 are primarily restricted to lower elevation, interior Douglas-fir and ponderosa pine forests. All species in this habitat category utilize large-diameter (>53 cm [21 inches] d.b.h.) snags or trees with cavities for nesting, foraging, or both (Wisdom et al. 2000).

Historically, source habitats for Family 1 occurred in all 13 ERUs in the Interior Columbia Basin (e.g., basin). However, these habitats typically composed <25 percent of most watersheds. Declines in Family 1 source habitats are among the most widespread and strongest of any declines observed for any set of species analyzed by Wisdom et al. (2000). Today, source habitats for Family 1 still occur in all 13 ERUs but are particularly scarce within six ERUs, including the Lower Clark Fork ERU within the planning area (Table 18-5).

Table 18-5. Percentage of Watersheds (5th Hydrologic Unit Code [HUC]) in Three Trend Categories for Family 1, by Ecological Reporting Unit (Wisdom et al. 2000)

Ecological Reporting Unit		Number of Watersheds	Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
#	Name	Total	Decreasing	Neutral	Increasing	
5	Columbia Plateau	437	51	19	31	Decreasing
6	Blue Mountains	252	67	20	13	Decreasing
8	Lower Clark Fork	119	95	4	1	Decreasing
13	Central Idaho Mountains	372	57	33	10	Decreasing

Note: Percentages may not add up to 100% due to rounding.
[a] ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See “Forming Families of Groups to Summarize Results among Multiple Groups” in “Methods” section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.

The importance of habitat restoration for Family 1 species is highlighted by the magnitude of the declines. Basin-wide, the current extent of late-seral single-storied lower montane forests represents an 81% decline from the historical areal extent, and the extent of multistoried forests represents a 35% decline (Hann et al. 1997 in Wisdom et al. 2000). In the planning area, these declines were particularly pronounced in the Lower Clark Fork ERU, where nearly 100% of these community types have been lost (Hann et al. 1997 in Wisdom et al. 2000). The Blue Mountains, Central Idaho Mountains, and Columbia Plateau ERUs also had decreasing trends, with each of these ERUs having a substantial percentage of watersheds with declining trends: 67% in the Blue Mountains, 57% in the Central Idaho Mountains, and 51% in the Columbia Plateau (Table 18-5).

Wisdom et al. (2000) identified the following management issues that apply to Family 1 species, inclucing the white-headed-woodpecker, Lewis’s woodpecker, and pygmy nuthatch:

- Basin-wide decline, or loss, of late-seral ponderosa pine and large (>53 cm [21 in] overstory trees and snags
- Declines in shrub and herb understories of montane and lower montane forests in response to increased density of small trees and downed wood, litter, and duff
- Fragmentation of lower-elevation landscape patterns
- Exclusion of light surface or underburn fires that occurred frequently and extensively
- Broad-scale shift of Family 1 habitats to environments with warmer than average temperatures

Wisdom et al. (2000) identified the following conservation strategies that apply to Family 1 species, inclucing the white-headed-woodpecker, Lewis’s woodpecker, and pygmy nuthatch:

- Retain stands of ponderosa pine where old-forest conditions are present, and manage to promote their long-term sustainability through the use of prescribed burning and understory thinning
- Identify mid-seral stands that could be brought into old-forest conditions in the near future and use appropriate silvicultural activities to encourage this development

- As a short-term strategy, retain all large-diameter (>53 cm [21 in] d.b.h.) ponderosa pine, cottonwood, Douglas-fir, and western larch snags, preferably in clumps, and provide opportunities for snag recruitment throughout the montane and lower montane communities
- Rejuvenate and enhance shrub and herb understory of lower montane community groups (old-forest ponderosa pine) in the Lower Clark Fork and Blue Mountains ERUs. Minimize mechanized harvest and site-preparation activities that increase susceptibility to exotic and noxious weed invasion, soil erosion, or high densities of tree regeneration.
- Close and restore excess roads to reduce fragmentation of landscapes by roads. Use thinning to repattern landscapes to a more native condition. Where natural process areas occur, prioritize road closures and restoration in adjacent watersheds to increase the interior core of habitats with native patterns.
- Continue a strategy of wildfire suppression of stand-replacing fires except where such fires would benefit habitat for Lewis' woodpecker. Use prescribed fire, timber harvest, and thinning to change forest composition and structure to reduce risk of stand-replacing wildfires and shift to maintenance with prescribed underburn fires.

Family 2

All species in Family 2 are associated with late-seral, lower-montane, multi- and single-story forests as source habitats as defined by Wisdom et al. (2000). Some Family 2 species also use late-seral stages of the subalpine, lower montane, or both community groups. All identified species in this habitat category utilize large-diameter snags, down logs, and hollow logs for nesting, denning, and/or foraging to meeting life-cycle needs. Down logs, lichens, and fungi of late-seral forests provide habitat for many prey species. High-elevation, stand-replacing wildfires and other beetle-infested stands provide high concentrations of prey (wood-boring beetles) for three-toed woodpeckers (Wisdom et al. 2000).

Source habitats for Family 2 overlap those of Family 1 but encompass a broader array of cover types and elevations (Wisdom et al. 2000).

In Family 2, 15 species depend on snags for nesting or foraging, 4 of these species also use down logs to meet life requisites and 4 species also use large, hollow trees (Wisdom et. al. 2000). Down logs, lichens, and fungi of late-seral forests provide habitat for prey species of flammulated owl, boreal owl, and fisher (Reynolds et al. 1992, Hayward 1994). Stand-replacing, large burns and beetle-infested stands provide high concentrations of prey (wood-boring beetles) for three-toed woodpeckers (USDA 2004). The juxtaposition of early- and late-seral stages is needed to meet all aspects of life functions for bats and owlsl, identified as contrast species (Wisdom et al. 2000). Late-seral source habitats used by fisher and boreal owl, however, may be negatively affected by increased fragmentation brought about by juxtaposing their need for late-seral habitats with early-seral habitats (Jones and Garton1994, Hayward 1994). The negative response of fisher and boreal owl to juxtaposition of their source habitats with forest openings versus the positive response of bat and other species to these same conditions must be considered when managing the spatial arrangement of early and late-seral habitats for Family 2 species.

Source habitats for Family 2 declined in most watersheds. Basin-wide, 59% of watersheds exhibited declining trends, 28% increased, and the remaining 13% were neutral (Table 18-6). Watersheds with declining trends were concentrated in the northern part of the basin and the Snake River drainage, those with increasing trends were mostly in the southcentral and southwestern areas of the basin.

In relation to the planning area the Lower Clark Fork ERUs had declining trends in >50% of the watersheds (Table 18-6). The Blue Mountains, Central Idaho Mountains, and Columbia Plateau ERUs had predominantly neutral trends, but nevertheless, each of these ERUs had a substantial percentage of watersheds with declining trends: 47% in the Blue Mountains, 43% in the Central Idaho Mountains, and 44% in the Columbia Plateau (Table 18-6).

Although source habitats for Family 2 declined in most watersheds, not all species-level trends for members of Family 2 exhibited a declining trend. One exception is the three-toed woodpecker (Wisdom et al. 2000). Source habitats for the three-toed woodpecker exhibited positive trends primarily due to increased wildfire activity because past fire suppression altered historical fire activity (Wisdom et al. 2000, Nez Perce Tribe 2011).

Table 18-6. Percentage of Watersheds (5th Hydrologic Unit Code [HUC]) in Three Trend Categories for Family 2, by Ecological Reporting Unit (Wisdom et al. 2000)

Ecological Reporting Unit		Number of Watersheds	Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
#	Name	Total	Decreasing	Neutral	Increasing	
5	Columbia Plateau	437	44	10	46	Neutral
6	Blue Mountains	252	47	17	36	Neutral
8	Lower Clark Fork	119	89	8	3	Decreasing
13	Central Idaho Mountains	372	43	22	35	Neutral

Note: Percentages may not add up to 100% due to rounding.
[a] ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See "Forming Families of Groups to Summarize Results Among Multiple Groups" in "Methods" section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.

Wisdom et al. (2000) identified the following management issues that apply to the species in this family:

- Declines in late-seral forests of subalpine, montane, and lower montane communities and associated attributes such as large trees, snag, and down logs
- Tradeoffs between source habitats for species in Family 2 and habitats for species in Family 1
- Balancing the fragmentation of late-seral habitats for fisher and boreal owl versus the juxtaposition of early- and late-seral habitats for other species
- Broad-scale departures from historical landscape patterns
- Reduction in the extent of frequent, light underburning and light surface fires

Wisdom et al. (2000) identified the following conservation strategies that apply to the species in this family:

- Retain stands of late-seral forests in the subalpine, montane, and lower montane communities, actively manage to promote their long-term sustainability, and manage young stands to develop late-seral characteristics. *Note:* In the Lower Clark Fork ERU it may be necessary to identify mid-seral forests in the lower montane community that could be brought to late-seral conditions because late-seral lower montane forests that can have been eliminated in these areas.
- In the short term, integrate the conservation of Family 2 habitat with the conservation of Family 1 habitat through mid-scale (forest) strategies. Develop a long-term strategy to repattern watersheds to a sustainable mosaic of Family 1 and Family 2 habitats.
- Increase connectivity of disjunct habitat patches and prevent further reduction of large blocks of contiguous habitat. Providing large, contiguous areas of forested habitat with small forest openings would also benefit the species' contrasting habitat needs.
- For boreal owls, identify areas that are highest priority for retention and restoration of habitat in the Lower Clark Fork ERU, where reduction in the extent of source habitats has increased the isolation of remaining habitat patches.
- Develop an integrated long-term strategy to repattern forest and forest-range landscape mosaics at the watershed scale through mid-scale (forest) strategies. Develop patterns that consider historical patterns as well as biophysical succession-disturbance regimes.
- Minimize or avoid road construction within late-seral forests. Obliterate or restrict use of roads after timber harvests and other management activities.
- Continue a strategy of wildfire suppression in most managed forests while allowing stand-replacing wildfires to burn in wilderness areas.
- In managed areas, use prescribed fire, timber harvest, and thinning to change forest composition and structure to reduce the risk of stand-replacement wildfires and loss of large, emergent trees and overstory trees to benefit other species in Family 2. Shift fire regimes to mixed fire behavior underburns and creeping-irregular disturbance events through use of prescribed fire.

<u>Family 3</u>

The mountain quail is the only species in this family for the planning area. All species in Family 3 tend to be habitat generalists that use montane forests, lower montane forests, or riparian woodlands as source habitats as defined by Wisdom et al. (2000). The mountain quail utilizes upland shrublands and forested habitats that generally include all structural stages. Special habitat features for the mountain quail are the shrub-herb understory in forest communities and shrub-herb riparian vegetation (Wisdom et al. 2000). Areas with abundant shrubs in the understory are used for cover as well as forage. Riparian areas appear to be preferred because mountain quail are primarilyfound within 328 to 656 feet of a water source (Brennan 1989 in Wisdom et al. 2000).

In the planning area, habitat declines were pronounced in the Blue Mountains, Central Idaho Mountains, and Columbia Plateau ERUs. Each of these ERUs had a substantial percentage of watersheds with declining trends: 7% in the Blue Mountains, 21% in the Central Idaho Mountains, and 23% in the Columbia Plateau (Table 18-7) (Hann et al. 1997 in Wisdom et al. 2000).

Although, the overall extent of Family 3 source habitats has changed little historically. However, notable changes occurred in the tree size classes and canopy cover classes that comprise the source habitat. Within the lower montane community, ecologically significant declines were projected basin-wide for early- and late-seral stages, but these declines were partially offset by ecologically significant increases in mid-seral, lower montane forests (Hann et al. 1997 in Wisdom et al. 2000).

Table 18-7. Percentage of Watersheds (5th Hydrologic Unit Code [HUC]) in 3 Trend Categories for Family 3, by Ecological Reporting Unit (Wisdom et al. 2000)

Ecological Reporting Unit		Number of Watersheds	Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
#	**Name**	**Total**	**Decreasing**	**Neutral**	**Increasing**	
5	Columbia Plateau	437	23	25	52	Increasing
6	Blue Mountains	252	7	15	78	Increasing
8	Lower Clark Fork	119	47	40	13	Neutral
13	Central Idaho Mountains	372	21	48	31	Neutral

Note: Percentages may not add up to 100% due to rounding.
[a] ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See "Forming Families of Groups to Summarize Results Among Multiple Groups" in "Methods" section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.

Regardless of the ERU trends in Table 18-7 the mountain quail has declined precipitously in Idaho (Vogel and Resse 1995a,b; Western Quail Management Plan 2008).

Wisdom et al. (2000) identified the following management issues that apply to Family 3 species, including the mountain quail:

- Loss of riparian shrubland for mountain quail at finer scales than this broad-scale assessment
- Changes in landscape pattern and simplification of forests across subbasins, within subbasins and watersheds, and within terrestrial communities

Wisdom et al. (2000) identified the following conservation strategies that apply to Family 3 species, including the mountain quail:

- Maintain and restore riparian shrublands through restoration of historical hydrologic regimes where feasible, through control of livestock grazing, and through better management of roads and recreation

- Develop a mid-scale (forest) assessment of the landscape departure patterns of succession-disturbance regimes. Focus short-term restoration of watersheds on those that depart greatly from succession-disturbance regimes, that do not contain susceptible populations of species of high conservation concern, and that are at high risk of loss of biophysical capability. In such watersheds, continue suppressing stand-replacing, high-severity wildfires and initiate prescribed fire appropriate to the biophysical succession-disturbance regime and timed to protect biophysical capability.

Family 5

The Rocky Mountain bighorn is the only species in this family for the planning area. Species in Family 5 use a broad range of forest, woodlands, and rangelands as source habitats as defined by Wisdom et al. (2000). Source habitats include all terrestrial community groups except for exotics and agriculture. Habitat conditions for bighorn sheep have been altered over the last century due to changes in historical fire regimes. Fire suppression has increased tree density in formerly open stands and reduced forage quantity, forage quality, and openness, which has decreased habitat suitability for bighorn sheep. Fire-suppressed stands have created barriers between historical winter and summer range, thereby preventing occupancy of the total range even though each isolated range is currently suitable (Wisdom et al. 2000). Riparian vegetation has declined in extent because of disruption of hydrologic regimes from water diversions, road construction, grazing, and increased recreational use along stream courses (Wisdom et al. 2000) Loss of riparian vegetation has degraded important foraging areas for bighorn sheep.

Bighorn sheep are highly susceptible to pneumonia after exposure to bacteria (*Pasteurella* spp.), viruses (*Parainfluenza* type-3), lungworm, and stress agents. Major reductions or total extirpation of bighorn herds from pneumonia outbreaks are well documented. Evidence exists that domestic and exotic sheep are the source of nonendemic bacteria and viruses predisposing bighorn sheep to pneumonia. Disease transmission from domestic animals is currently the most significant factor affecting bighorn sheep conservation.

In the planning area, habitat trends were particularly pronounced in the Columbia Plateau ERU, where 59% of these community types have decreased (Hann et al. 1997 in Wisdom et al. 2000). The Blue Mountains, Central Idaho Mountains, and Lower Clark Fork ERUs had neutral trends: 48% in the Blue Mountains, 52% in the Central Idaho Mountains, and 43% in the Lower Clark Fork (Table 18-8).

Table 18-8. Percentage of Watersheds (5th Hydrologic Unit Code [HUC]) in 3 Trend Categories for Family 5, by Ecological Reporting Unit (Wisdom et al. 2000)

Ecological Reporting Unit		Number of Watersheds	Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
#	Name	Total	Decreasing	Neutral	Increasing	
5	Columbia Plateau	437	59	39	2	Decreasing
6	Blue Mountains	252	34	48	17	Neutral
8	Lower Clark Fork	119	48	43	9	Neutral
13	Central Idaho Mountains	372	18	52	30	Neutral

Note: Percentages may not add up to 100% due to rounding.
a ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See “Forming Families of Groups to Summarize Results Among Multiple Groups” in “Methods” section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.

Wisdom et al. (2000) identified the following management issues that apply to Family 5 species, including the bighorn sheep:

- Degradation and loss of native upland shrublands, upland grasslands, riparian shrublands, and riparian woodlands
- Changes in landscape patterns of source habitats and reduction in forage quantity and quality for bighorn sheep because of changes in fire regimes
- Disease transmission potential between domestic sheep and bighorn sheep

Wisdom et al. (2000) identified the following conservation issues that apply to Family 5 species, including the bighorn sheep:Reduce human activities near important seasonal foraging areas and around known lambing and kidding areas of bighorn sheep:

- Maintain and restore native upland shrublands upland grasslands, riparian shrublands, and woodlands through restoration of hydrologic flows and vegetation, road management, and controlled grazing and recreational activities
- Restore habitat links between summer and winter range and access to escape cover that have been lost because of changes in historical fire regimes. Restore quality and quantity of forage where succession has caused substantial reductions.
- Implement use of prescribed fire to reestablish inherent fire regime-vegetation patterns
- Actively control the potential for disease transmission between bighorns and domestic livestock

Family 7

Wisdom et al. (2000) identified 9 broad-scale focal species in Family 7, two of whose ranges extend onto the Forest:

- Fringed myotis
- Townsend’s big-eared bat

The fringed myotis and Townsend's big-eared bat are the only species in this family for the planning area. The California myotis was not identified by Wisdom et al. (2000) but will be included as part of Family 7 because of similar habitat needs and use.

Family 7 members use a complex pattern and broad range of forest, woodlands, and sagebrush cover types as defined by Wisdom et al. 2000, but also have special requirements for nesting or roosting (Wisdom et al. 2000). Some species use cliffs, caves, mines, and buildings for day roosts and hibernacula. For example, the fringed myotis uses large diameter (>53 cm [21 in]) trees and snags with exfoliating bark or large cavities. Species use declines when snag decomposition changes no long provides these these attributes. Although shrub/herb riparian areas are not considered a requirement for these bat species, all use riparian areas for foraging because of high insect density (Wisdom et al. 2000).

In the planning area 55% of these community types having decreased in the Lower Clark Fork ERU (Hann et al. 1997 in Wisdom et al. 2000). The Blue Mountains, Central Idaho Mountains and Columbia Plateau ERUs had neutral trends: 46% in the Blue Mountains, 36% in the Central Idaho Mountains, and 29% in the Columbia Plateau (Table 18-9).

Table 18-9. Percentage of Watersheds (5th Hydrologic Unit Code [HUC]) in 3 Trend Categories for Family 7, by Ecological Reporting Unit (Wisdom et al. 2000)

Ecological Reporting Unit		Number of Watersheds	Percent of 5th HUC Watersheds Within Trend Category (%)			Dominant Trend[a]
#	Name	Total	Decreasing	Neutral	Increasing	
5	Columbia Plateau	437	47	29	24	Neutral
6	Blue Mountains	252	23	46	31	Neutral
8	Lower Clark Fork	119	55	37	8	Decreasing
13	Central Idaho Mountains	372	34	36	30	Neutral

Note: Percentages may not add up to 100% due to rounding.
[a] ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See "Forming Families of Groups to Summarize Results Among Multiple Groups" in "Methods" section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.

Wisdom et al. (2000) identified the following management issues that apply to the species in this family (including the fringed myotis, Townsend's big-eared bat, and California myotis identified as an SCC):

- Loss of potential roost sites because of mine closures, destruction of abandoned buildings, snag removal, deliberate fumigation of buildings, and levels of human activity that cause roost abandonment
- Excessive disturbance of roosting bats because of human activities and roads as a facilitator of such activities
- Degradation and loss of native riparian vegetation

Wisdom et al. (2000) identified the following conservation strategies that apply to the species in this family (including the fringed myotis, Townsend's big-eared bat, and California myotis identified as an SCC):

- Protect all known roost sites (nurseries, day roosts, and hibernacula) and restore usability of historical roosts where feasible.

- Actively manage for the retention and recruitment of large-diameter (>53 cm [21 in] snags in all forest cover types and structural stages.
- Reduce levels of human activities around known bat roosts through road management, signs, public education, and bat gates.
- Maintain and improve the condition of riparian vegetation for bat foraging areas.

Species Groups

Wisdom et al. (2000) developed species groups to contain increasingly detailed results that support and complement results in the broad-scale Family discussed in Volume 1 of Wisdom et al. (2000). Groups are composed of one or more species that share common source habitats, as defined by vegetation cover types and structural stages.

Broad-scale Species Group Relationships

With Table 18-10 indicating watershed trends by ERUs, SCC within these families are categorized in groups in Table 18-4 and Table 18-11. These groups may have different trends based on their individual habitat associations and habitat changes. While the California myotis is not addressed in the ICBEMP, it is included with the other two bat species in Family 7. Based on Forest-level information, the California myotis appears to have similar habitat requirements as fringed, long-legged, and long-eared myotis discussed in Group 26 by Wisdom et al. (2000). Therefore, California myotis will be included in Group 26 with fringed myotis. The Coeur d'Alene salamander is not addressed by Wisdom et al. (2000). This species will be addressed using other best-available science and in the Idaho CWCS discussions.

Table 18-10. Interior Columbia Basin Ecosystem Management Project (ICBEMP) families and Species of Conservation Concern (SCC) representation

Species group	Related Terrestrial Family	Nez Perce-Clearwater National Forests SCC
1	1—Low-elevation old forest	2 species
2	1—Low-elevation old forest	1 species
5	2—Broad-elevation old forest	2 species
7	2—Broad-elevation old forest	1 species
11	2—Broad-elevation old forest	1 species
17	3—Forest mosaic	1 species
22	5—Forest and Range mosaic	1 species
26	7—Forest, woodland, and sagebrush	2 species[a]
27	7—Forest, woodland, and sagebrush	1 species

Note: No ICBEMP representation for Coeur d'Alene salamander
[a]California myotis not listed in ICBEMP but added to be part of Family 7, which contains all bats

Table 18-11. Source habitat trends at the group level (Wisdom et al. 2000)

Species Group	Related Species of Conservation Concern	Ecological Reporting Units	Historical and Current Percentage of Area and Relative Change (%) for Watersheds			Dominant Trend[a]
			Historical	Current	Relative change	
1	White-headed woodpecker [b] Pygmy nuthatch	Columbia Plateau	14.19	8.82	–37.59	Decreasing
		Blue Mountains	24.48	9.42	–61.50	Decreasing
		Lower Clark Fork	17.18	1.02	–94.04	Decreasing
		Central Idaho Mountains	11.08	6.39	–42.38	Decreasing
2	Lewis' woodpecker	Columbia Plateau	11.55	0.31	–97.32	Decreasing
		Blue Mountains	22.29	6.21	–72.17	Decreasing
		Lower Clark Fork	14.63	0.60	–95.89	Decreasing
		Central Idaho Mountains	8.55	3.15	–63.17	Decreasing
5	Fisher Flammulated owl	Columbia Plateau	16.18	7.74	–12.31	Decreasing
		Blue Mountains	18.81	16.49	–12.31	Decreasing
		Lower Clark Fork	19.52	1.43	–92.68	Decreasing
		Central Idaho Mountains	12.50	11.54	–7.71	Decreasing
7	Boreal owl	Columbia Plateau[c]	6.62	2.32	–64.99	Decreasing
		Blue Mountains	8.96	8.66	–3.25	Decreasing
		Lower Clark Fork	9.20	0.83	–91.01	Decreasing
		Central Idaho Mountains	10.24	10.36	–1.18	Increasing
11	American three-toed woodpecker	Columbia Plateau	3.19	4.87	+52.65	Increasing
		Blue Mountains	3.83	13.69	+>100	Increasing
		Lower Clark Fork	3.97	1.15	–71.05	Decreasing
		Central Idaho Mountains	6.60	12.64	+91.62	Increasing
17	Mountain quail[d]	Columbia Plateau[e]	—	—	—	—
		Blue Mountains	31.00	30.68	–1.04	Decreasing
		Lower Clark Fork	—	—	—	—
		Central Idaho Mountains	27.20	17.27	–36.52	Decreasing
22	Bighorn sheep	Columbia Plateau[f]	—	—	—	—
		Blue Mountains	36.29	20.60	–43.23	Decreasing
		Lower Clark Fork[f]	—	—	—	—
		Central Idaho Mountains	36.71	28.40	–22.62	Decreasing
26	California myotis Fringed myotis	Columbia Plateau	38.00	36.12	–7.58	Decreasing
		Blue Mountains	52.60	55.15	4.86	Increasing
		Lower Clark Fork	80.93	78.23	–3.34	Decreasing
		Central Idaho Mountains	55.47	54.04	–2.57	Decreasing
27	Townsend's big-eared bat	Columbia Plateau	59.12	44.72	–24.37	Decreasing
		Blue Mountains	40.21	49.82	+23.89	Increasing
		Lower Clark Fork	30.30	23.76	–21.58	Decreasing
		Central Idaho Mountains	25.80	32.38	+25.49	Increasing

[a]ERUs were classified as increasing or decreasing if >50% of the watersheds had positive or negative trends, respectively. ERUs not classified as increasing or decreasing were classified as neutral. See "Forming Families of Groups to Summarize Results Among Multiple Groups" in "Methods" section (Wisdom et al. 2000, Volume 1) for details about assigning trends to watersheds.
[b]The primary ERU for this species are the Blue Mountains. The species may be incidental in the western-most portions of the Central Idaho ERU, and the Palouse portion of the Columbia Plateau ERU.
[c]Species habitat in the Palouse Prairie portion of the planning area is likely limited.
[d]Summer forested habitat only in the Blue Mountains and western fringe of the Central Idaho Mountains ERUs. The lower Salmon River Canyon portion of these ERUs is the last stronghold for the species in the planning area.
[e]Historically the species has far north as the Palouse Prairie.
[f]The species is not present in these ERUS in the planning area. ICBEMP trend information for this species does not apply to these ERUs.

Broad-scale Changes in Habitat

Group 1

Source habitats for Group 1 are found in old lower-elevation forests of mixed-conifer and ponderosa pine cover types. A special habitat feature for Group 1 is large-diameter snags for nesting and foraging (Volume 3, Appendix 1, Table 2 in Wisdom et al. 2000). The pygmy nuthatch is a secondary cavity nester and can use various nesting structures. White-headed woodpeckers typically nest in snags and leaning logs, and occasionally nest in the dead tops of live trees. However, the white-headed woodpecker is a primary cavity excavator of soft snags and is therefore more limited by the degree of wood decay suitable for cavity excavation (Wisdom et al. 2000). Suitable nest sites for both species are usually found within the larger diameter classes of trees and snags, and both species forage primarily in live trees (Wisdom et al. 2000).

Within the basin, broad-scale changes have occurred in the habitat of Group 1 (white-headed woodpecker and pygmy nuthatch). For this group, dramatic increases have occurred in mid-seral, shade-tolerant forests throughout the basin. These increases are likely due to fire suppression and the conversion of late-seral forests to early- and mid-seral stages (Wisdom et al. 2000). Interior ponderosa pine old forests were reduced and commonly transitioned into mid-seral stands of interior Douglas fir and grand fir–white fir (Wisdom et al. 2000).

Large-diameter ponderosa pine snags are a special habitat feature for Group 1. In roaded areas with a history of timber sales, large-diameter snags >53 cm (21 in) have been reduced basinwide. Thus, nesting and foraging substrates for Group 1 species have been reduced. Roads indirectly affect Group 1 because roaded areas in the basin have fewer snags than unroaded areas (Hollenbeck et al. 2013, Wisdom et al. 2000). Historically, source habitats likely occurred throughout the forested portions of the planning area (Volume 2, Figure 7a in Wisdom et al. 2000). Currently, the distribution of source habitats in the planning area has become decidedly more disjunct (Volume 2, Figure 7b in Wisdom et al. 2000).

White-headed woodpecker source habitat has declined >62% basinwide, pygmy nuthatch source habitat has declined >67% basinwide (Volume 1, Table 7 in Wisdom et al. 2005). Downward trends were predominantly in the northern basin while the central and southwestern portions of the basin showed mixed trends (Wisdom et al. 2000).

Ecologically significant declines in source habitat were observed in the Lower Clark Fork (–94%), Blue Mountains (–61.5%), and Central Idaho Mountains (–42%) ERUs (Volume 2, Figure 4 in Wisdom et al. 2000). The current amount of source habitat is significantly reduced from historical levels in >50% of the watersheds in the basin. This basinwide trend was mirrored within six ERUs that also had strong negative declines in more than 50% of the watersheds, including the Lower Clark Fork ERU, in the planning area. Historically, the extent of source habitat in the Lower Clark Fork ERU accounts for 17% of the total area of this ERU; however, the current estimate is 1% (Volume 3, Appendix 1, Table 3 in Wisdom et al. 2000).

The Central Idaho Mountains ERU provides the most contiguous habitats in the planning area (Volume 2, Figure 4c in Wisdom et al. 2000). However, historically the amount of source habitat in this ERU only occurred in 11% of watersheds, current estimates indicating that 6.4% of watersheds now contain source habitat (Volume 3, Appendix 1, Table 3 in Wisdom et al. 2000).

With two small watersheds being the exception, both the Blue Mountains and Columbia Plateau portions of the planning area show declines of ≥60% (Volume 2, Figure 4c in Wisdom et al. 2000).

The change from historical to current conditions for Group 1 habitats is displayed in Figure 18-28.

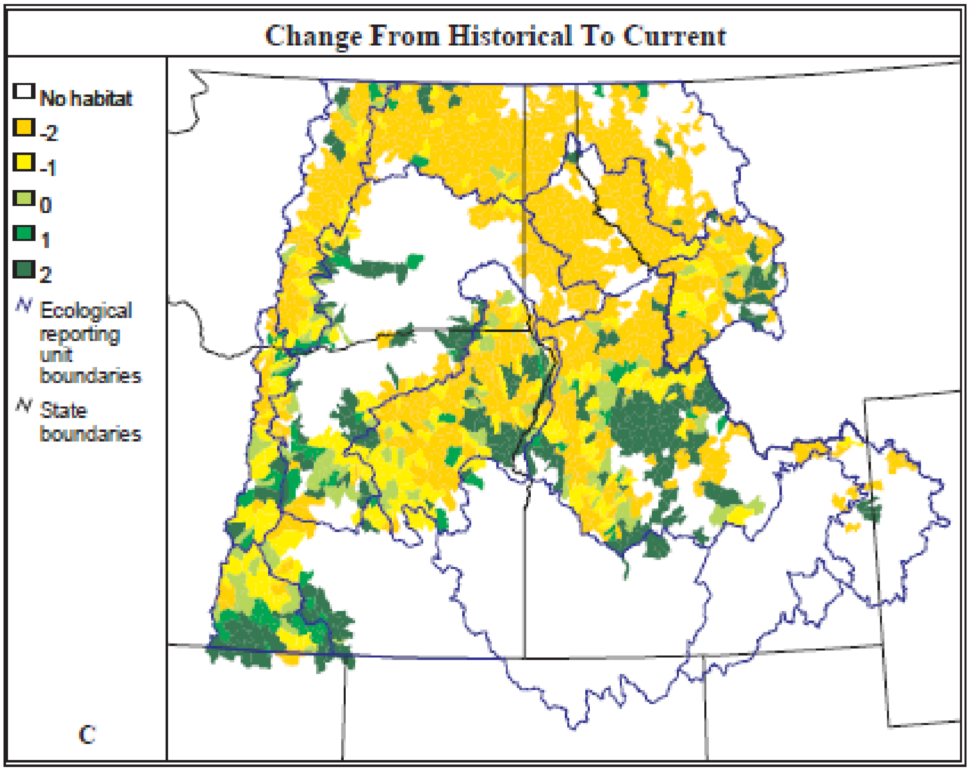

Figure 18-28. Percentage of area identified as source habitats, and the relative change in percentage of area of source habitats from historical to current periods for Group 1. Wisdom et al. 2000 (Vol. 2, Figure 4: Group 1). Note: Relative change for each watershed is shown as 1 of 5 trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

Wisdom et al. (2000) identified the following management issues that apply to white-headed woodpecker and pygmy nuthatch in this group:

- Basinwide decline in late-seral interior and ponderosa pine
- Basinwide loss of large-diameter snags (>53 cm [21 in])
- High risk of additional loss of ponderosa pine habitat through stand-replacing fires

The following potential strategies could be used to maintain habitat (Wisdom et al. 2000):

- Retain stands of interior ponderosa pine where old-forest conditions are present and actively manage to promote their long-term sustainability. The white-headed woodpecker has the most restricted distribution of all Group 1 species. Therefore, retaining existing old forests is particularly important within the range of this species where declines in old forests have been most pronounced, including watersheds such as the Upper Clark Fork and Blue Mountains ERUs.
- Restore dominance of ponderosa pine where transition to other cover types has occurred
- Accelerate development of late-seral conditions, including snag recruitment, within stands that are currently in mid-seral stages
- Include provisions for snag retention and snag recruitment where needed in all management plans involving forests used as source habitats for Group 1
- Reduce risk of stand-replacing fires in late-seral ponderosa pine

The following practices would be effective in implementing the potential conservation strategies (Blair and Servheen 1995, Wisdom et al. 2000):

- Use understory thinning and prescribed burns to enhance development of ponderosa pine old forests and to reduce fuel loads. Refer to Blair and Servheen (1995) for specific recommendations about live tree densities for the old-forest structural stage.
- Retain existing snags, particularly if >53 cm (21 in), and provide measures for snag replacement
- Reduce road densities in managed forests where ponderosa pine snags are in low abundance. Close roads after timber harvests and other management activities, and minimize the period when such roads are open to minimize removal of snags along roads. In addition, or as an alternative to road management, actively enforce fuel wood regulations to minimize removal of large snags.
- Restrict fuel wood permits to disallow snag cutting where ponderosa pine snags are in low abundance, particularly where existing roads cannot be closed

The amount and distribution of predicted habitat has been modeled using the SIMPPLLE process. This modeling will be discussed at the mid-level Forest scale in this Assessment.

Group 2

Within the basin, broad-scale changes have occurred in the habitat of Group 2. The Lewis's woodpecker is the only SCC in Group 2. Changes in vegetation structure from old-forest single stratum to mid-seral structures, as well as large snag removal and increases in closed-canopy, multi-storied forests have reduced understory shrubs and presumably reduced the foraging on, and abundance of, arthropods on which the Lewis'woodpecker feeds (Wisdom et al. 2000).

The relative change in extent of source habitats for the Lewis'woodpecker was the greatest (most negative) of any species analyzed in the Wisdom et al. (2000) report (Volume 1, Table 7 in Wisdom et al. 2000). The current amount of source habitat is significantly reduced from historical levels in all 11 ERUs that provide source habitat (Volume 2, Figure 7b in Wisdom et al. 2000). The Central Idaho Mountains ERU provides the most contiguous habitat, yet the amount of source habitat in this ERU comprises <25 percent of most watersheds (Volume 2, Figure 7b in Wisdom et al.2000). Strong negative trends were particularly evident in the northern watersheds of the basin, including the Lower Clark Fork ERU, where more than 95% of the watersheds have experienced declines (Volume 2, Figure 8 in Wisdom et al. 2000). The abundance of large (>53 cm [21 in]), heavily decayed snags for nesting has been reduced basinwide because of changes in vegetation structure from old-forest single stratum to mid-seral structures, as well as snag removal (Wisdom et al. 2000). Historically, source habitats likely occurred throughout the forested portions of the planning area (Volume 2, Figure 7a in Wisdom et al. 2000). Currently, the distribution of source habitats in the planning area has become decidedly more disjunct (Volume 2, Figure 7b in Wisdom et al. 2000).

Ecologically significant declines were observed in source habitat, including in the Lower Clark Fork (–97%), Blue Mountains (–92%) and Central Idaho Mountains (–85%) ERUs (Volume 2, Figure 8 in Wisdom et al. 2000). These changes are most apparent in the planning area with the majority of watersheds indicating declines from ≥20% to over 80% in all except two watersheds; one watershed on the Clearwater National Forest portion of the planning unit increased by ≥60% and one in the Elk City area had either an increase or a decrease of 20% (Volume 2, Figure 8 in Wisdom et al. 2000). All of the watersheds in the Columbia Plateau and Blue Mountains ERUs show moderate or strong declines in source habitats in the planning area. The majority of watersheds in the planning area portion of the Central Idaho Mountains ERUs showed moderate or strong declines in source habitats (Volume 2, Figure 8 in Wisdom et al. 2000).

The change from historical to current conditions for Group 2 habitat is displayed in Figure 18-29.

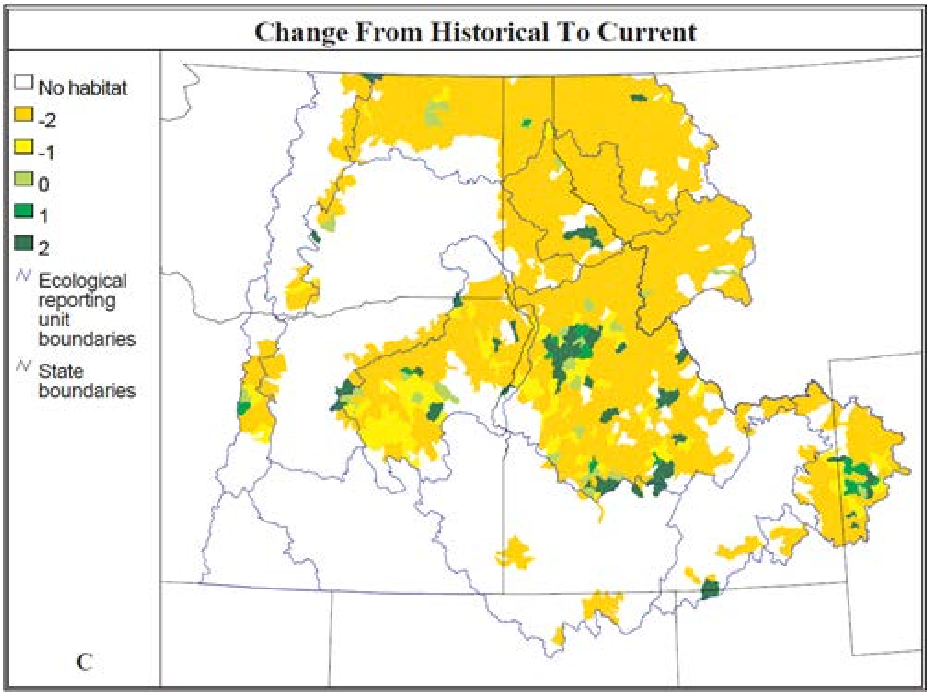

Figure 18-29. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 2. Wisdom et al. 2000 (Vol. 2, Figure 7: Group 2). Note: Relative change for each watershed is shown as one of five trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

Wisdom et al. (2000) identified the following management issues that apply to the species in this group, including the Lewis's woodpecker:

- Declines in shrub understories of montane and lower montane forests
- Basinwide decline in old forests of interior and ponderosa pine and interior western larch
- Basinwide decline in old forests of cottonwood woodlands
- Decline in availability of large snags and trees for foraging and nesting

The following potential conservation strategies were suggested for the long-term persistence of Lewis'woodpecker (Blair and Servheen 1995, Wisdom et al. 2000):

- Rejuvenate and enhance shrub understory of lower montane community groups (old-forest ponderosa pine) and montane community groups that include interior Douglas-fir and western larch

- Restore degraded stands and maintain high-quality existing stands of old-forest interior and ponderosa pine, interior Douglas-fir, western larch, and cottonwood-willow. Accelerate the development of old forests within stands that are currently at the mid-seral structural stages. Protecting and restoring existing old forests is especially important where declines in old forests have been most pronounced, including the Blue Mountains, Lower Clark Fork, and Central Idaho Mountains ERUs.
- Maintain existing old cottonwood-willow stands and identify younger stands for eventual development of old-forest structural conditions. Return natural hydrologic regimes to riparian areas where large cottonwood woodlands still remain.
- Retain all large-diameter (>53 cm d.b.h. [21 in]) ponderosa pine, cottonwood, Douglas-fir, and western larch snags within the basin, preferably in clumps, and provide opportunities for snag recruitment
- Reduce exposure to pesticides and insecticides during the nesting season

The following practices would be effective in implementing the potential conservation strategies (Wisdom et al. 2000):

- Use prescribed burns and understory thinning of small-diameter trees (<25 cm d.b.h. [10 in]) to maintain existing old-forest ponderosa pine stands and to accelerate development of mid-successional stages to old-forest conditions. These practices also can be used to enhance and develop shrub understories (>13% shrub canopy) to attract arthropod prey.
- Allow stand-replacing wildfires to burn in lower montane wilderness and other lands managed with a reserve emphasis (for example, designated wilderness, research natural areas, and areas of critical environmental concern). Such opportunities can be found in the Central Idaho Mountains and Blue Mountains ERUs.
- Develop measures for snag recruitment in unburned forests. Management for snag recruitment (particularly broken-topped snags) in unburned forests with high risks of stand-replacing fires will provide nest trees during the first few years after wildfire when other trees are not easily excavated.
- In salvage-logged, postfire ponderosa pine forests, retain snags in clumps rather than evenly spaced, leaving both hard and soft decay classes to lengthen the time that those stands are suitable for nesting by Lewis' woodpeckers.
- Minimize the density of roads open to motorized vehicles. Close roads after timber harvests and other management activities and maintain short periods during which such roads are open to minimize removal of snags along roads. In addition, or as an alternative to road management, actively enforce fuel wood regulations to minimize removal of large snags.
- Restrict fuel wood permits to disallow snag cutting where ponderosa pine snags are in low abundance, particularly where existing roads cannot be closed
- Avoid use of toxic chlorinated agricultural insecticides near Lewis' woodpecker nest sites

The amount and distribution of predicted habitat has been modeled using the SIMPPLLE process. This modeling will be discussed at the mid-level Forest scale in this Assessment.

Group 5

The flammulated owl and fisher are the only SCC in Group 5. Changes in old forest habitat availability, snag abundance, forest composition, and structure can affect both flammulated owl and fisher populations in the respective cover types they prefer (Wisdom et al. 2000).

The geographic distribution of source habitat has shifted away from the north and towards the southwestern portion of the basin. Densities of large-diameter snags (>53 cm [21 in] d.b.h.) have declined from historical levels basinwide. Trends in snag abundance ultimately affect the availability of large down logs and cavities (Wisdom et al. 2000). Additionally, the distribution of source habitat in the northern and central basin has become decidedly more disjunct (Volume 2, Figure 16a and 16b in Wisdom et al. 2000). Historically, source habitats likely occurred throughout the forested portions of the basin, with some of the greatest concentrations in the western, central, and northern portions of the basin (Volume 2, Figure 16a in Wisdom et al. 2000).

Approximately 68% of the watersheds in the basin showed moderate or strong declines in source habitat (Figure 17 in Wisdom et al. 2000). These declines were reported in all of the ERUs in the planning area, especially the Lower Clark Fork and Columbia Plateau ERUs (Figure 17 in Wisdom et al. 2000).

For flammulated owl, ecologically significant declines were observed in late-seral ponderosa pine forests, including the Lower Clark Fork (–100%), Blue Mountains (–96%), and Central Idaho Mountains (–88%) ERUs (Volume 3, Appendix 1, Table 4 in Wisdom et al. 2000).

However for fisher, late-seral, multi-story grand fir/red cedar forests have increased significantly in the Lower Clark Fork (>100%), Columbia Plateau (76.5%), Blue Mountains (>100%) and Central Idaho Mountains ERUs (>100%).

These changes from historical to current conditions are most apparent in the planning area with the majority of watersheds indicating declines ≥20% to over 80% in all but two watersheds; these two other watersheds either increased or decreased by 20%. All of the watersheds in the Columbia Plateau ERU showed moderate or strong declines in source habitat in the planning area. Approximately56% of the watersheds in the Blue Mountains ERU showed moderate or strong declines in source habitat. Approximately 50% of the watersheds in the Central Idaho Mountains ERUs showed moderate or strong declines in source habitat (Figure 16c, Volume 2 in Wisdom et al. 2000).

The change from historical to current conditions for Group 5 habitat is displayed in Figure 18-30.

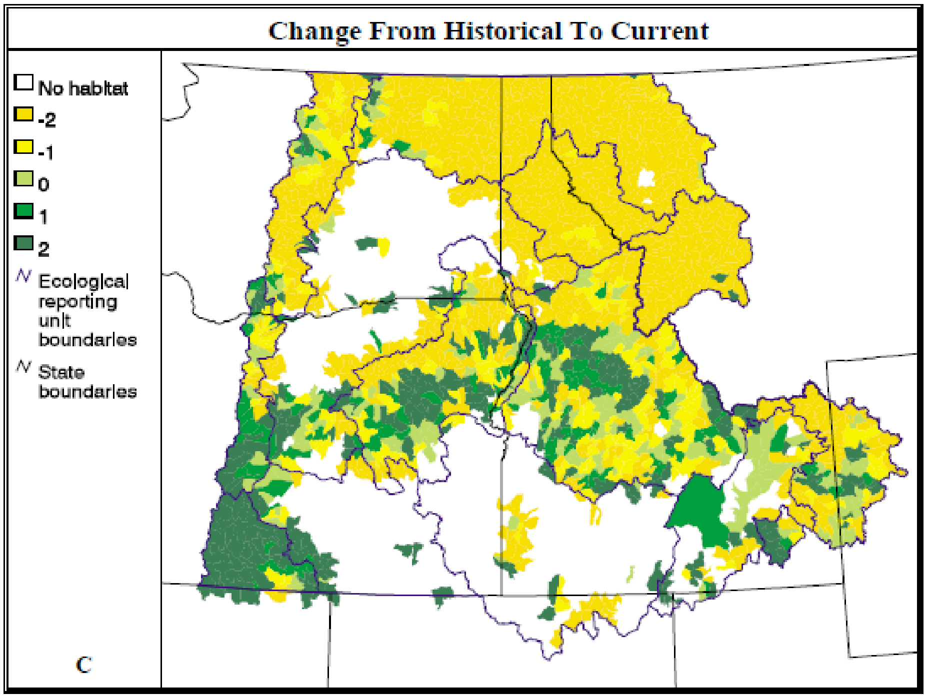

Figure 18-30. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 5. Wisdom et al. 2000 (Vol. 2, Figure 16: Group 5). Note: Relative change for each watershed is shown as 1 of 5 trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

Wisdom et al. (2000) identified the following management issues that apply to the species in this group.

- Reduction in the amount of old-forests and associated structures (snags, logs, and cavities), particularly within the montane and lower montane community groups
- Fragmentation of habitat
- Low population numbers of fisher
- Negative effects resulting from higher road densities in source habitats
- Possibly unsustainable conditions of old forests where there have been large transitions from shade-intolerant to shade-tolerant tree species. This last issue stems from the exclusion of fire from many forested communities, which has resulted in increased susceptibility to stand-replacing fires.

The following potential conservation strategies could be used to maintain habitat for flammulated owl and fisher (Wisdom et al. 2000):

- Increase the representation of late-seral forests in all cover types used as source habitats, particularly in the northern half of the basin (Lower Clark Fork ERU)

- Increase connectivity of disjunct habitat patches and prevent further reduction of large blocks of contiguous habitat
- Identify potential species strongholds for long-term management of fisher
- Reduce human disturbances in source habitats
- Reduce the risk of loss of habitat by focusing old-forest retention and restoration efforts on areas where fire regimes are either nonlethal or mixed. Where old-forest habitat has remained stable or increased from historical conditions, efforts could be focused on retaining existing habitat in areas with lower fire and insect risk while managing other areas to reduce risks of catastrophic loss of habitat.

The following practices would be effective in implementing the potential conservation strategies (Wisdom et al. 2000):

- In the northern basin, identify representative stands of old forests for retention and mid-successional stages for development into old-forest conditions. Priority should be given to large blocks having high interior-to-edge ratios and few large openings.
- Actively recruit snags and logs from trees described by Green et al. (2011) to increase the representation of old-forest structures (snags and logs) in mid-seral stands and in old forests where snags and logs are in low density or are absent
- Retain slash piles and decks of cull logs to substitute for down logs over the short term
- Where possible, use selection harvest rather than clearcutting. If clearcuts are used, aggregate cuts so that large blocks of unharvested forest are retained.
- Adjust activities, including timber harvests, to provide links between currently isolated patches of source habitats
- Identify existing areas with the following desired conditions, or manage selected areas to create the following desired conditions for strongholds: existing populations of fisher; large, contiguous blocks of forest cover with a high percentage of late-seral stages; abundant snags and large logs; low road densities and overall low human disturbance; and potential connectivity to currently unoccupied source habitats
- Minimize new construction of secondary roads and close unneeded roads after timber harvest
- Manage risks of catastrophic loss by using prescribed fire and thinning to reduce fuel loading and to encourage the development of forest openings, shrub openings, and shade-intolerant and fire-, insect-, and disease- resistant tree species

The amount and distribution of predicted habitat has been modeled using the Olsen et al. (2013) model for fisher (USDA Forest Service 2014) and the SIMPPLLE process for flammulated owl. This modeling will be discussed at the mid-level Forest scale in this Assessment.

Group 7

The boreal owl is the only SCC in Group 7. Changes in cavity availability and abundance of coarse woody debris, snags, lichens, and fungi as a result of declining older forest structural stages can affect nesting opportunities and reproductive success of boreal owl populations (Wisdom et al. 2000).

The geographic distribution of source habitats has shifted from the northern ERUs towards the central portions of the basin. The trend in forest structure has been an increase in mid-seral stages at the expense of both early and late-seral stages (Wisdom et al. 2000). Large-diameter snags and trees >53.3 cm (>21 inches) d.b.h. have decreased basinwide (Wisdom et al. 2000). Additionally, the distribution of source habitats in the northern basin has become decidedly more disjunct (Volume 2, Figure 22 in Wisdom et al. 2000). Historically, the most concentrated areas of source habitat for boreal owls were in the Northern Cascades, Northern Glaciated Mountains, and Snake Headwaters ERUs (Volume 2, Figure 22a in Wisdom et al. 2000).

Approximately 80% of the watersheds in the basin showed moderate or strong declines in source habitat (Figure 23 in Wisdom et al. 2000). These declines were reported in >50% of the watersheds in the northern and eastern portions of the basin, including the Lower Clark Fork and Central Idaho Mountains ERUs (Figure 23 in Wisdom et al. 2000). Trends in the Blue Mountains ERU were mixed (Volume 2, Figure 23 in Wisdom et al. 2000).

In the northern basin, ecologically significant declines were observed in late-seral subalpine multi-story forests, including in the Columbia Plateau (–97.3%) and Lower Clark Fork (–94.7%) ERUs (Volume 3, Appendix 1, Table 4 in Wisdom et al. 2000). Late-seral subalpine multi-story forests increased significantly in the Blue Mountains (88%) and Central Idaho Mountains (41%) ERUs (Volume 3, Appendix 1, Table 4 in Wisdom et al. 2000).

However, while late-seral subalpine multi-story forests have increased significantly in the Blue Mountains and Central Idaho Mountains ERUs the majority of this increase appears to have occurred outside of the planning area. Declines were reported in >50% of the watersheds in the northern and eastern portions of the basin, including the Lower Clark Fork and Central Idaho Mountains ERUs that occur in the planning area (Figure 22 in Wisdom et al. 2000).

Approximately 55% of the watersheds in the Central Idaho Mountains ERUs showed moderate or strong declines in source habitats (Figures 22 and 23 in Wisdom et al. 2000) with apparently a significant majority of the watersheds in the planning area showing declines from 20% to greater than 60%. A small number of watersheds show moderate or strong increases in the Lower Clark Fork ERU but these are surrounded by watersheds showing declines of 20% to greater than 60% in the planning area (Volume 2, Figure 22 in Wisdom et al. 2000). Trends in the Blue Mountains ERU were mixed but indicating increases (Volume 2, Figures 22 and 23 in Wisdom et al. 2000).

The change from historical to current conditions for Group 7 habitat is displayed in Figure 18-31.

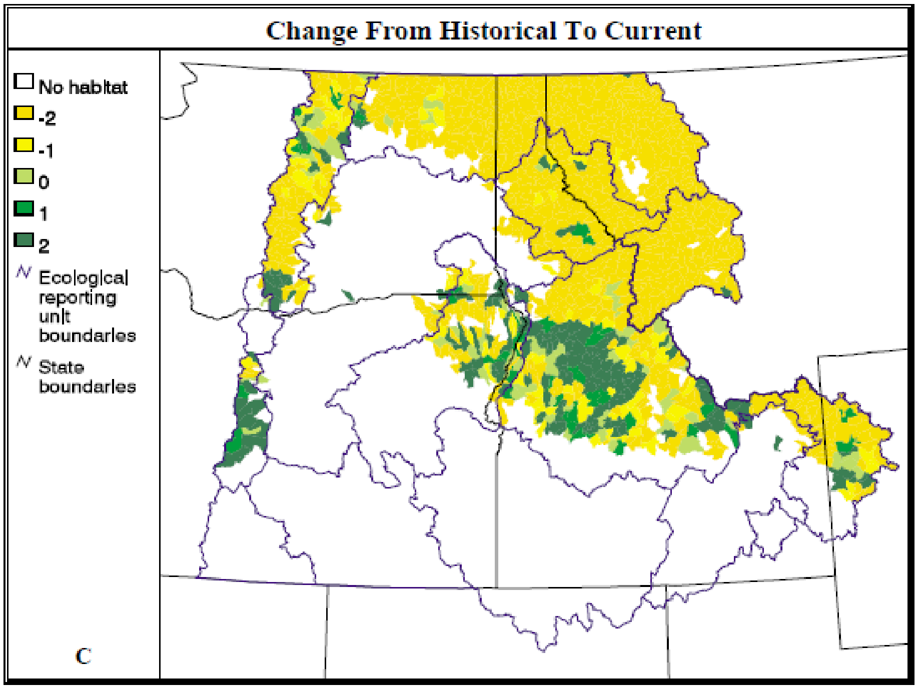

Figure 18-31. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 7. Wisdom et al. 2000 (Vol. 2, Figure 22: Group 7). Note: Relative change for each watershed is shown as one of five trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

Wisdom et al. (2000) identified the following management issues that apply to the species in this group:

- Declines in late-seral subalpine and montane forests, particularly in the Lower Clark Fork ERU
- Declines in large aspen trees and forests due primarily to fire suppression
- Loss of large-diameter snags >18 in. d.b.h.
- Loss of microenvironments for small-mammal prey
- Changes in forest structure and composition, such as the loss of snags and logs

The following potential conservation strategies could be used to maintain habitat (Wisdom et al. 2000):

- Accelerate development of old-forest conditions in montane and subalpine forests within areas currently dominated by mid-seral stages
- Restore aspen forests where they have been reduced

- Identify areas that are highest priority for retention and restoration of habitat, especially in the Lower Clark Fork ERU, where reduction in the extent of source habitats has increased the isolation of habitat patches
- Retain large-diameter snags and provide for snag replacement over time
- Include boreal owl conservation within a larger ecosystem context that addresses the management of primary cavity nesters, small mammals, and forest structural components

The following practices would be effective in implementing the potential conservation strategies (Wisdom et al. 2000):

- Avoid extensive use of clearcuts, which may reduce habitat quality
- Small patch cuts implemented on long rotations may be compatible with maintaining habitat quality for boreal owls. Thinning from below may provide for development of nest structures.
- Use clearcutting to regenerate aspen, focusing on the maintenance of large aspen that provide nesting habitat for boreal owls. Where aspen regeneration is inhibited by domestic or wild ungulate browsing, use exclosures to protect regenerating stands and modify management to reduce browsing pressure.
- Provide measures for snag protection and recruitment in all timber harvest plans

The amount and distribution of predicted habitat has been modeled using the SIMPPLLE process. This modeling will be discussed at the mid-level Forest scale in this Assessment.

Group 11

The American three-toed woodpecker is the only SCC in Group 11. The species occurs at the higher elevations of this broad-elevation family, and at these upper elevations throughout the basin. Source habitats are old forests of lodgepole pine, grand fir-white fir, and Engelmann spruce-subalpine fir. The trend in forest structure has been an increase in mid-seral stages at the expense of both early and late-seral stages (Hann et al. 1997). Large-diameter snags and trees >53.3 cm (>21 inches) d.b.h. have decreased basinwide (Hann et al. 1997 in Wisdom et al. 2000).

Historically, source habitats likely were distributed throughout most of the mountainous regions of the basin but generally occupied <25% of any given watershed (Volume 2, Figure 34A in Wisdom et al. 2000). Current source habitat seems to have roughly the same geographic distribution, but the amount of habitat in the northern portion of the ranges of the species has generally declined, whereas habitat in the south has increased (Volume 2, Figure 34B in Wisdom et al. 2000).

The ERUs that support significant amounts of habitat for the group and had moderately or strongly increasing trends in more than 50% of watersheds include the Blue Mountains and Central Idaho Mountains. The Lower Clark Fork ERU contains moderate or strong declines in more than 50% of the watersheds (Volume 2, Figure 35 in Wisdom et al. 2000). The Columbis Plateau ERU has near similar percentages of watersheds that either have increased or declined.

Figure 18-32 shows the relative changes for watersheds within the basin and ERUs within the planning area.

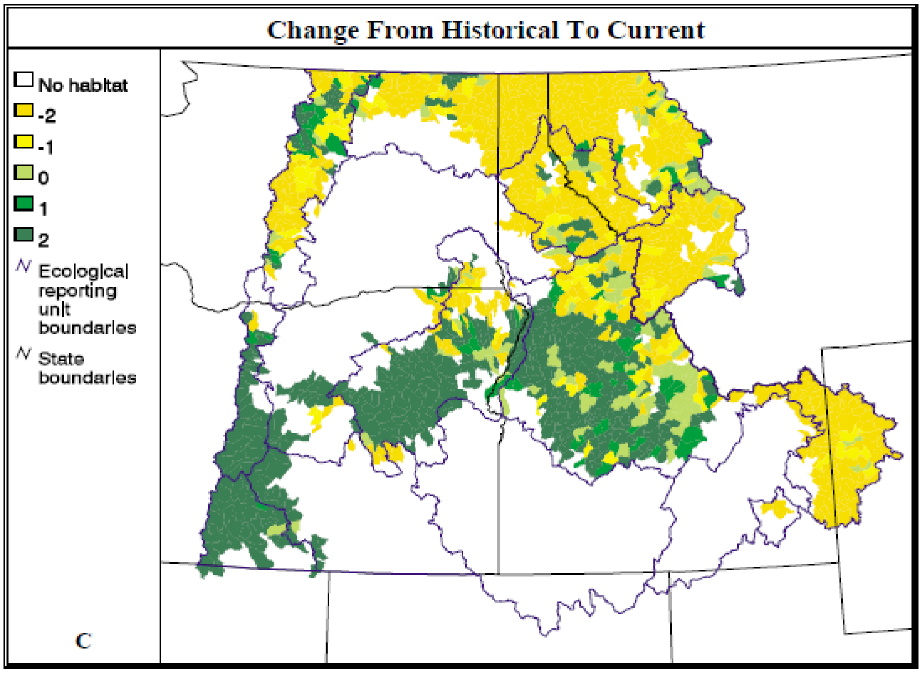

Figure 18-32. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 11. (Wisdom et al. 2000 (Volume 2, Figure 34: Group 11). Note: Relative change for each watershed is shown as 1 of 5 trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

The relative change of habitat conditions for this species has increased, primarily in the portions of the planning area within the Blue Mountain ERU and in the southern half of the planning area within the Central Idaho Mountains ERU (Volume 2, Figure 34C in Wisdom et al. 2000). These increases are due to the increased amount of forest succession with subsequent disease and insect mortalty. However, declines were reported in >70% of the watersheds in the Lower Clark Fork and >40% of the Columbia Plateau ERUs. The majority of the watersheds in the Columbia Plateau that occur in or adjacent to the planning area have declined btween 20% to more than 60% (Figure 34 in Wisdom et al. 2000). A small number of watersheds show moderate or strong increases in the Lower Clark Fork ERU, but these watersheds are surrounded by watersheds showing declines of 20% to greater than 60% in the planning area. Watersheds in the northern portion of the Central Idaho Mountains ERU show a mix of increases and declines, with the majority indicating declines (Volume 2, Figure 34 in Wisdom et al. 2000).

While these source habitat occurs at upper elevations, it may typically not be as abundant within the suited timber base as mid- and low-elevation habitats for other species groups. In general, while increased amount of habitat in many watersheds has a positive trend for this species, decreases in others indicates conservation measures are still warranted.

Wisdom et al. (2000) identified the following management issues that apply to the species in this group:

- Decline in late-seral subalpine and montane forests. Cover types with basinwide decline are western larch and whitebark pine (*Pinus albicaulis*). Declines of Engelmann spruce-subalpine fir are most notable in northern portions of the basin.
- Potential decline in key components of the shifting food and nesting resource, which is characterized by large areas of conifer trees infected with bark beetles, disease, or heart rot, or in the early stages of decay

The following potential conservation strategies could be used to maintain habitat (Wisdom et al. 2000):

- Maintain remaining old forests of western larch and whitebark pine and actively manage to promote their long-term sustainability
- Accelerate development of old-forest conditions in montane and subalpine forests within areas currently dominated by mid-seral stages
- Maintain stands that have experienced beetle outbreaks and stand-replacing burns

The following practices would be effective in implementing the potential conservation strategies (Wisdom et al. 2000):

- Use under-story thinning and prescribed burns, or both, to enhance development and sustainability of western larch and whitebark pine old forests
- Maintain some large (>528 acres) forest patches with bark beetle outbreaks for at least 5 years, until beetle occupancy diminishes
- Where suitable nesting and foraging trees are underrepresented, retain mature and old trees susceptible to bark beetle infestations, disease, and heart rot, or in the early stages of decay
- Allow wildfires to burn in some forests with high fire risk to produce stand-replacing conditions, and avoid postfire salvage logging in portions of large burned forests to maintain contiguous burned stands of at least 528 acres for about 5 years postfire

The amount and distribution of predicted habitat has been modeled using the SIMPPLLE process. This modeling will be discussed at the mid-level Forest scale in this Assessment.

Group 17

The mountain quail is the only SCC in Group 17. Group 17 represents summer habitat for mountain quail according to Wisdom et al. (2000). Wisdom et al. (2000) only addressed summer habitat for this species. The species uses the mid- to upper-elevations of montane and lower montane forests. Source habitat for Group 17 includes all structural stages, except stem exclusion, of interior Douglas-fir and interior ponderosa pine (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000). Specific habitat used by the mountain quail is riparian shrub (Volume 3, Appendix 1, Table 2 in Wisdom et al. 2000). Mountain quail within the basin are primarily found within 100 to 200 m (328 to 656 feet) of a water source (Vogel and Reese 1995a,b).

The overall basin trend in source habitat since historical times has been neutral, including in the Blue Mountains ERU. The Central Idaho Mountains ERU has had a decreasing trend. The species occurs in the easternmost and westernmost portions of thses ERUs in the planning area (Figure 53 in Wisdom et al. 2000).

Approximately 46% of the watersheds in the basin showed moderate or strong declines in source habitat (Figure 53 in Wisdom et al. 2000). Declines were reported in >40% of the watersheds in the eastern Blue Mountains and western Central Idaho Mountains ERUs that are part of the lower Salmon River Canyon where this species occurs (Figures 52A, 52B, and 53 in Wisdom et al. 2000). Source habitats reportedly showed increases in ~26% of watersheds in the Blue Mountains and Central Idaho Mountains ERUs (Figure 53 in Wisdom et al. 2000). Figure 18-33 shows the relative changes for watersheds within the basin and ERUs within the planning area.

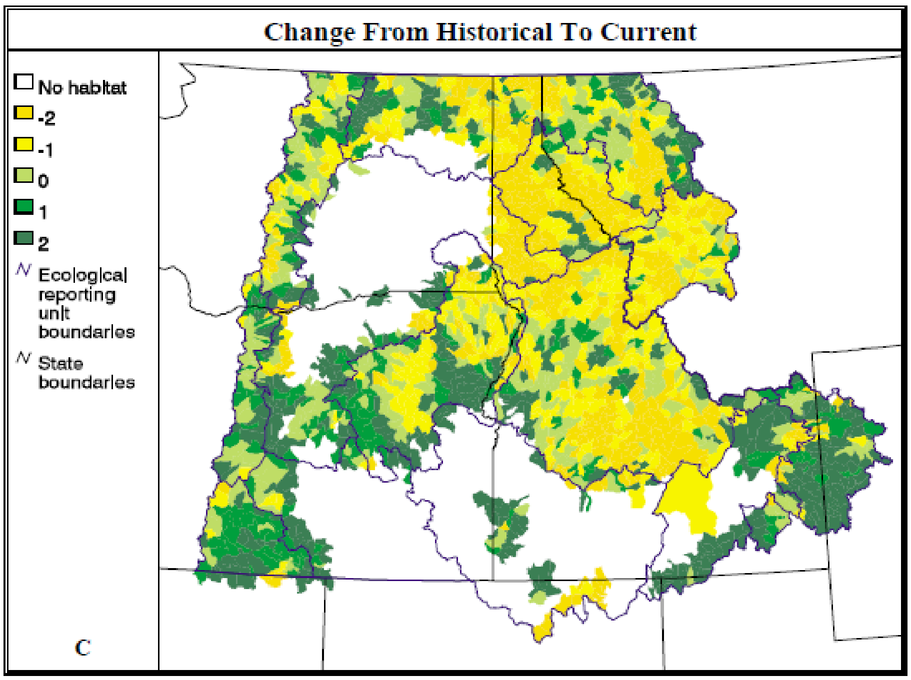

Figure 18-33. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 17. Wisdom et al. 2000 (Vol. 2, Figure 52: Group 17). Note: Relative change for each watershed is shown as one of five trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

Basinwide analysis of riparian vegetation found significant changes, including widespread declines in riparian shrublands. Because of the scale of the coarse-filter ICBEMP analysis and the fine-scale nature of riparian shrubland habitats, the results of the ICBEMP analysis do not likely reveal the true loss in this important habitat component for mountain quail. Remaining habitat in the basin is fragmented, and populations often exist in islands of habitat connected by narrow corridors of vegetation (Vogel and Reese 1995a,b).

Some mountain quail populations migrate to lower elevations to winter (Vogel and Reese 1995a,b). Winter habitat availability may be more limited than summer habitat because of severe winter weather in some mountainous areas. Low-elevation riparian shrub habitat is especially important during severe winters (Vogel and Reese 1995a,b; Vogel and Reese 2002).

Mountain quail are most often found in areas with a high abundance of shrubs. Management activities, such as salvage logging and planting in postfire habitat, may shorten the duration of these early seral, shrub-dominated sites (Wisdom et al. 2000).

On the planning area, the watersheds that contain the preferred habitat conditions for this species may vary due to the establishment and spread of invasive plants, higher stand densities in the dry mixed-conifer forest mosaic, and wildfire activity in the watersheds of the Lower Salmon River drainage. However, outside of the planning area, lower-elevation habitat conditions or human influences could also be limiting factors for this species or its habitat. It is possible the synergistic interaction of these factors on remnant quail populations make species persistence difficult despite the amount of source habitat on the Forests (USDA Forest Service 2010a, Vogel and Reese 1995a,b).

Wisdom et al. (2000) identified the following management issues that apply to the species in this group:

- Declines in late- and early seral source habitat, particularly in the northeastern part of the basin
- Changes in vegetation composition and structure of understory shrub habitat
- Loss of riparian shrubs
- Increased interaction with humans
- Isolated and disjunct populations of mountain quail vulnerable to extinction by stochastic events (i.e., demographic, environmental, or genetic stochasticity)

The following potential conservation strategies could be used to maintain habitat (Wisdom et al. 2000):

- Maintain and restore late-seral montane and lower montane forests
- Increase the representation of shrub-dominated early seral forests
- Restore fire as an ecological process in the montane and lower montane community groups
- Maintain and restore riparian shrubland habitats, including protecting existing areas from the encroachment of exotics
- Reduce habitat degradation by livestock grazing in areas currently occupied by mountain quail
- Restrict human access in known nesting areas used by mountain quail
- Expand the current range of mountain quail within their historical range

The following practices would be effective in implementing the potential conservation strategies (Wisdom et al. 2000):

- Maintain existing old forests until mid-seral forests have developed into old forests at a level that is within the range of historical variability
- Leave some postfire areas unaltered to regenerate naturally
- Use prescribed fire to enhance growth and regeneration of understory or mountain shrub development. Avoid burning during the nesting season, as fires can cause direct mortality to mountain quail.
- Reduce exotic weed invasions by planting native shrub and herbaceous vegetation in riparian shrubland habitats
- Remove or explicitly control the timing and intensity of grazing to discourage weed invasions and to minimize losses and allow for restoration of native riparian and mountain shrubs
- Reduce road densities and timing of management activities to reduce human interactions with these species, especially during the nesting and brooding season. In addition, or as an alternative to reductions in road density, implement seasonal road closures during nesting and brooding periods.
- Reintroduce and augment populations of mountain quail after habitat enhancement

The amount and distribution of predicted habitat has been modeled using the SIMPPLLE process. This modeling will be discussed aat the mid-level Forest scale in this Assessment.

Group 22

The bighorn sheep is the only SCC in Group 22. Rocky Mountain bighorns historically occurred in northeastern Oregon, central Idaho, Montana, Wyoming, and northeastern Nevada. After a severe population decline in the early 1900s, bighorns remained in only a few isolated areas of their former habitat (Wisdom et al. 2000). The current range represents an increase in occupied habitat since that time because of a combination of reintroductions and protection of remnant populations. Much of the historical range, however, is still unoccupied in the basin and Idaho (IDFG 2005, Wisdom et al. 2000).

Source habitat for the species is primarily in the alpine, subalpine, upland shrubland, and upland herbland community groups. Old-forest and stand- initiation stages of whitebark pine are source habitat, but only the stand-initiation stage of other forest cover types is used (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000). Bighorn sheep prefer open habitats with short vegetation, both for high-quality forage (Wisdom et al. 2000) and to maintain high visibility for predator avoidance.

Special habitat features identified include cliffs, talus, and seasonal wetlands (Volume 3, Appendix 1, Table 2 in Wisdom et al. 2000). The location of cliff s and talus ultimately defines the distribution of bighorn sheep because such features are essential for escape cover and the secure rearing of young (Wisdom et al. 2000). Cover types listed as source habitat (Volume 3,

Appendix 1, Table 1 in Wisdom et al. 2000) generally are not available to bighorns unless they are near cliffs.

Habitats declined in 57% of the watersheds throughout the basin and by 0% to greater than 60% in most watersheds in the two ERUs where bighorn sheep occur: the Blue Mountains and Central Idaho Mountains (Figure 68 in Wisdom et al. 2000). Figure 18-34 shows the relative changes for watersheds within the basin and ERUs within the planning area.

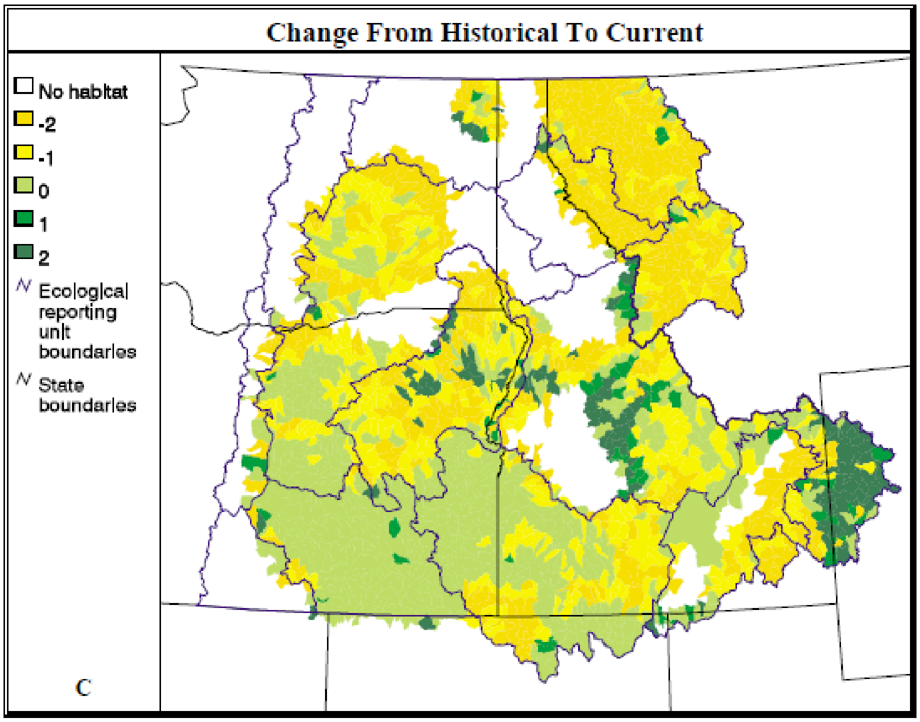

Figure 18-34. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 22. Wisdom et al. 2000 (Vol. 2, Figure 4: Group 22). Note: Relative change for each watershed is shown as one of five trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

The primary reason the bighorn sheep is an SCC is the species are highly susceptible to pneumonia after exposure to bacteria (*Pasteurella* spp.), viruses (Parainfluenza type-3), lungworm, and stress agents. Major reductions or total extirpation of bighorn herds due to pneumonia outbreaks are well documented (Wisdom et al. 2000, USDA Forest Service 2010a).

The amount and distribution of predicted habitat has been not modeled using the SIMPPLLE process. Bighorn sheep will be further discussed as a big game species in this Assessment.

Wisdom et al. (2000) identified the following management issues that apply to the species in this group:

- Incompatibility with domestic sheep and possibly domestic goats because of the potential for disease transmission and competition for forage

The following potential conservation strategies could be used to maintain habitat (Wisdom et al. 2000):

- Actively control the potential for disease transmission and forage competition between bighorns and domestic livestock

The following practices would be effective in implementing the potential conservation strategies (Wisdom et al. 2000):

- Avoid direct contact between bighorn sheep and domestic sheep and goats
- Reduce forage competition with livestock by factoring bighorn sheep consumption into total forage utilization

Group 26

The California myotis and fringed myotis are year-round residents in the planning area and generally use a wide variety of forested conditions, albeit on the drier end of the forest spectrum. While Wisdom et al. (2000) did not identify the California myotis as part of Group 26, the two species are similar in their use of a broad range of forest and woodland habitats for foraging. Therefore, information for fringed myotis will be considered applicable to California myotis.

Source habitats shared by these species are all cover types in the montane, lower montane, riparian woodland, and upland woodland community groups and the mountain hemlock cover type in the subalpine community group (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000). The need for suitable roost sites is the primary factor for all bat species. When the need for suitable roost sites is ignored, few changes have occurred in the extent of source habitats between historical and current conditions (Figures. 79A and 79B in Wisdom et al. 2000). Neutral trends predominated in all 13 ERUs (Figure 80 in Wisdom et al. 2000) and increasing trends in a few watersheds of the Central Idaho Mountains ERUs. Figure 18-35 shows the relative changes for watersheds within the basin and ERUs within the planning area.

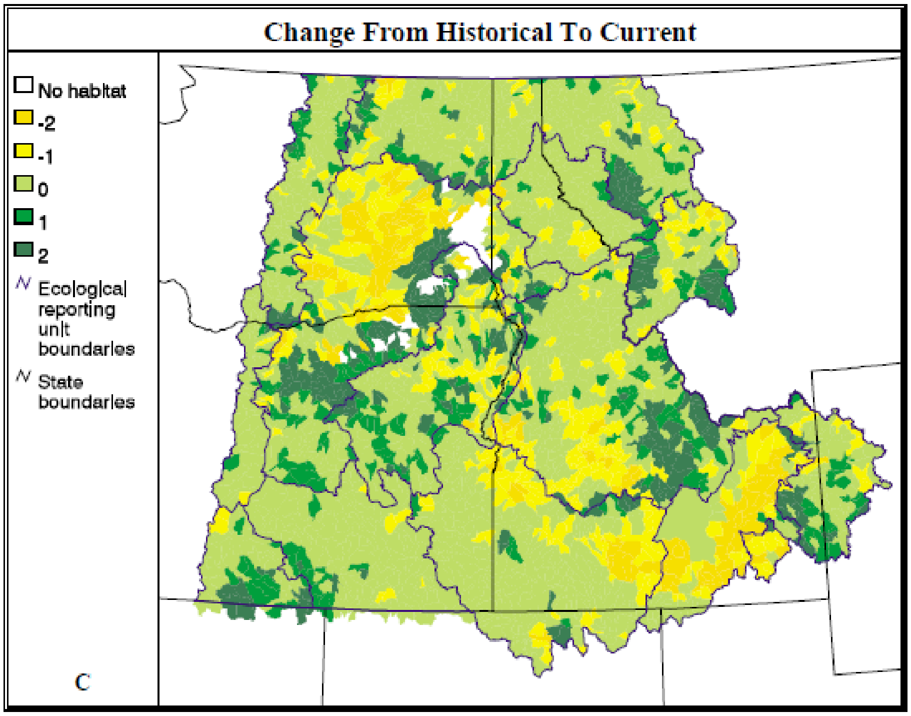

Figure 18-35. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 26 (Figure 79c, Volume 2 in Wisdom et al. 2000). Note: Relative change for each watershed is shown as one of five trend categories, where –2 = a decrease of >60 percent, –1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

The California myotis and fringed myotis forage primarily by hover-gleaning insects off of foliage. Prey species are insects with the fringed myotis consuming mostly beetles (Millar et al. 2005.

Several special habitat features were identified for Group 26 (Volume 3, Appendix 1, Table 2 in Wisdom et al. 2000). Large-diameter (>53 cm [21 in]) snags with exfoliating bark provide maternity roosts for the California myotis and the fringed myotis (Miller et al. 2005). Caves, mines, and buildings provide maternity roosts and hibernacula for the fringed myotis and California myotis. Various structures are used for day and night roosts, including exfoliating bark, rock crevices, mines, caves, and buildings (Miller et al. 2005, Wisdom et al. 2000). Snag-roosting bats may require higher densities of snags than cavity-nesting birds because the stage at which snags are suitable for bat roosts (exfoliating bark) is extremely short lived, requiring the use of several snags over the course of the lifetime of a bat. Bats frequently shift maternity roosts, possibly to find snags with better thermal conditions when the bark on the previous roost is no longer suitable (Miller et al. 2005). Both species have a strong association with water and riparian vegetation for foarging (Miller et al. 2005).

Aside from the clear need to provide for and protect roost sites, the threat of White-Nosed Syndrome to spread to and become established in the western United States emphasizes the need to protect hibernacula from human disturbance. Also, the need to maintain and restore overall forested habitat conditions for bats is needed in the event White-Nosed Syndrome does spread to the west. Providing quality foraging and roosting habitat may be key to maintaining bat populations.

Miller et al. (2005) and Wisdom et al. (2000) identified the following management issues that apply to the species in this group:

- Loss of large-diameter snags (>53 cm [21 inches]) for maternity roosts and day roosts
- Potential introduction of White-Nosed Syndrome to hibernacula
- Destruction of roosts, disturbance of roosting bats, or both
- Degradation and loss of native riparian vegetation
- Impacts of pesticides on bats and their prey
- Lack of information on hibernacula, including locations, special features, and numbers of bats associated with them
- Lack of population trend data

The following potential conservation strategies could be used to maintain habitat (Wisdom et al. 2000):

- Actively manage for the retention and recruitment of large-diameter snags in all forest cover types and structural stages
- Protect all roosts and reduce human disturbances near roosts
- Maintain and improve the condition of riparian and wetland vegetation for bat foraging areas
- Alleviate impacts of pesticides on bat populations
- In cooperation with other state, Federal, and tribal agencies, establish a coordinated approach to search for hibernacula, and to protect these sites

The following practices would be effective in implementing the potential conservation strategies (Miller et al. 2005, Wisdom et al. 2000):

- Retain existing snags, particularly if >53 cm (21 in), and provide measures for snag replacement. Review existing snag guidelines or develop guidelines that reflect local ecological conditions and address snag numbers, diameter, height, decay class, species, and distribution. Retain snags in clusters to provide adjacent roosts for maternity colonies. Maintain snags at higher than historical levels to restore loss in previously harvested areas.
- Emphasize retaining snags that provide best solar exposure to bark or cavity roost sites

- Reduce road densities in managed forests where snags are currently in low abundance. Close roads after timber harvests and other management activities, and minimize the period when such roads are open to minimize removal of snags along roads. In addition, or as an alternative to road management, actively enforce fuel wood regulations to minimize snag removal.
- Restrict fuel wood permits to disallow snag cutting where snags are in low abundance, particularly where existing roads cannot be closed. Recommend that public fuel wood harvest should be limited to trees <38 cm (15 in) d.b.h.
- Monitor known roosts for potential human disturbances, and initiate recreational closures or cease construction activity near roost sites
- If possible, stabilize old structures that are important for maternity roosts and hibernacula
- Survey caves, mines, and abandoned buildings before removal or closure, and protect roosting bats from human presence and disturbance. During closures, use specialized gates designed to allow continued use of mines and caves by bats.
- Assure that construction of roads and rights-of-way are not going to cause siltation, slumping, or water run-off to enter cave habitats or alter other roosting structure
- Identify areas of existing riparian and wetland habitats that are important bat foraging areas, and design conservation measures to protect and enhance foraging opportunities for bats
- Modify grazing practices to improve condition of degraded riparian areas for bat foraging and roosting
- Restore degraded areas by appropriate mechanical treatments and with seeding of appropriate native species
- Avoid pesticide use in areas of high bat foraging activity or near nursery colonies
- Use existing interagency cooperative agreements, or develop agreements where needed, to conduct surveys for hibernacula
- Use individual project planning (such as timber sales, road construction, mineral extraction, or recreational development) as opportunities for conducting surveys for new roost sites and to assess population status of known roosts

The primary reason that these two species are SCC is the clear risk posed by disturbances to key roost sites, and that these species are typically habitat generalists. In addition, no agreement exists on the proper habitat parameters that could be used to develop a model. Therefore, the amount and distribution of predicted habitat has been not modeled using the SIMPPLLE process. However, best available science has documemted habitat components that can be retained and managed for these species.

Group 27

The Townsend’s big-eared bat is the only SCC in this group. The species is a forest generalist within the subalpine, montane, upland woodland, and riparian woodland community groups. It generally uses a wide-variety of forested cover types, albeit on the moister emd of the forest spectrum, in all structural stages except the stem-exclusion and stand-initiation stage. Source habitat for the Townsend's big-eared bat includes several cover types within the upland shrubland, upland herbland, and riparian shrubland community groups (Volume 3, Appendix 1, Table 1 in Wisdom et al. 2000).

The current extent of habitat is similar to the historical distribution (Volume 2, Figure 82b in Wisdom et al. 2000), although the abundance of habitat has changed in some areas. Overall, basinwide, there is a neutral trend in watershed change. In the planning area, watersheds with increasing trends are located in the Blue Mountains and Central Idaho Mountains ERUs; however, there are mixed trends in the northern portion of the Central Idaho Moutains ERU and declining trends in the Lower Clark Fork and Columbia Plateau ERUs in the northern part of the planning area (Volume 2, Figures 82C and 83 in Wisdom et al. 2000).

Mixed trends in habitat reflect the association of the species in Group 27 with several cover types and nearly all structural stages of forests as source habitats. The basin has experienced dramatic declines in old-forest structural stages of all forest cover types (Volume 3, Appendix 1, Table 4 in Wisdom et al. 2000), but these losses have been offset by increases in mid-seral stages that also serve as source habitats. In the Blue Mountains, Northern Glaciated, and Central Idaho Mountains ERUs, increasing trends were largely due to increases in the areal extent of grand fir-white fir. The Engelmann spruce-subalpine fir cover type has also increased in the Central Idaho Mountains ERU (Volume 3, Appendix 1, Table 4 in Wisdom et al. 2000).

Figure 18-36 shows the relative changes for watersheds within the basin and ERUs within the planning area.

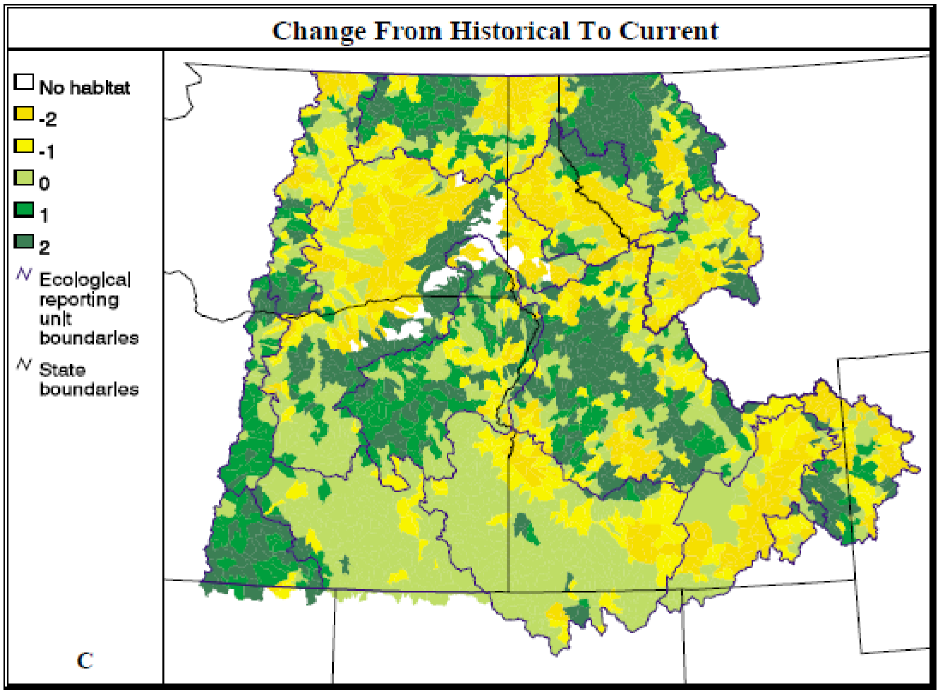

Figure 18-36. Percentage of area identified as source habitats and the relative change, in percentage of area, of source habitats from historical to current periods for Group 27 (Figure 82c, Volume 2 in Wisdom et al. 2000). Note: Relative change for each watershed is shown as one of five trend categories, where -2 = a decrease of >60 percent, -1 = a decrease of >20 percent but <60 percent, 0 = an increase or decrease of <20 percent, 1 = an increase of >20 percent but <60 percent, and 2 = an increase of >60 percent.

The Townsend's big-eared bat is colonial in its use of caves and cavelike structures for nursery colonies, day roosts, and hibernacula (Miller et al. 2005). Big-eared bats do not roost in crevices like many other bat species but rather restrict their roosting sites to the ceilings of cavelike structures (caves, mines, and buildings), where they aggregate in large colonies. A stable, cold temperature and moderate airflow may be important criteria for hibernation (Miller et al. 2005). The distribution of big-eared bats is patchy across the basin because of their restrictive roosting requirements (Wisdom et al. 2000). The big-eared bat is a moth specialist (Miller et al. 2005).

Mines and caves are special habitat features for this species (Wisdom et al. 2000). The number of caves likely has stayed the same from historical to present periods, but human disturbance from recreation has increased, thereby causing some caves to be abandoned by big-eared bats (Miller et al. 1995). Because the distribution of Townsend's big-eared bats depends on specialized roosting requirements, alterations and disturbances of any structures used for day roosts, nursery colonies, or hibernacula (caves, mines, old buildings) could affect the persistence of individual colonies (Wisdom et al. 2000).

The big-eared bat is negatively affected by the presence of roads. Increased road networks have made caves more accessible and have increased the amount of human visitation and potential harassment. Because the big-eared bat is insectivorous, use of insecticides in foraging areas has the potential to impact bat species, primarily by reducing the prey base (Wisdom et al. 2000).

Miller et al. (2005) and Wisdom et al. (2000) identified the following management issues that apply to the species in this group:

- Direct loss of big-eared bat roosts because of cave and mine closures and destruction of abandoned buildings
- Excessive disturbance of roosting bats from human activities
- High mortality of roosting bats or total loss of colonies because of vandalism and shooting
- Reduction in bat prey base (moths) through excessive use of insecticides

The following potential conservation strategies could be used to maintain habitat (Wisdom et al. 2000):

- Protect all known roost sites (nursery, day roosts, and hibernacula) of big-eared bats and restore historical roosts where feasible
- Reduce levels of human activities around known bat roosts
- Reduce vandal-related mortalities of roosting bats
- Reduce impacts of insecticide use on principal prey of big-eared bats

The following practices would be effective in implementing the potential conservation strategies (Miller et al. 2005, Wisdom et al. 2000):

- Survey all mines and caves scheduled for public closure for big-eared bats before closure. If roosting colonies are found, or if the structure has potential as a roosting colony, carry out the closure with gates that allow bats to enter and exit the structure. If possible, stabilize old structures that are important for maternity and hibernacula sites.
- Initiate seasonal public closures of caves used as big-eared bat roosts during critical time periods, by using signs, road closures, and bat gates
- Reduce surveys to the minimum needed for assessing colony health and population status; coordinate research efforts to minimize entry of roosts for data collection
- Increase public education and awareness of bat ecology and the current conservation status of big-eared bats
- Reduce human access to bat roosting structures by closing roads that facilitate access to such habitat
- Avoid or minimize applying pesticides near bat roosts; utilize “no-spray” buffer zones around roost sites and reduce the amount of area sprayed around known roosts

The primary reason that these two species are SCC is the clear risk posed by disturbances to key roost sites, and that these species are typically habitat generalists. In addition, no agreement on the proper habitat parameters that could be used to develop a model exist. Therefore, the amount and distribution of predicted habitat has been not modeled using the SIMPPLLE process. However, best available science has documemted habitat components that can be retained and managed for these species.

18.1.4 *Interior Columbia Basin Ecosystem Management Project Key Findings and Implications*

18.1.4.1 Habitat Families

Wisdom et al. (2000) described the following major findings and implicatiuons for the families relevant to the Forests:

1. Source habitats for most species declined strongly from historical to current periods across large areas of the basin. Strongest declines were for species that depend on low-elevation, old-forest habitats (Family 1). Widespread, but less severe declines, also occurred for most species that depend on old-forest habitats present in several elevation zones (Family 2). Source habitats for the above-named families have become increasingly fragmented, simplified in structure, and infringed on or dominated by exotic plants.

2. Primary causes for decline in old-forest habitats (Families 1 and 2) are intensive timber harvest and large-scale fire exclusion. Note: Wisdom et al. (2000) also stated that low-elevation, old-forest habitats have declined on lands adjacent to NFS lands due to the conversion of land to agriculture and to residential or urban development.

3. Altered fire regimes are responsible for decline in native grassland and shrubland habitats.

Wisdom et al. (2000) noted the following implications of the broad-scale analysis:

1. Manage old-forest structural stages, including the potential to conserve old-forest habitats in subbasins and watersheds where decline has been strongest

2. Manipulate mid-seral forests to accelerate development of late seral stages where such manipulations can be done without further reduction in early or late-seral forests

3. Restore fire and other disturbance regimes in all forested structural stages to hasten development and improvement in the amount, quality, and distribution of old-forest stages

Wisdom et al. (2000) noted that many of the practices designed to restore old-forest habitats also can be designed to restore early seral habitats. For example, long-term restoration of more natural fire regimes will hasten development of both early and late-seral structural conditions and minimize areas of mid-seral habitats, upon which few, if any, species depend on as source habitat.

Wisdom et al. (2000) concluded that a major opportunity existed in the basin for conserving and restoring source habitats across various landownerships and jurisdictions at multiple spatial scales. Related to the planning area, these opportunities range from the 3 key ERUs to the watershed levels as indicated by the mapping of the trends of these watersheds. These opportunities exist to be designed into long-term efforts to, " restore source habitats that have undergone strong, widespread decline, with simultaneous design of efforts to conserve and restore terrestrial species and their habitats" (Wisdom et al. 2000).

18.1.4.2 Species Groups

Wisdom et al. (2000) described the following major findings and implicatiuons for the Species Groups relevant to the identified SCC for the Forests (Additional implications not in Wisdom et al. [2000] are noted):

- Group 1
  - Basin-wide decline in late-seral interior and ponderosa pine
  - Basin-wide loss of large-diameter snags (>53 cm [21 in])
  - High risk of additional loss of ponderosa pine habitat through stand-replacing fires
  - Decline in old forests of aspen and cottonwood-willow
- Group 2
  - Declines in shrub understories of montane and lower montane forests
  - Basinwide decline in old forests of interior and ponderosa pine and interior western larch
  - Basinwide decline in old forests of cottonwood woodlands
  - Decline in availability of large snags and trees for foraging and nesting
  - Potential for negative impacts from agricultural pesticides
- Group 5
  - Reduction in the amount of old forests and associated structures (snags, logs, and cavities), particularly within the montane and lower montane community groups
  - Fragmentation of habitat
  - Low population numbers of fisher
  - Negative effects resulting from higher road densities in source habitats. The loss of snags and logs associated with firewood collection may be higher along open roads.
  - Declines in overall extent of aspen and cottonwood-willow and shifts from early and late-seral to mid-seral stages of these cover types
  - Possible unsustainable conditions of old forests where large transitions from shade-intolerant to shade-tolerant tree species have occurred. This issue is the result of the exclusion of fire from many forested communities, which has resulted in increased susceptibility to stand-replacing fires.
- Group 7
  - Declines in late-seral subalpine and montane forests in the Lower Clark Fork ERU
  - Loss of large-diameter snags (>45 cm [18 in] d.b.h.
  - Declines in large aspen trees and forests primarily because of fire suppression
  - Increasingly disjunct distribution of source habitat that may affect population structure and persistence of boreal owls
  - Loss of microenvironments for small-mammal prey. Changes in forest structure and composition (such as loss of snags and logs) that may alter habitat for primary prey species.
- Group 11

  - Decline in late-seral subalpine and montane forests. Cover types with basinwide decline are western larch and whitebark pine. Declines of Engelmann spruce-subalpine fir are most notable in northern portions of the basin.
  - Potential decline in key components of the shifting food and nesting resource, which is characterized by large areas of conifer trees infected with bark beetles, disease, or heart rot, or in the early stages of decay

- Group 17
  - Decline in late- and early seral source habitats
  - Changes in vegetation composition and structure of understory shrub habitat
  - Loss of riparian shrubs
  - Increased interaction with humans
  - Isolated and disjunct populations of mountain quail are vulnerable to stochastic events

- Group 22
  - Incompatibility with domestic sheep and possibly domestic goats because of the potential for disease transmission and competition for forage
  - Reduction in forage quantity and quality, and habitat fragmentation because of successional changes
  - Disturbance and habitat displacement because of human activities in lambing areas

- Group 26
  - Basinwide loss of large-diameter snags (>53 cm [21 in]) maternity roosts and day roosts
  - Destruction of roosts, disturbance of roosting bats, or both
  - Degradation and loss of native riparian vegetation
  - Impacts of pesticides on bats and their prey
  - Lack of information on hibernacula
  - The potential impacts of White-Nosed Syndrome if it spreads to the planning area (WBWG 2009, Perry 2013)

- Group 27
  - Direct loss of bat roosts because of cave and mine closures and destruction of abandoned buildings
  - Excessive disturbance of roosting bats because of human activities
  - High mortality of roosting bats or total loss of colonies because of vandalism and shooting
  - Reduction in bat prey base (moths) through excessive use of insecticides
  - The potential impacts of White-Nosed Syndrome if it spreads to the planning area (WBWG 2009, Perry 2013)

This summary of ICBEMP findings and implications can be useful in the development of Plan components such as desired future conditions, objectives, standards, and/or guidelines as per the 2003 MOU (USDA Forest Service 2003b).

18.1.5 *Idaho Comprehensive Wildlife Conservation Strategy*

In 2001, Congress provided funding through the State Wildlife Grants program (SWG) to each State and territory to develop a State Wildlife Action Plan (SWAP). These proactive plans, known technically as Comprehensive Wildlife Conservation Strategies (CWCSs), help conserve wildlife and vital natural areas before they become rarer and more costly to restore. They also are intended to make the best use of the federal funds provided through annual Wildlife Conservation and Restoration Program (WCRP) payments and SWG program to help meet the need for conservation of all fish and wildlife. The U.S. Fish and Wildlife Service was tasked with reviewing and approving these CWCSs (USFWS 2014).

State fish and wildlife agencies developed these strategic action plans by working with a broad array of partners, including scientists, sportsmen, conservationists, and members of the community. Working together, with input from the public, these diverse coalitions agreed on actions needed for the full array of wildlife in every state (USFWS 2014). The State of Idaho completed its CWCS in 2005 (IDFG 2005)

18.1.5.1 Species of Conservation Concern Relationships with Comprehensive Wildlife Conservation Strategy

Bitterroot Mountains Section

This area (Figure 18-37 and Figure 18-38) consists of steep, dissected mountains with sharp crests and narrow valleys. Elevation ranges from1,200–7,000 feet. Perennial streams are generally fairly steep and deeply incised. Major rivers include the Coeur d’Alene, St. Maries, St. Joe, and Clearwater (IDFG 2005).

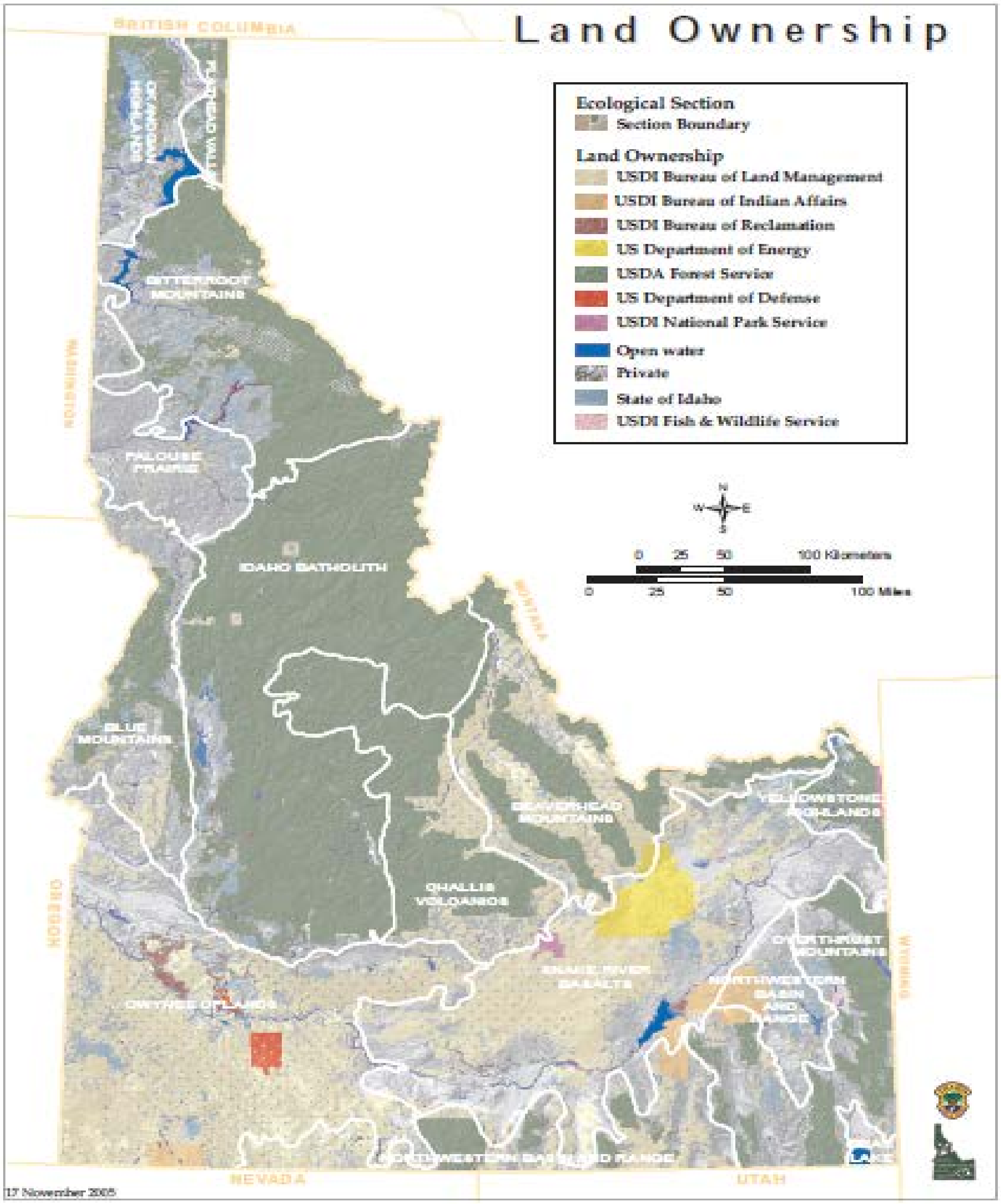

Figure 18-37. Relationship of Comprehensive Wildlife Conservation Strategies Ecological Sections with National Forest System lands

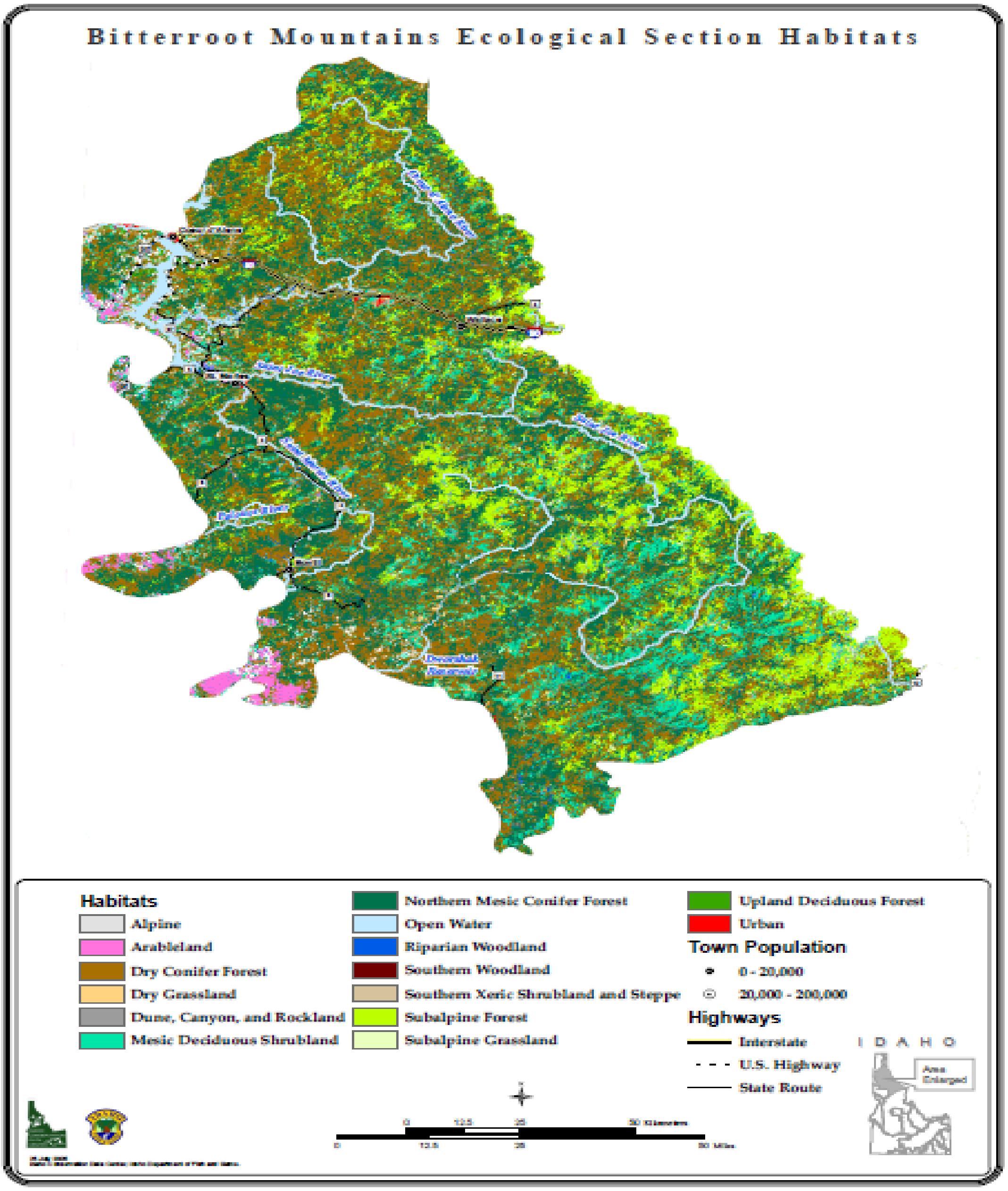

Figure 18-38. Bitterroot Mountains Section

The CWCS lists a total of 55 SGCN with a terrestrial relationship in this Ecological Section. Of these 55, the following 11 of 13 selected SCC species occur in this Ecological Section.

Amphibians

- Coeur d'Alene Salamander—*Plethodon idahoensisa*[1]

Birds

- Mountain Quail—*Oreortyx pictus*
- Boreal Owl—Aegolius funereus[1]
- Lewis's Woodpecker—Melanerpes lewis
- White–headed Woodpecker—Picoides albolarvatus[1]
- American Three–toed Woodpecker—Picoides dorsalis[1]
- Pygmy Nuthatch—Sitta pygmaea

Mammals

- California Myotis—Myotis californicusa[1]
- Fringed Myotis—Myotis thysanodes[1]
- Townsend's Big–eared Bat—Corynorhinus townsendii
- Fisher—Pekania (Martes) pennanti[1]

[1] Species for which the Bitterrroot Mountains Ecological section represents a significant portion of their Idaho range (IDFG 2005)

Idaho Batholith Section

This area (Figure 18-37 and Figure 18-39) is characterized by extensive mountainous terrain, alpine ridges, cirques, and large U–shaped valleys with broad bottoms, and other features of glacial origins dominate many areas, such as the Sawtooth Mountains. Waterbodies are predominant, including major portions of the Salmon and Clearwater rivers. Many perennial streams and lakes are present, as well as a number of reservoirs. Elevation ranges from 1,400 to 11,000 feet (IDFG 2005).

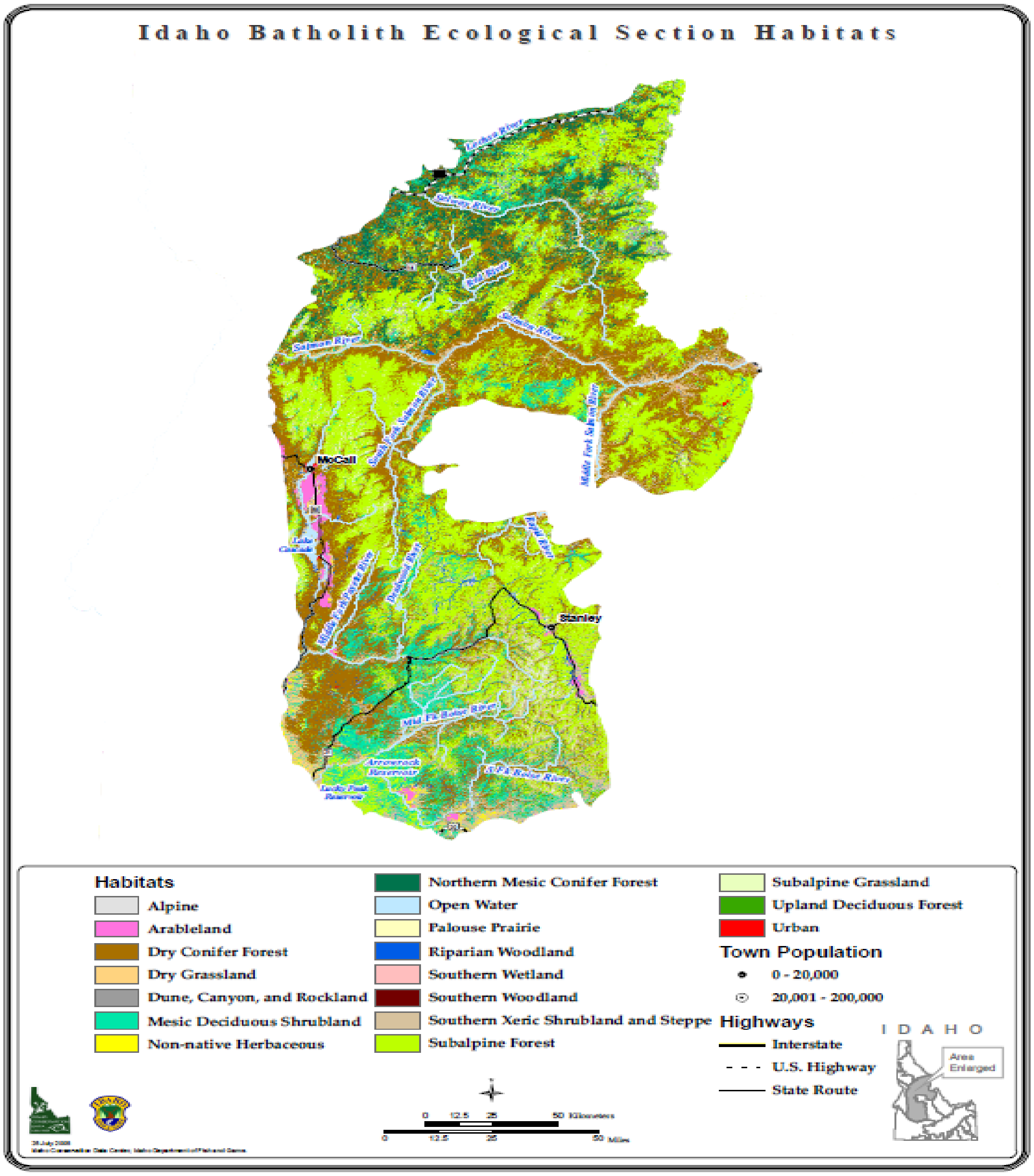

Figure 18-39. Idaho Batholith Section

The CWCS lists a total of 81 SGCN with a terrestrial relationship in this ecological section. Of these 81, 11 of the 13 selected SCC species occur in the Idaho Batholith Section.

Amphibians

- Coeur d'Alene Salamander—*Plethodon idahoensisa*[2]

Birds

- Mountain Quail—*Oreortyx pictus*[2]
- Flammulated Owl—*Otus flammeolus*
- Boreal Owl—*Aegolius funereus*[2]
- Lewis's Woodpecker—*Melanerpes lewis*
- White–headed Woodpecker—*Picoides albolarvatus*[2]
- American Three–toed Woodpecker —*Picoides dorsalis*[2]
- Pygmy Nuthatch—*Sitta pygmaea*[2]

Mammals

- Fringed Myotis—*Myotis thysanodes*[2]
- Townsend's Big–eared Bat—*Corynorhinus townsendii*
- Fisher—*Pekania* (*Martes*) *pennanti*[2]

[2] Species for which the Idaho Batholith Ecological Section represents a significant portion of their Idaho range (IDFG 2005).

Blue Mountains Section

This area (Figure 18-37 and Figure 18-40) consists of steep, dissected mountains with sharp crests and narrow valleys. Elevation ranges from 1,200–7,000 feet. Perennial streams are generally fairly steep and deeply incised. Major rivers include the Coeur d'Alene, St. Maries, St. Joe, and Clearwater (IDFG 2005).

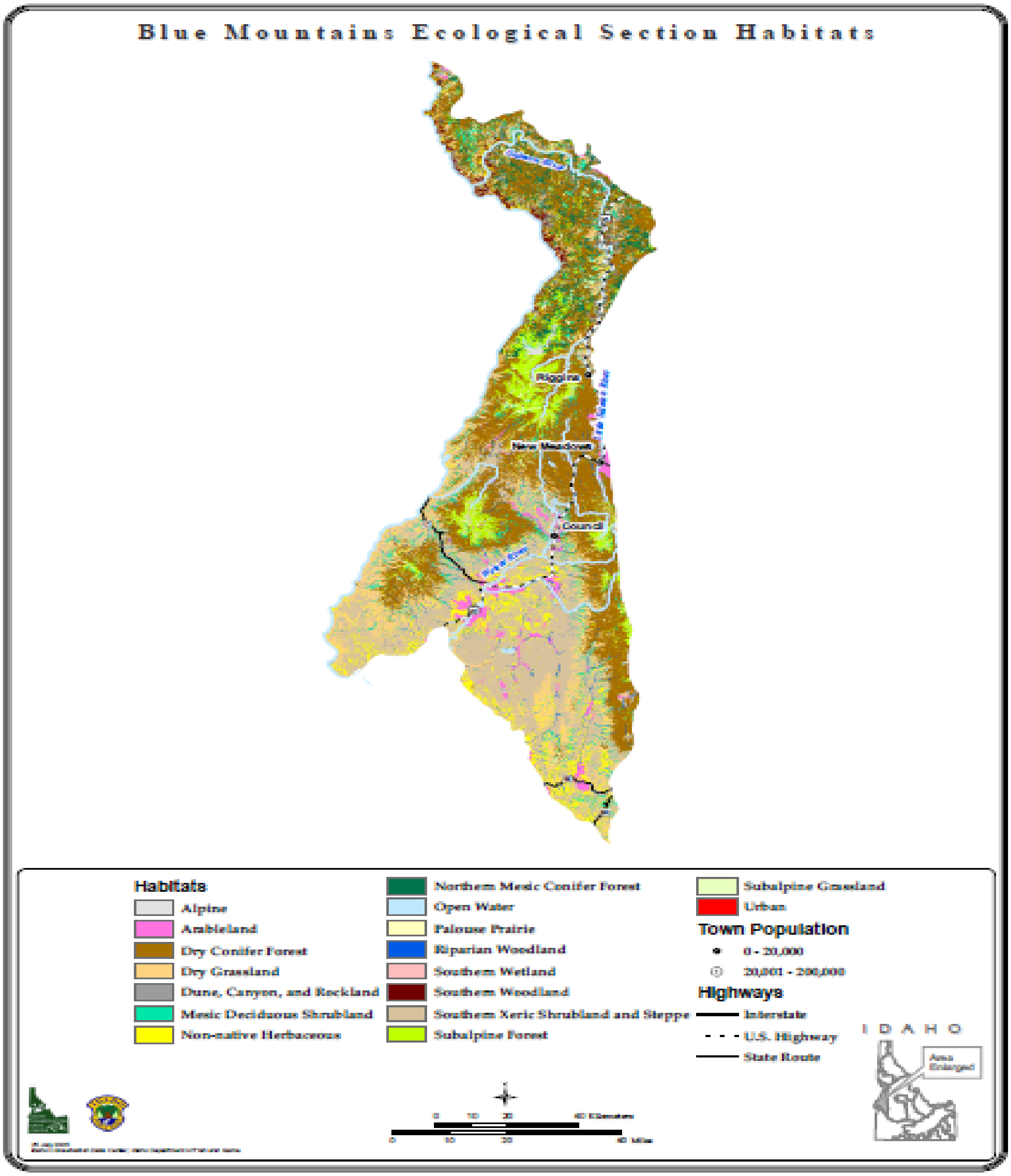

Figure 18-40. Blue Mountains Section

The CWCS lists a total of 88 SGCN with a terrestrial relationship in this ecological section. Of these 88, 11 of the 13 selected SCC species occur in the Blue Mountains Section.

Birds

- Mountain Quail—*Oreortyx pictus*
- Flammulated Owl—*Otus flammeolus*
- Boreal Owl—*Aegolius funereus*
- Lewis's Woodpecker—*Melanerpes lewis*
- White–headed Woodpecker—*Picoides albolarvatus*[3]
- American Three–toed Woodpecker—*Picoides dorsalis*
- Pygmy Nuthatch—*Sitta pygmaea*[3]

Mammals

- California Myotis—Myotis californicus[3]
- Fringed Myotis—Myotis thysanodes
- Townsend's Big–eared Bat—Corynorhinus townsendii
- Fisher—Pekania (Martes) pennanti

[3] Species for which the Blue Mountains Ecological section represents a significant portion of their Idaho range (IDFG 2005).

Palouse Prairie Section

This section (Figure 18-37 and Figure 18-41) is characterized by dissected loess–covered basalt plains, undulating plateaus, and river breaklands. Elevation ranges from 720 to 5,700 feet. The lower reaches and confluence of the Snake and Clearwater rivers are major waterbodies (IDFG 2005).

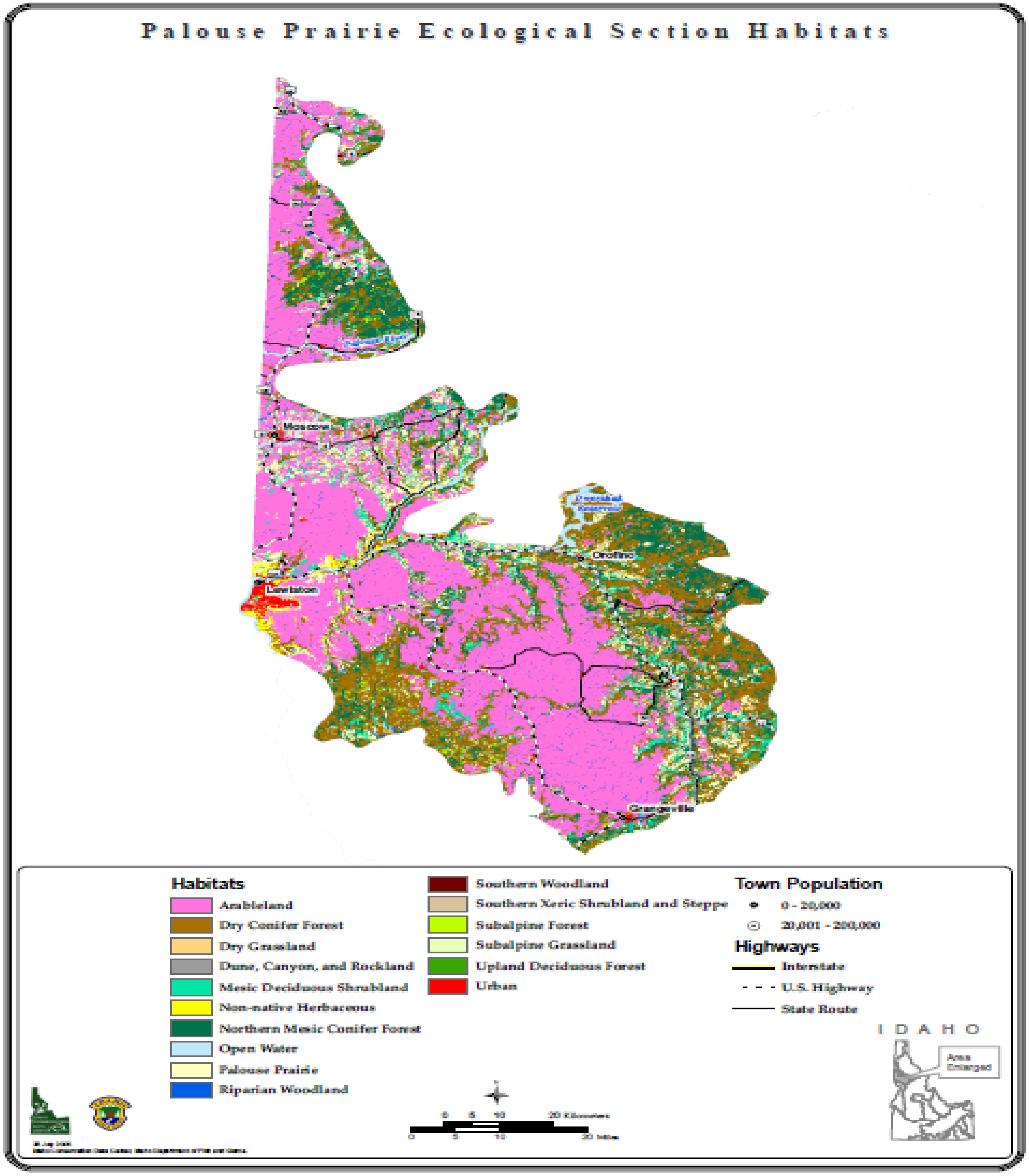

Figure 18-41. Palouse Prairie Section

The CWCS lists a total of 60 SGCN with a terrestrial relationship in this ecological section. Of these 60, 12 of the 13 selected SCC species occur in the Palouse Prairie Section.

Amphibians

- Coeur d'Alene Salamander—Plethodon idahoensisa[4]

Birds

- Mountain Quail—Oreortyx pictus
- Flammulated Owl—Otus flammeolus
- Boreal Owl—Aegolius funereus
- Lewis's Woodpecker—Melanerpes lewis
- White–headed Woodpecker—Picoides albolarvatus
- American Three–toed Woodpecker—Picoides dorsalis
- Pygmy Nuthatch—Sitta pygmaea

Mammals

- California Myotis—Myotis californicus
- Fringed Myotis—Myotis thysanodes
- Townsend's Big–eared Bat—Corynorhinus townsendii
- Fisher—Pekania (Martes) pennanti

Comprehensive Wildlife Conservation Strategy Issues

The CWCS makes general recommended actions for conservation by priority habitats according to the ecological conditions represented within the ecological sections. These recommended actions are listed in the "State Overview" section (IDFG 2005). The CWCS also provides additional recommended actions in the species-specific accounts located in Appendix F (IDFG 2005).

Further discussions for the identified SCC species and their associated habitats will be discussed at the forest (mid-scale) and habitat-type group (fine-scale) levels.

18.1.6 *Mid-scale (Forest Level): Nez Perce–Clearwater National Forests*

The Nez Perce-Clearwater National Forests (Figure 18-42) consists of approximately 4.0 million acres of beautiful and diverse land located in northcentral Idaho. Wildlife habitat conditions vary widely from the dry, rugged canyons of the Salmon River to the moist cedar forests of the Selway River drainage, the rolling uplands of the Palouse, and the high-elevation mountains across the Forests.

[4] Species for which the Palouse Prairie Ecological section represents a significant portion of their Idaho range (IDFG 2005).

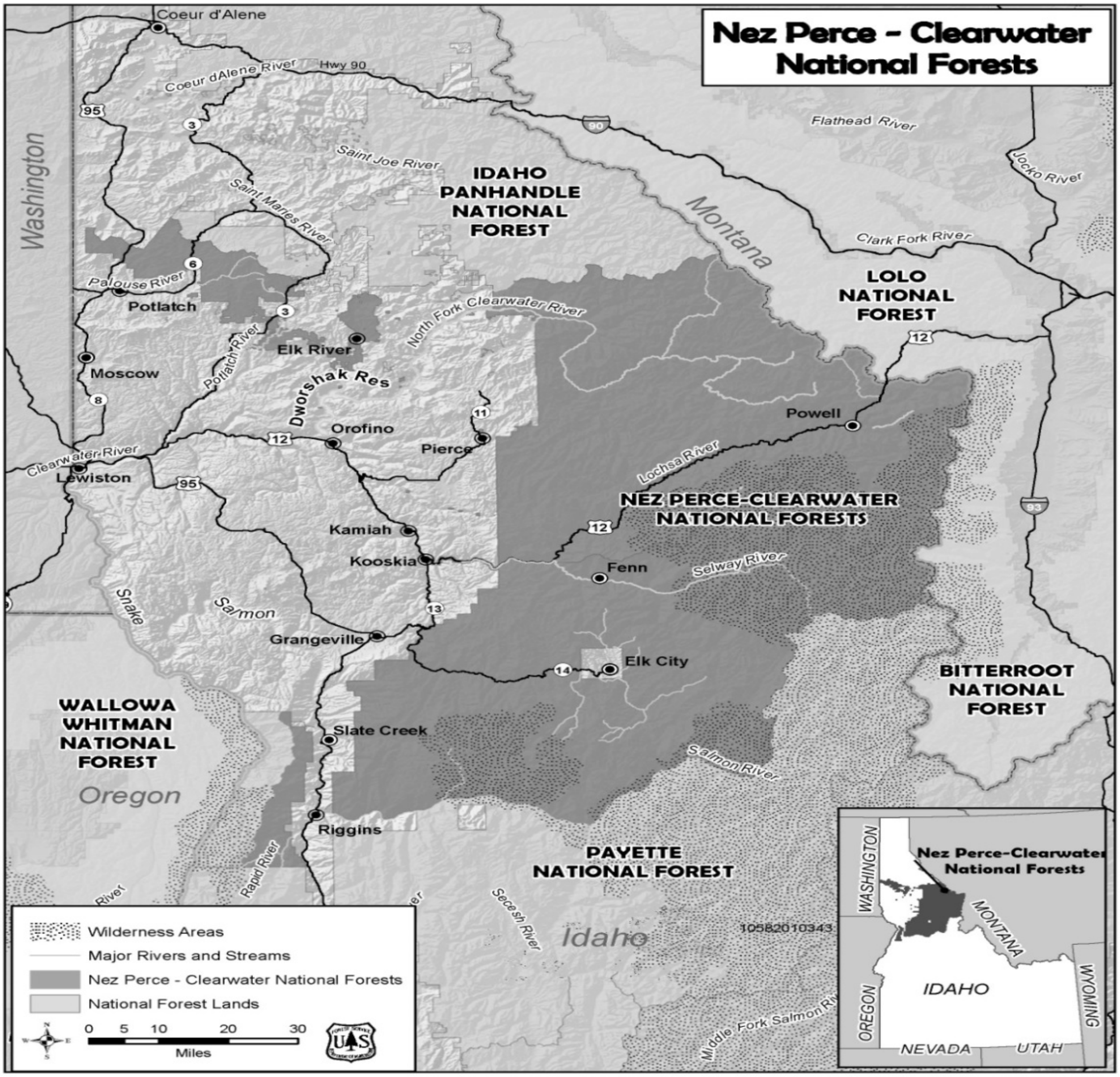

Figure 18-42. Nez Perce-Clearwater National Forests

18.1.6.1 SCC Existing Habitat, Historical Range of Variation and 50-Year Projection Data

The following data were developed by applying the best available science to modeling species habitat to estimate existing habitat availability, Historical Range of Variation (HRV) without management influences, and the 50-Year projection of future habitat conditions were based on the Proposed Action harvest schedule.

White-headed Woodpecker

Based on SIMPPLLE modeling of the best available science, the planning area contains 33,777 acres of estimated suitable habitat and 70,333 acres of potentially suitable habitat. Figure 18-43 depicts the estimated suitable habitat for the species as modeled. Due to the low resolution of estimated suitable habitat, Figure 18-44 depicts the points where estimated habitat exists. Also, no historical evidence exists that the species existsed in the interior of the Clearwater and Selway portions of the planning area.

Figure 18-45 and Figure 18-46 depicts the HRV (estimated suitable and potential habitat) for the species as modeled.

Figure 18-45 and Figure 18-46 indicate that the current estimates of white-headed woodpecker habitat are departed from the HRV (less than existing) for both suited and potential habitat. However, modeling depicts the data based on the presence of key habitat attributes. Actual stand conditions may contain stand densities and other attributes that are less suited for this species. Figure 18-46 may indicate the impacts of past fire suppression that have resulted in higher than normal stand conditions in potentially suitable habitat and/or the artifact of the documented significant decline of the ponderosa pine ecosystem in the planning area.

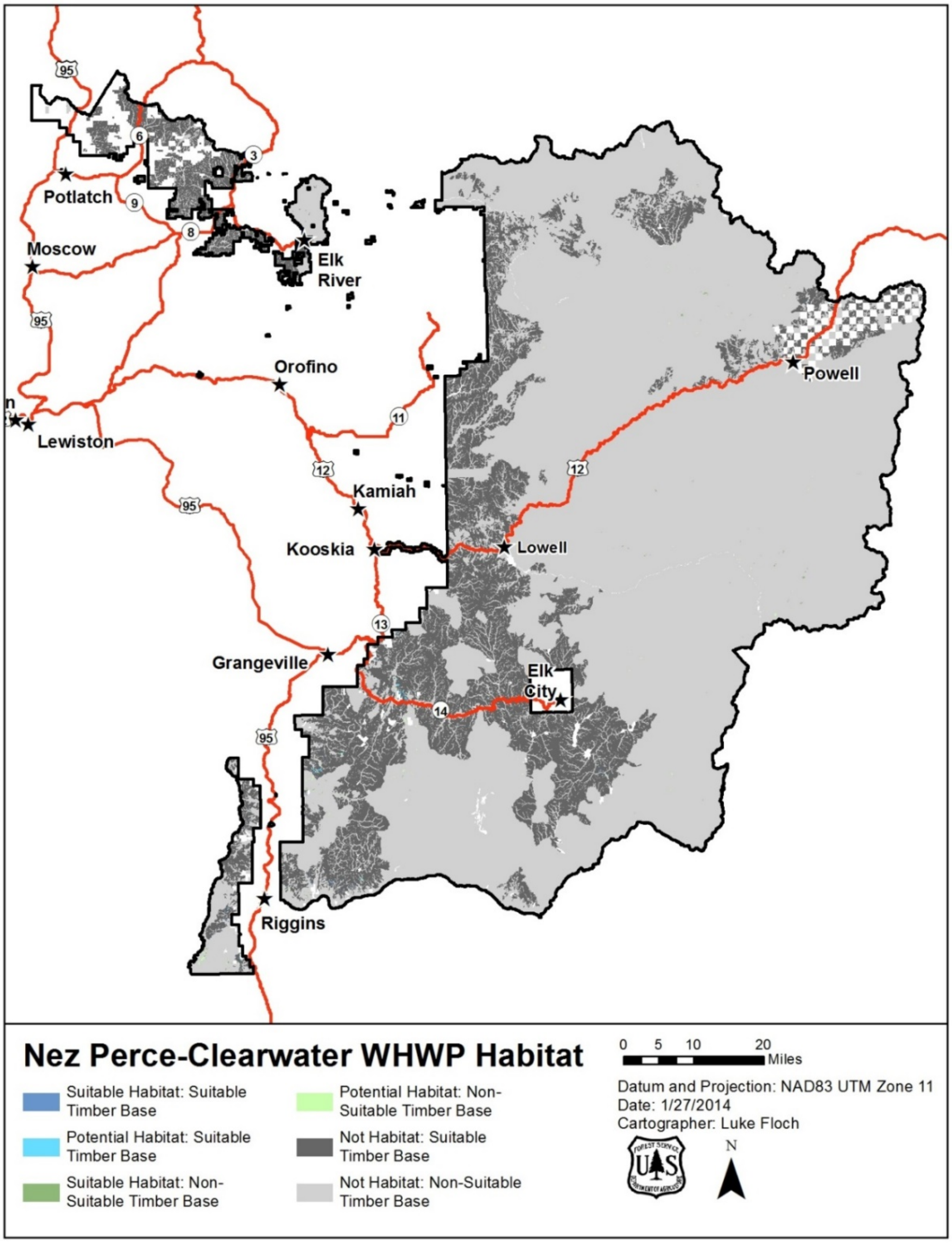

Figure 18-43. Distribution of estimated suitable white-headed woodpecker habitat on the Nez Perce-Clearwater National Forests

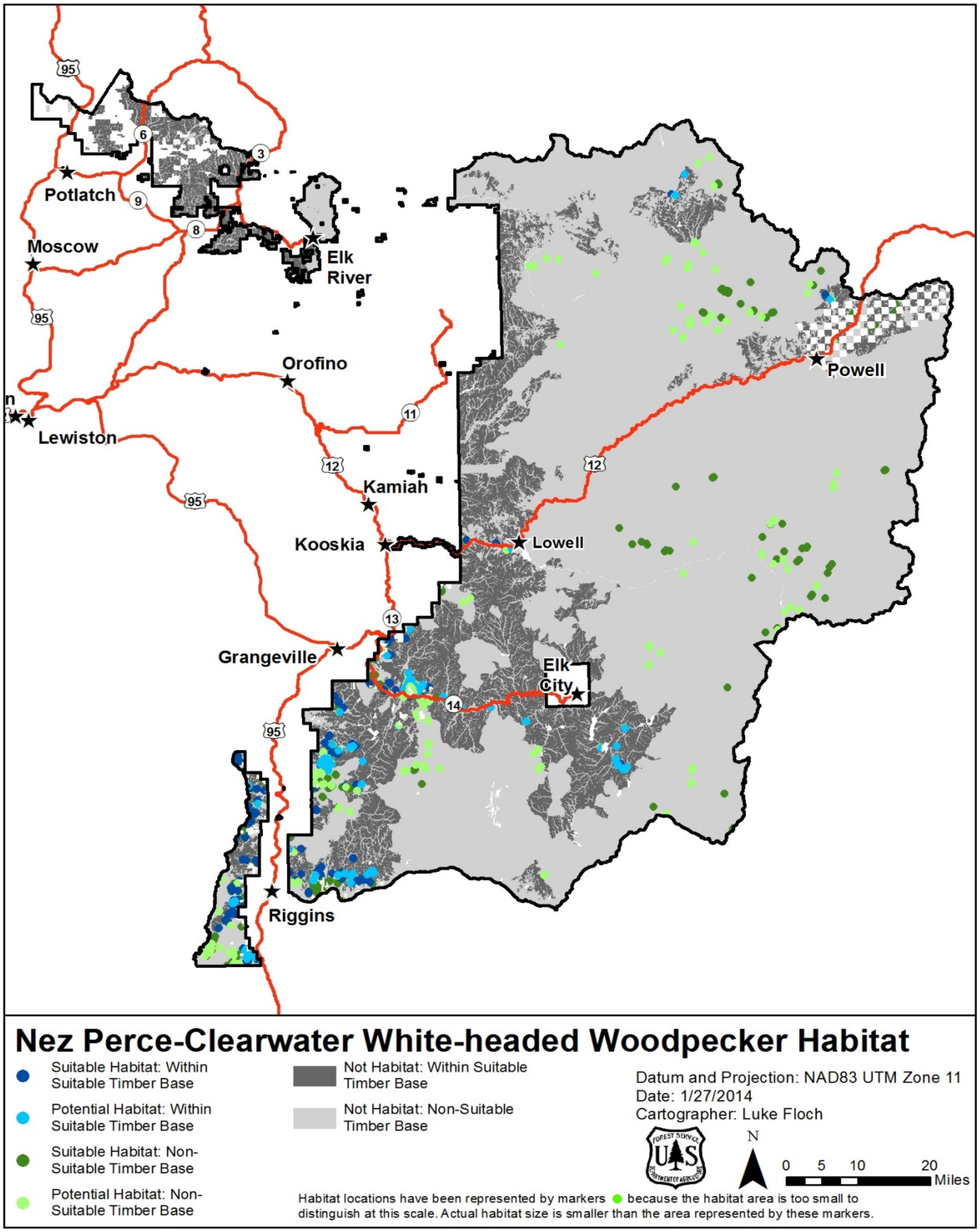

Figure 18-44. Distribution of estimated suitable white-headed woodpecker habitat "points" on the Nez Perce-Clearwater National Forests

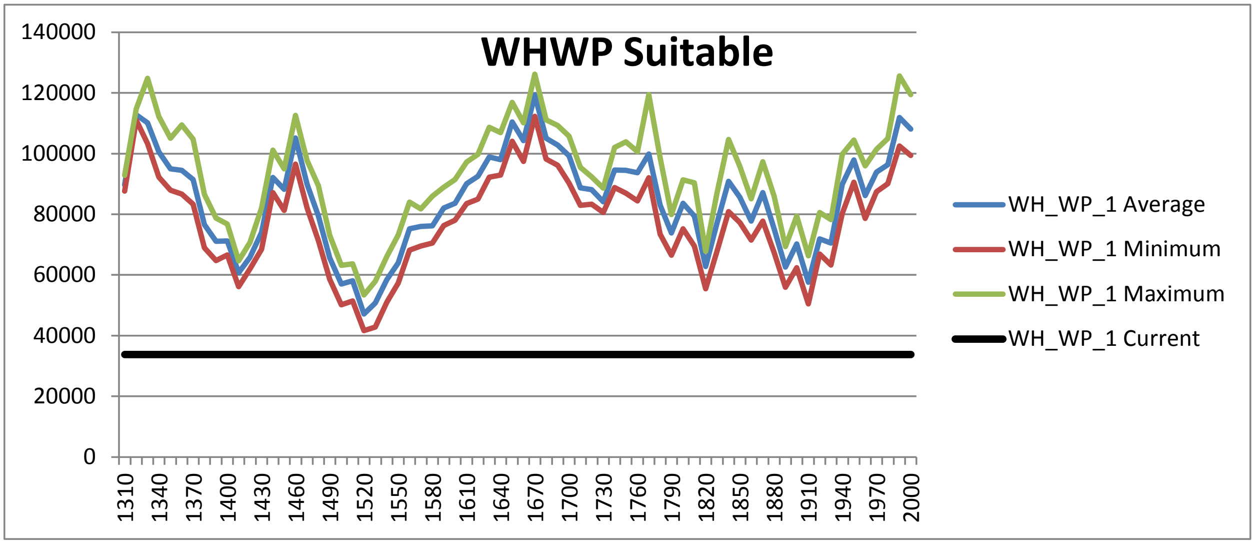

Figure 18-45. Estimated Historical Range of Variation for white-headed woodpecker suitable habitat

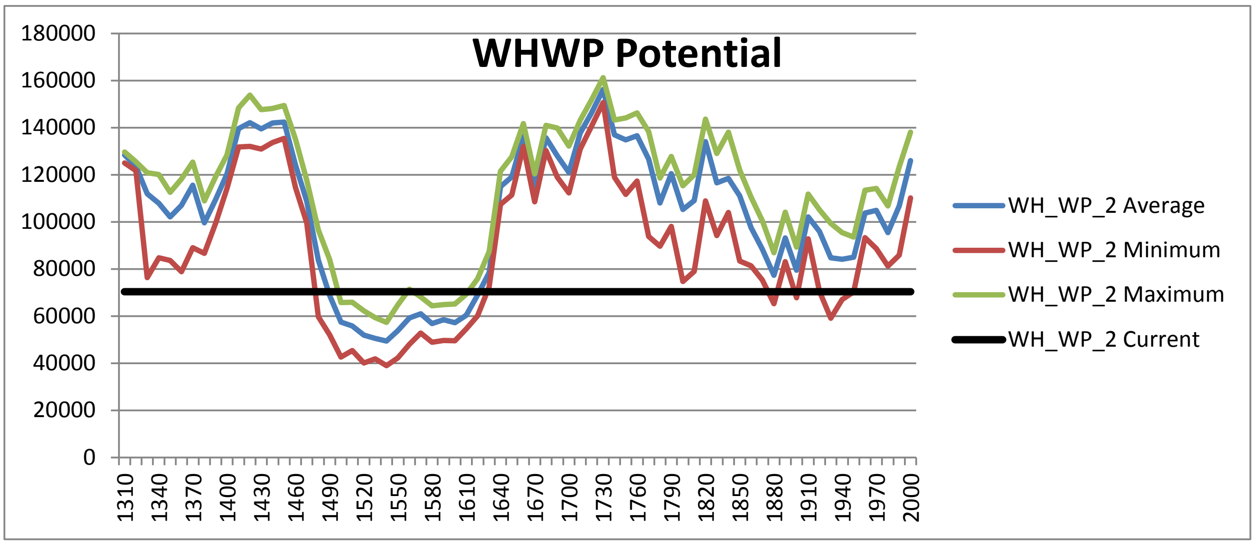

Figure 18-46. Estimated Historical Range of Variation for white-headed woodpecker potential habitat

Pygmy Nuthatch

Based on SIMPPLLE modeling of the best available science, the planning area contains 162,992 acres of estimated suitable habitat and 35,126 acres of potentially suitable habitat. Figure 18-47 depicts the estimated suitable habitat for the species as modeled.

Figure 18-48 and Figure 18-49 depict the HRV (estimated suitable and potential habitat) for the species as modeled.

Figure 18-48 and Figure 18-49 indicate that the current estimates of pygmy nuthatch habitat is departed from the HRV for both suited (less than existing) and potential habitat (slightly more than existing). However, modeling \depicts the data based on the presence of key habitat attributes. Actual stand conditions may contain stand densities and other attributes that are less suited for this species. Potential habitat estimates should be investigated to determine the variations depicted in Figure 18-49. Figure 18-49 may depict an artifact of fire suppression to habitat that may be selected for use if stand conditions would be more suitable for the species.

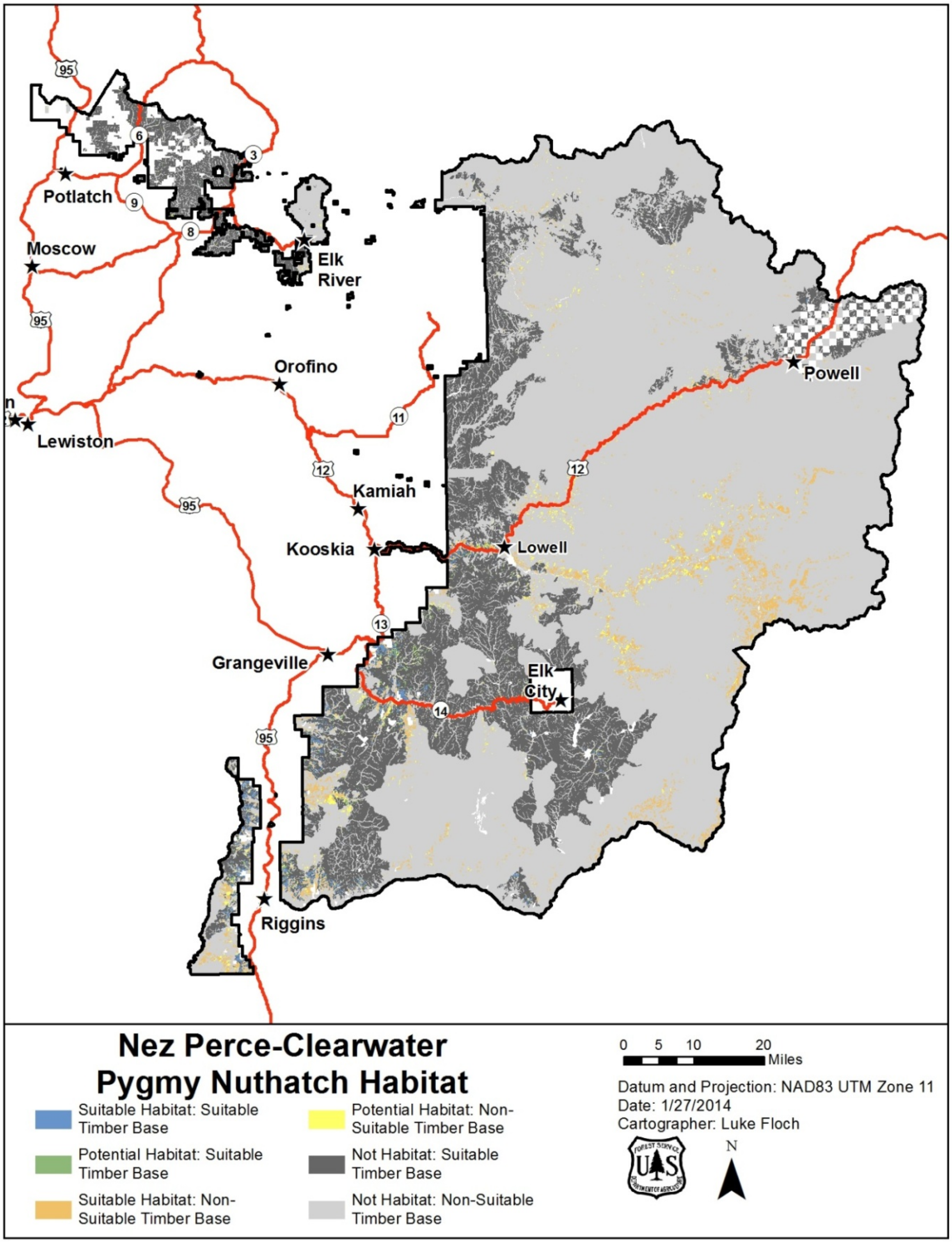

Figure 18-47. Distribution of estimated suitable pygmy nuthatch habitat on the Nez Perce-Clearwater National Forests

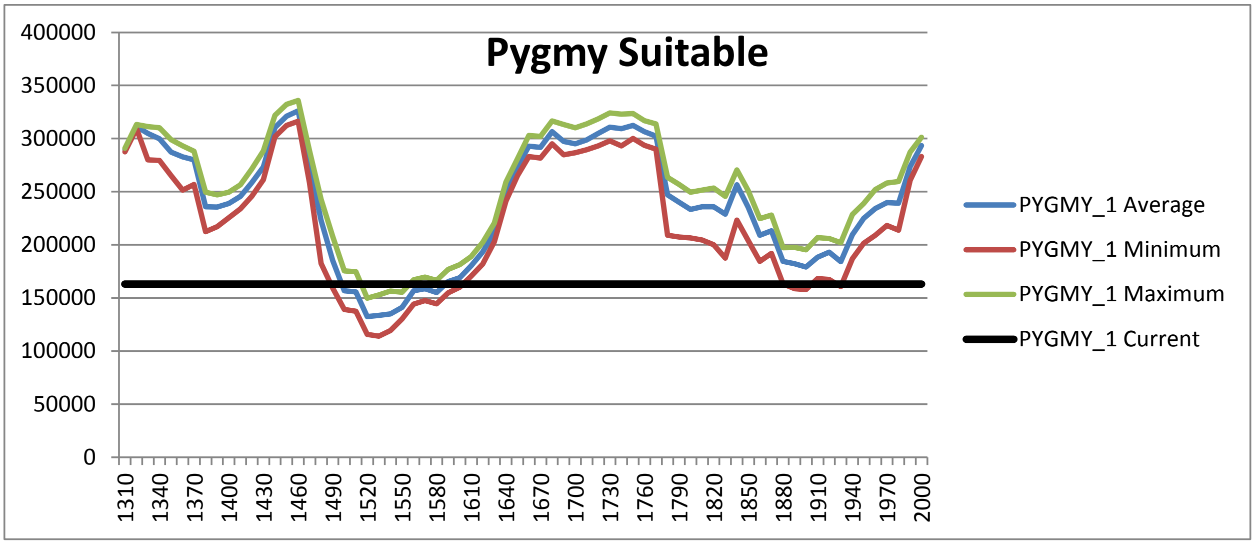

Figure 18-48. Estimated Historical Range of Variation for estimated suitable pygmy nuthatch habitat

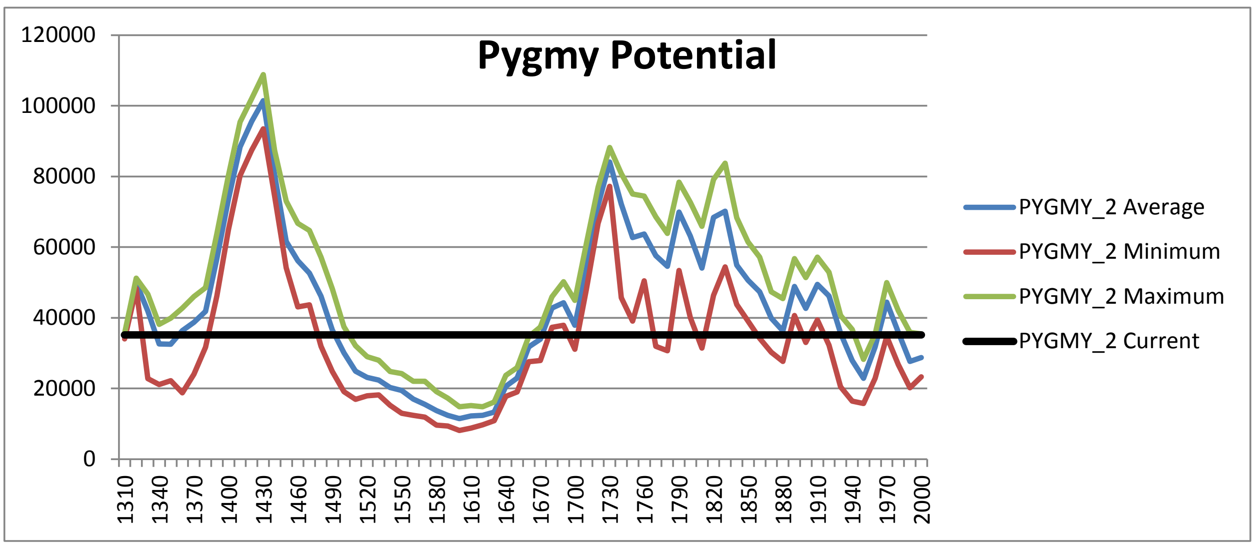

Figure 18-49. Estimated Historical Range of Variation for potential pygmy nuthatch habitat

Lewis' Woodpecker

Based on SIMPPLLE modeling of the best available science, the planning area contains 59,252 acres of estimated suitable habitat and 114,833 acres of potentially suitable habitat for the Lewis' woodpecker. Figure 18-50 depicts the distribution of estimated suitable habitat for the species as modeled.

Figure 18-51 and Figure 18-52 depicts the HRV (estimated suitable and potential habitat) for the species as modeled.

Figure 18-51 and Figure 18-52 indicate that the current estimates of Lewis's woodpecker habitat are departed from the HRV for both suited (less than existing) and potential habitat (slightly more than existing). Actual stand conditions may contain stand densities and other attributes that are less suited for this species. Potential habitat estimates in Figure 18-52 should be investigated to determine if the variations represent either or both an artifact of fire suppression and varied habitat availability due to climate changes over time. Figure 18-51 may depict an artifact of fire suppression and habitat loss due to past management practices.

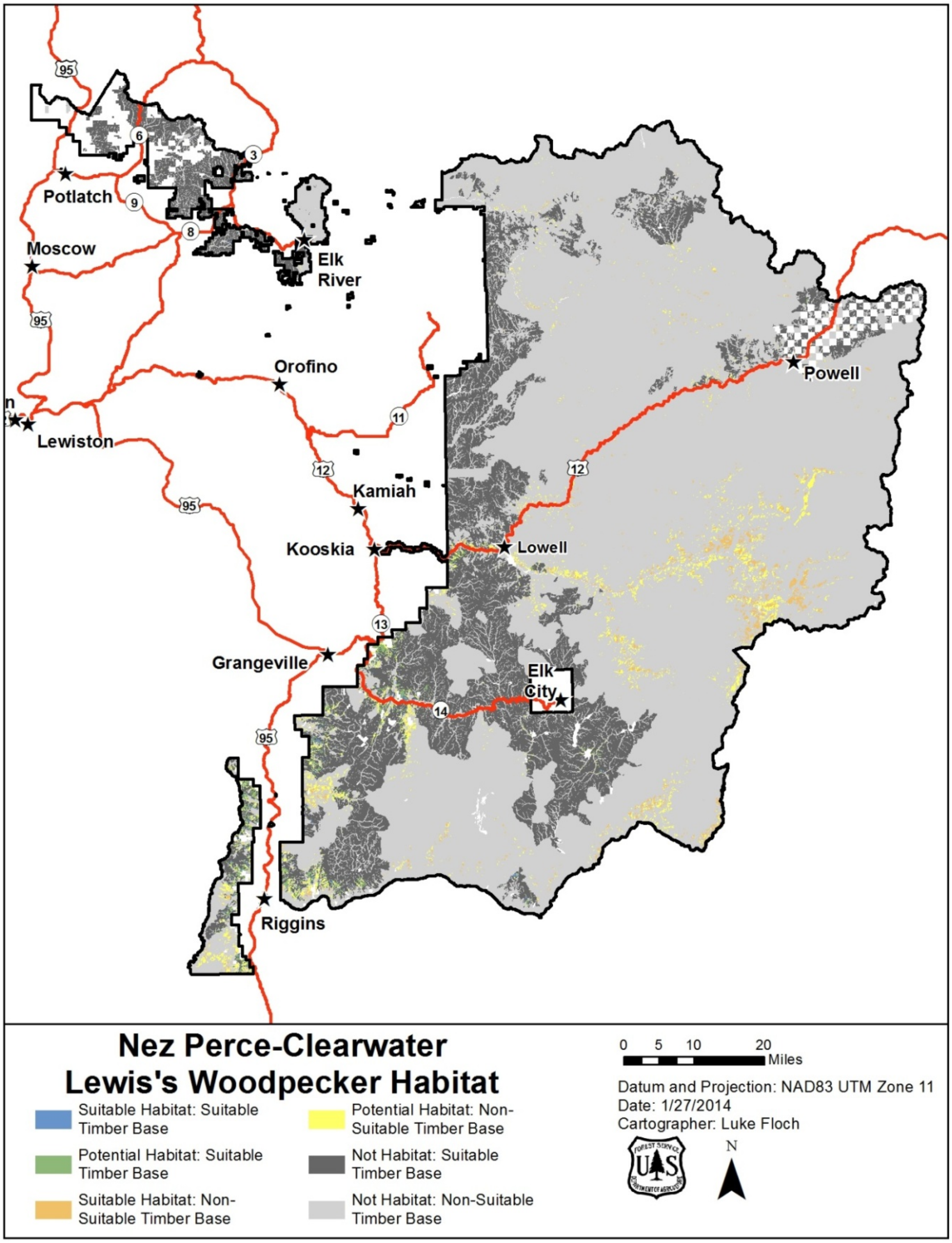

Figure 18-50. Distribution of estimated suitable Lewis's woodpecker habitat on the Nez Perce-Clearwater National Forests

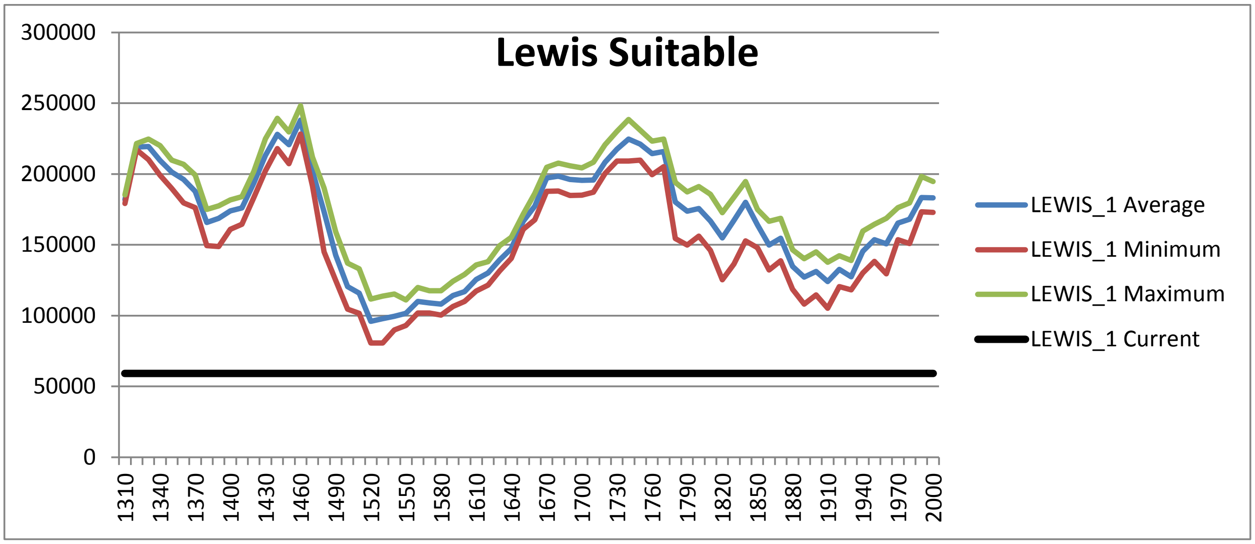

Figure 18-51. Estimated Historical Range of Variation for estimated suitable Lewis's woodpecker habitat

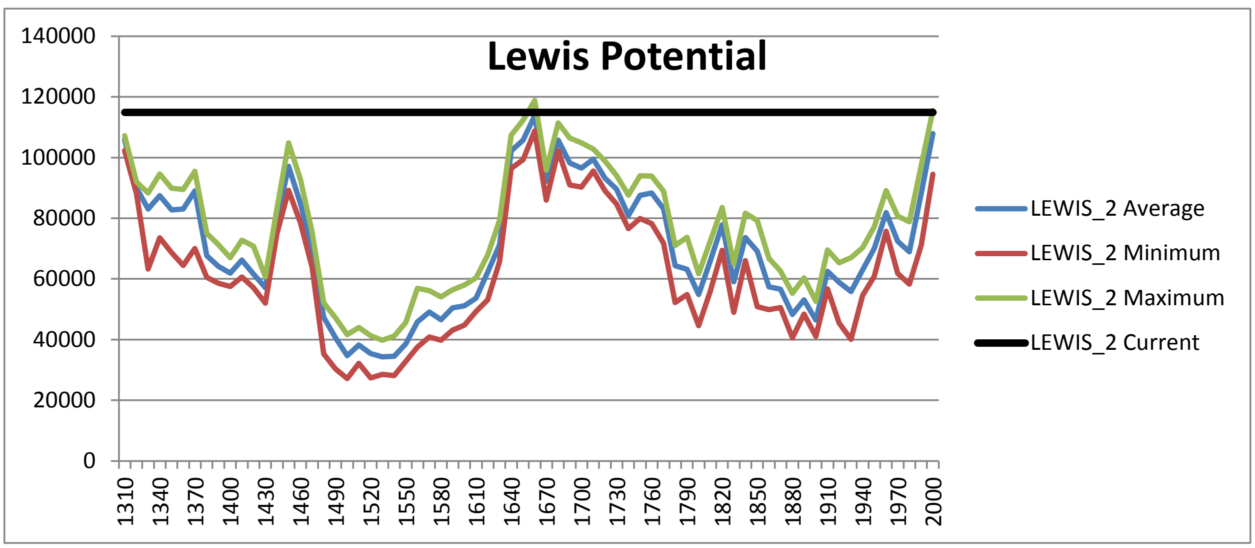

Figure 18-52. Estimated Historical Range of Variation for estimated potential Lewis's woodpecker habitat

Fisher

Based on the modeling of the best available science, the planning area contains 1,134,352 acres of estimated suitable habitat on the Clearwater portion and 685,137 acres on the Nez Perce portion (USDA Forest Service 2014). Figure 18-53 depicts the distribution of estimated suitable habitat in the planning area, and Figure 18-54 and Figure 18-55 depict the distribution of the 6,314,511 acres of estimated suitable habitat in the northern region for the species as modeled (USDA Forest Service 2014).

Estimated fisher habitat was calculated in suitable and unsuitable timber base. Approximately 407,513.8 acres (1649.15 km^2) is contained within the suitable timber base, and 1,348,118.00 acres (5455.64 km^2) in the non-suitable base.

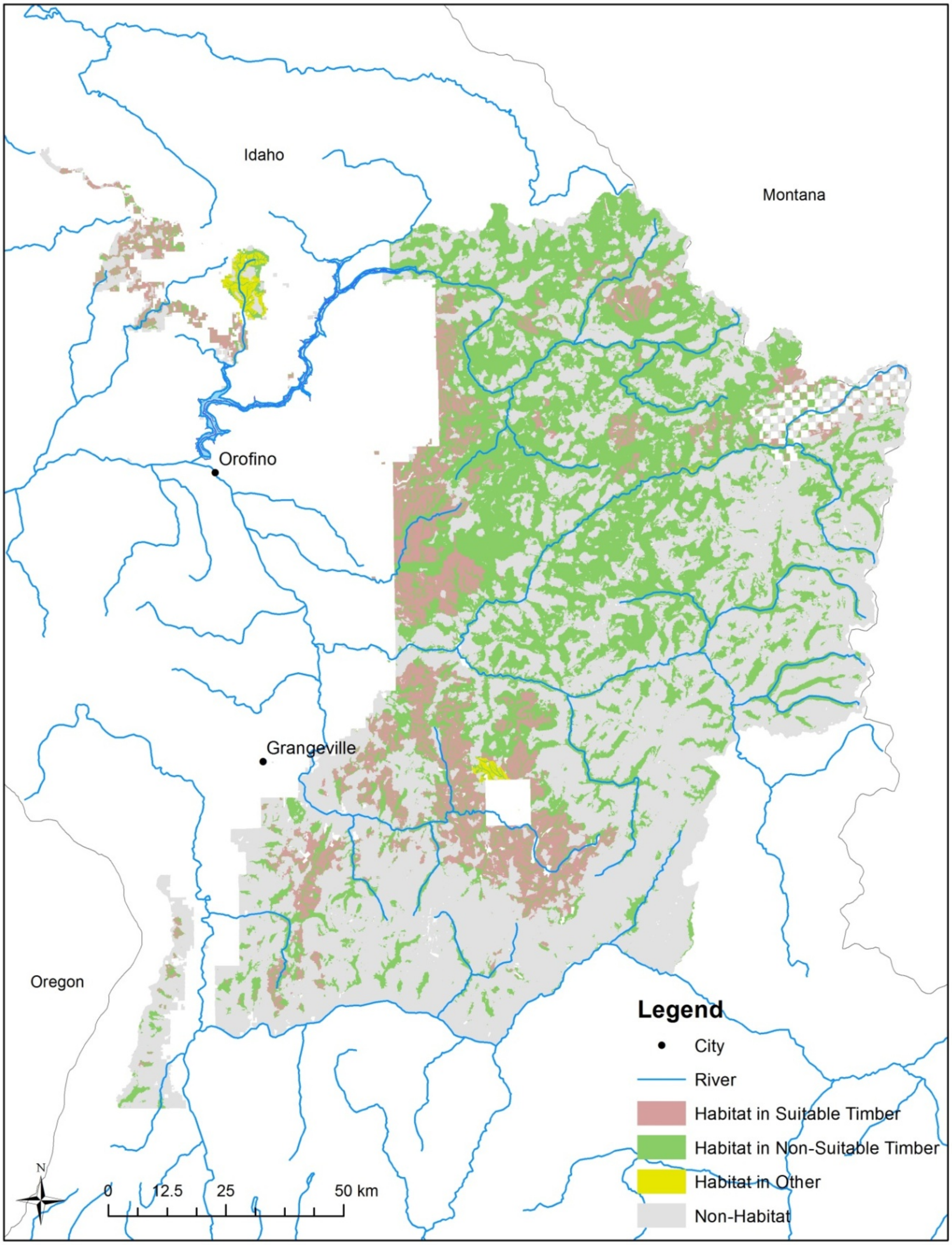

Figure 18-53. Distribution of estimated suitable fisher habitat (Values) on the Nez Perce-Clearwater National Forests

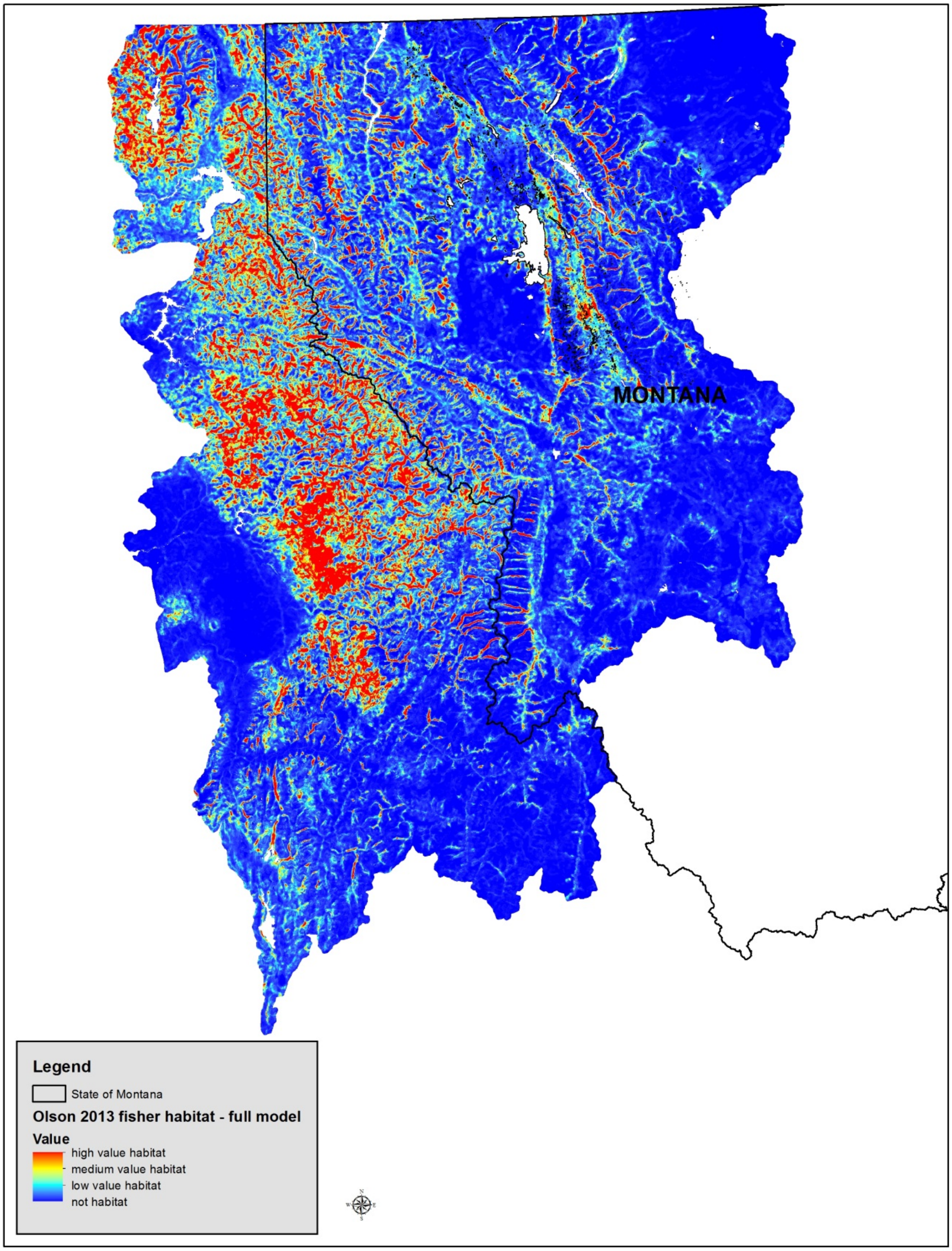

Figure 18-54. The distribution of estimated fisher habitat in the Northern Region

Figure 18-55. The distribution of estimated fisher habitat in the Northern Region

Flammulated Owl

Based on SIMPPLLE modeling of the best available science, the planning area contains 177,088 acres of estimated suitable habitat and 55,571 acres of potentially suitable habitat. Figure 18-56 depicts the distribution of estimated suitable habitat for the species as modeled.

Figure 18-57 and Figure 18-58 indicate that the current estimates of flammulated owl habitat are departed from the HRV for both suited (less than existing) and potential habitat (slightly more than existing). However, modeling depicts the data based on the presence of key habitat attributes. Actual stand conditions may contain stand densities and other attributes that are less suited for this species. Potential habitat estimates should be investigated to determine if the variations depicted in Figure 18-58 represents varied habitat availability due to climate changes over time. Figure 18-57 may depict an artifact of fire suppression and habitat loss due to past management practices.

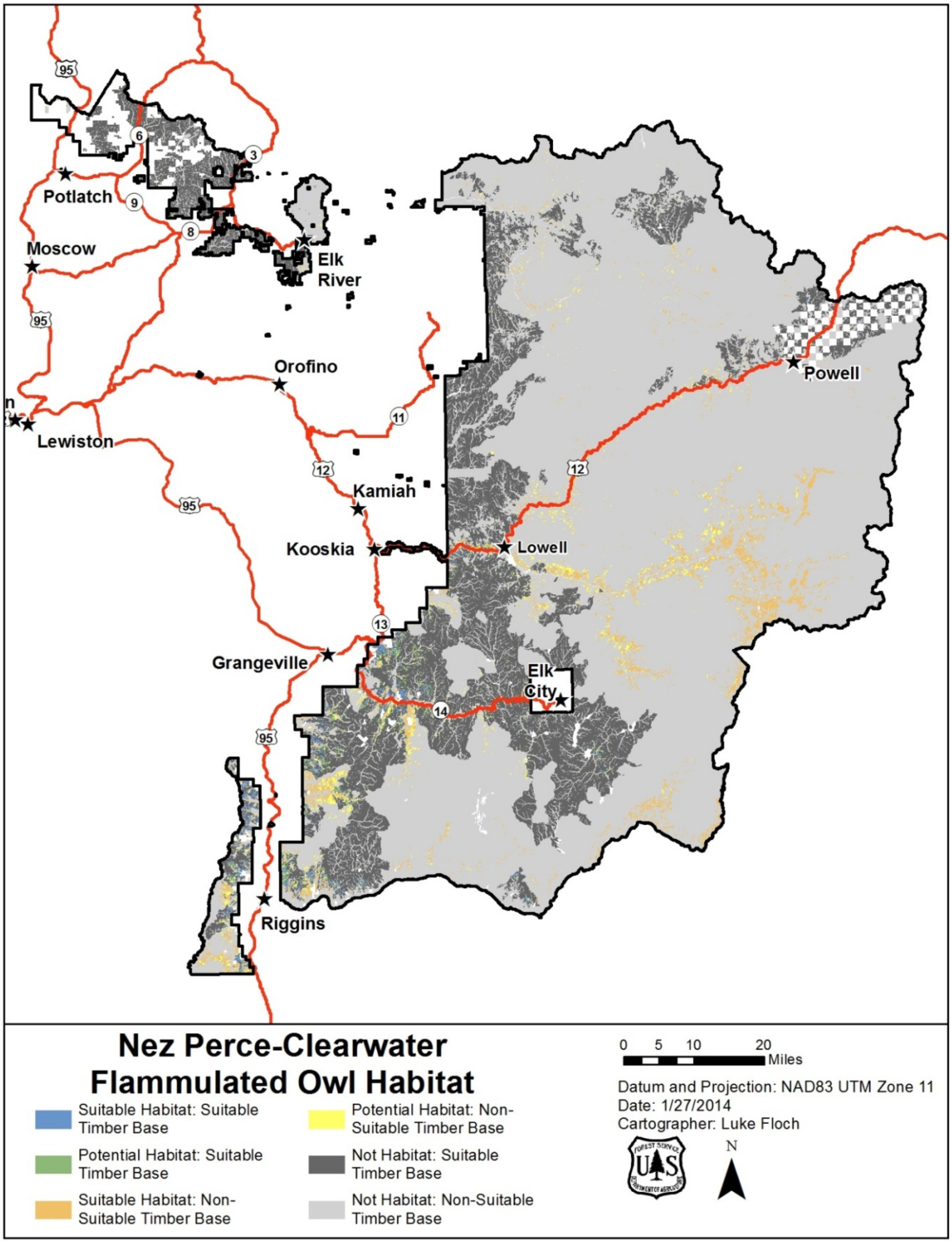

Figure 18-56. Distribution of estimated suitable flammulated owl habitat on the Nez Perce-Clearwater National Forests

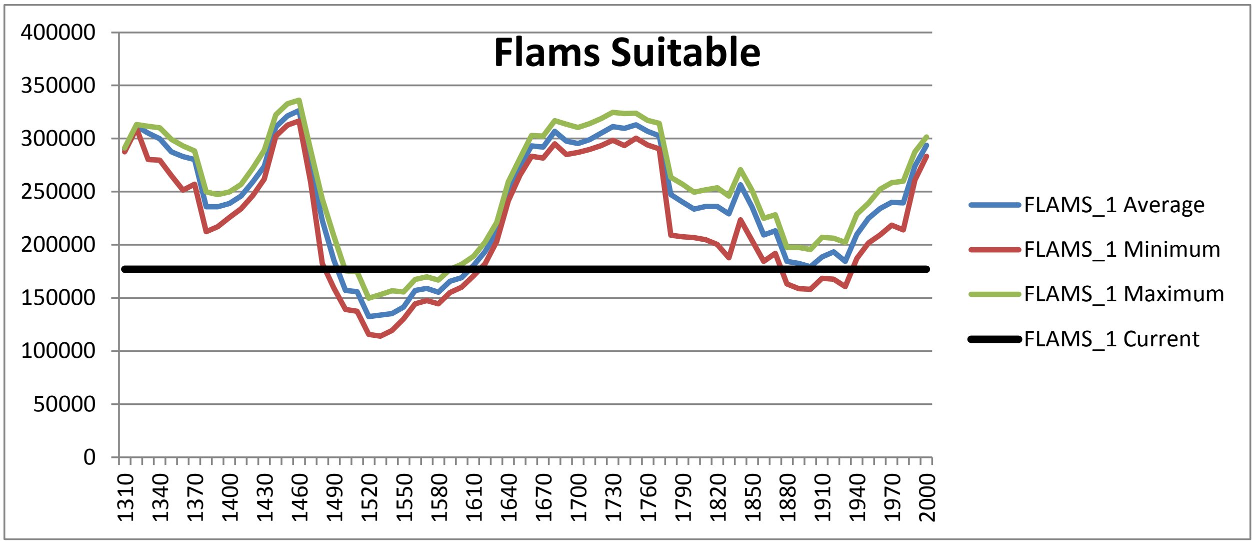

Figure 18-57. Estimated Historical Range of Variation for suitable flammulated owl habitat

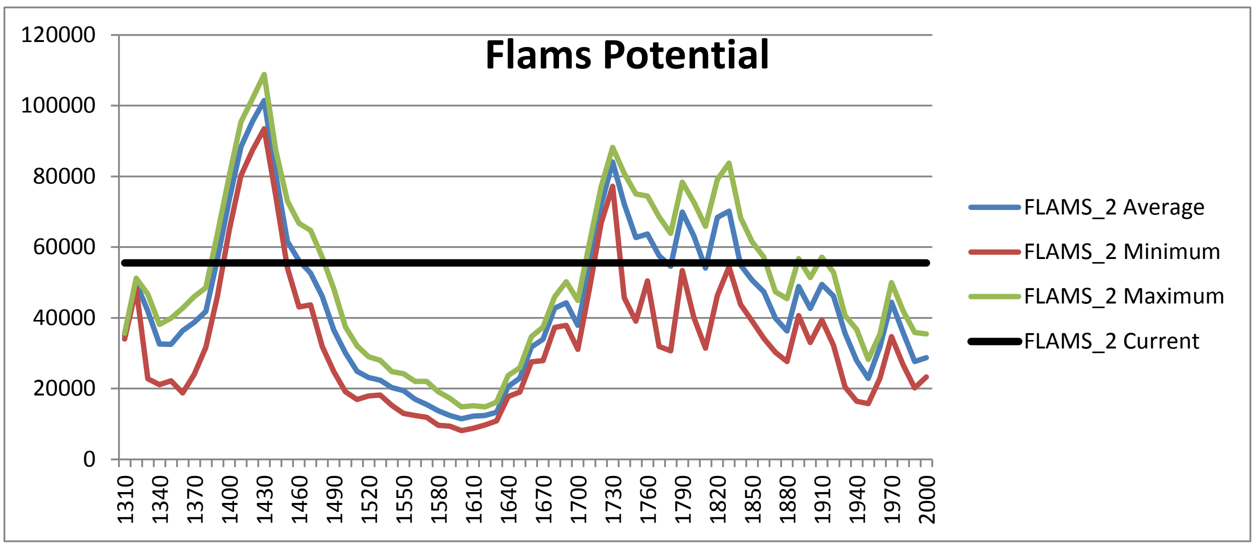

Figure 18-58. Estimated Historical Range of Variation for potential flammulated owl habitat

Boreal Owl

Based on SIMPPLLE modeling of the best available science, the planning area contains 22,418 acres of estimated suitable nestimg habitat and 10,159 acres of potentially suitable habitat. Figure 18-59 depicts the distribution of estimated suitable habitat for the species as modeled.

Figure 18-60 and Figure 18-61 depict the HRV (estimated suitable and potential habitat) for the species as modeled.

Figure 18-60 and Figure 18-61 indicate that the current estimates of boreal owl habitat are departed from the HRV (less than existing) for both suited and potential habitat. However, modeling depicts the data based on the presence of key habitat attributes. Actual stand conditions may contain stand densities and other attributes that are less suited for this species. Figure 18-60 and Figure 18-61 may indicate the impacts of past fire suppression that have resulted in a decline of high-elevation old forest conditions in the planning area.

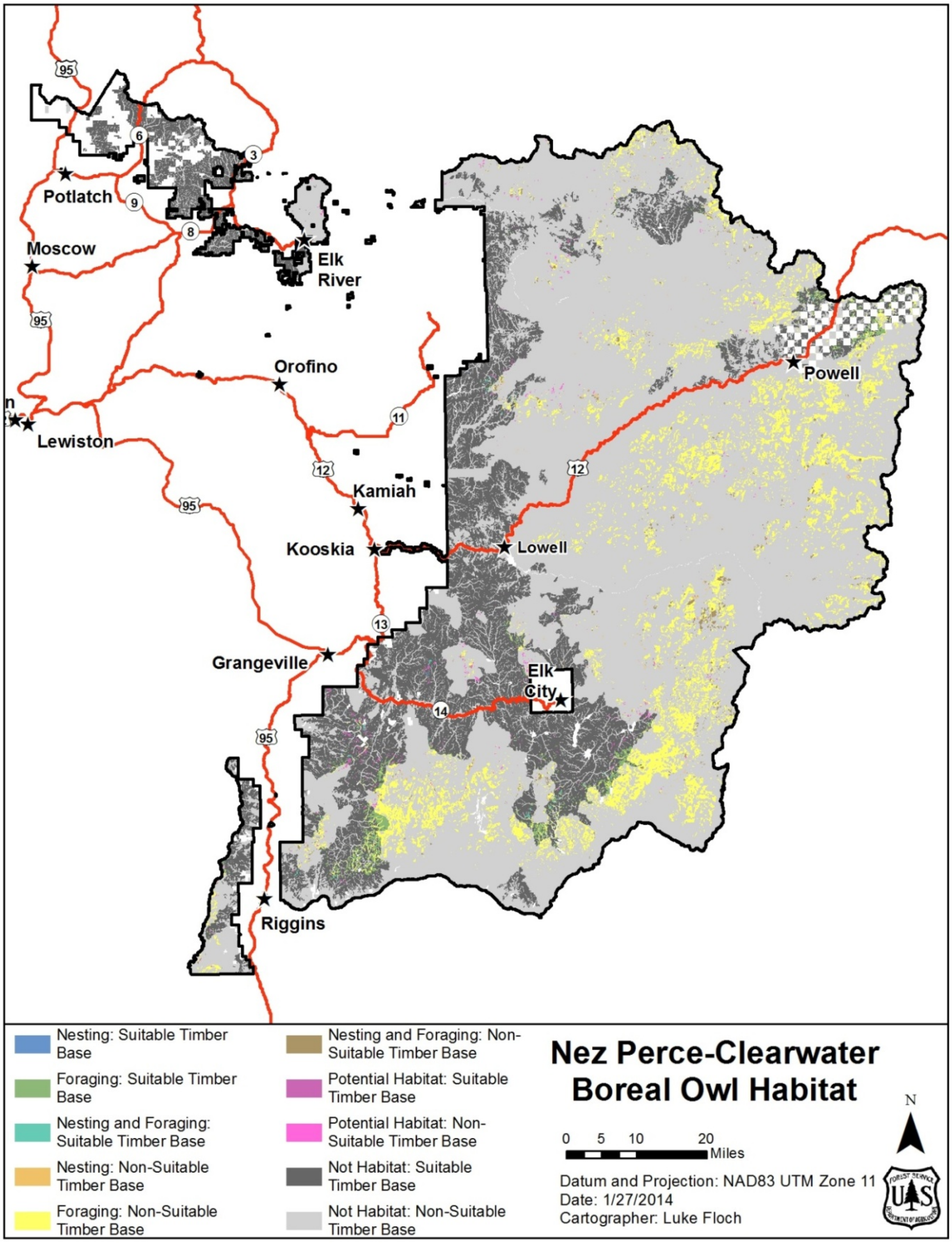

Figure 18-59. Distribution of estimated suitable boreal owl habitat on the Nez Perce-Clearwater National Forests

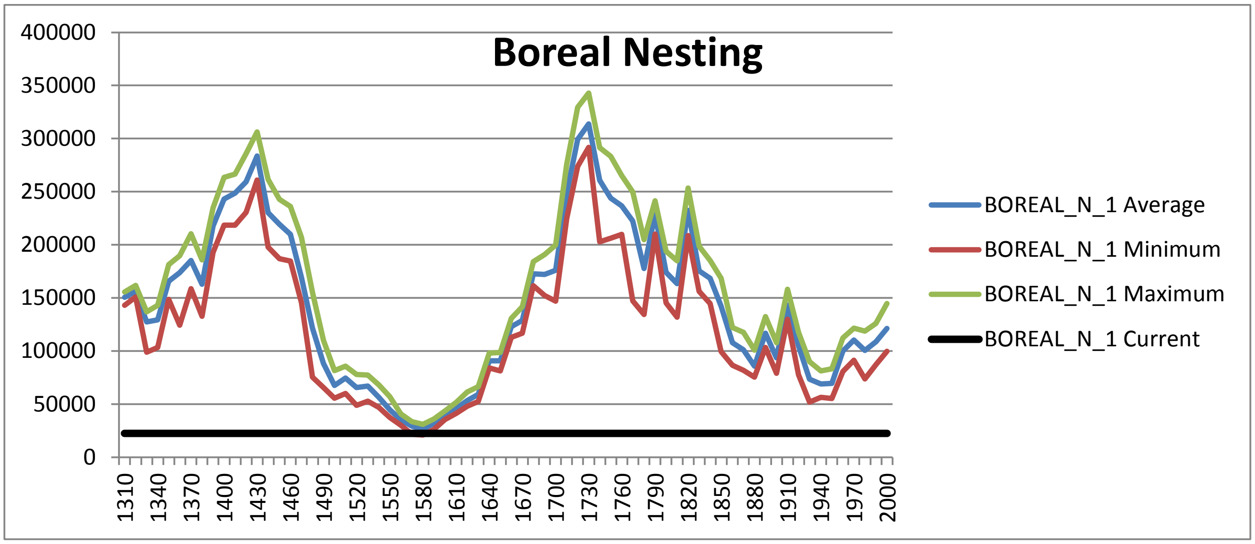

Figure 18-60. Estimated Historical Range of Variation for boreal owl nesting habitat

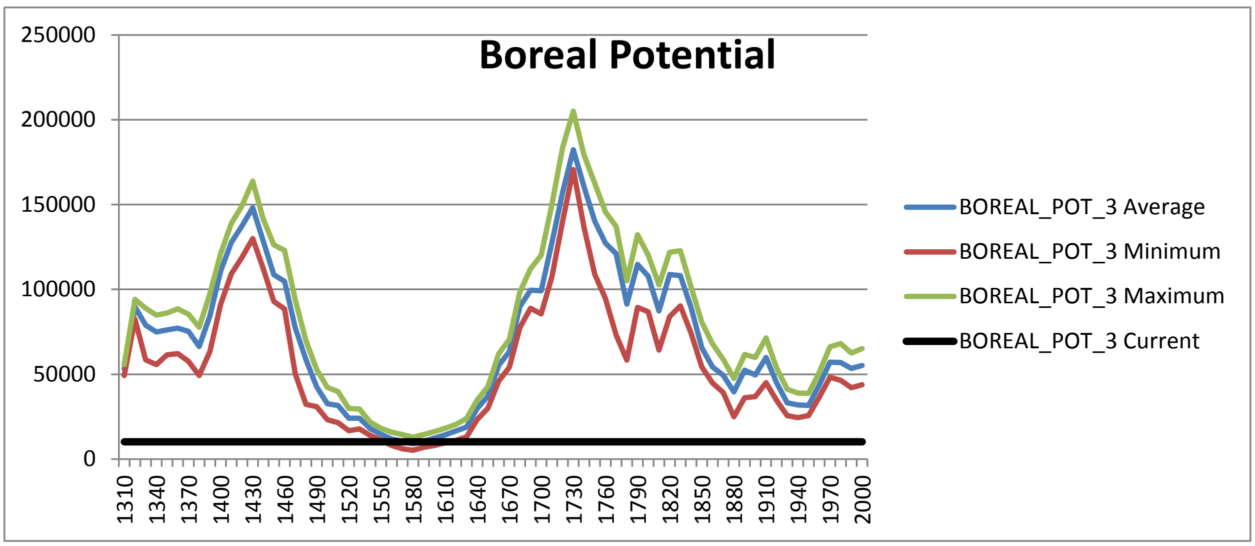

Figure 18-61. Estimated Historical Range of Variation for potential boreal owl habitat

American Three-toed Woodpecker

Based on SIMPPLLE modeling of the best available science, the planning area contains 22,418 acres of estimated suitable nestimg habitat and 10,159 acres of potentially suitable habitat. Figure 18-62 depicts the distribution of estimated suitable habitat for the species as modeled.

Figure 18-63 and Figure 18-64 depicts the HRV (estimated suitable and potential habitat) for the species as modeled.

Figure 18-62Figure 18-63 and Figure 18-63indicate that the current estimates of American three-toed woodpecker habitat are departed from the HRV (less than existing) for both suited and potential habitat. However, modeling depicts the data based on the presence of key habitat attributes. Actual stand conditions may contain stand densities and other attributes that are less suited for this species. Figure 18-62 may indicated that existing conditions are greater than historic but that historical conditions are trending towards existing as it has done in the past. Figure 18-63 may indicate that past fire suppression has resulted in highe-than-normal stand conditions in potentially suitable habitat and that potential three-toed woodpecker habitat in the planning area was less available in the past.

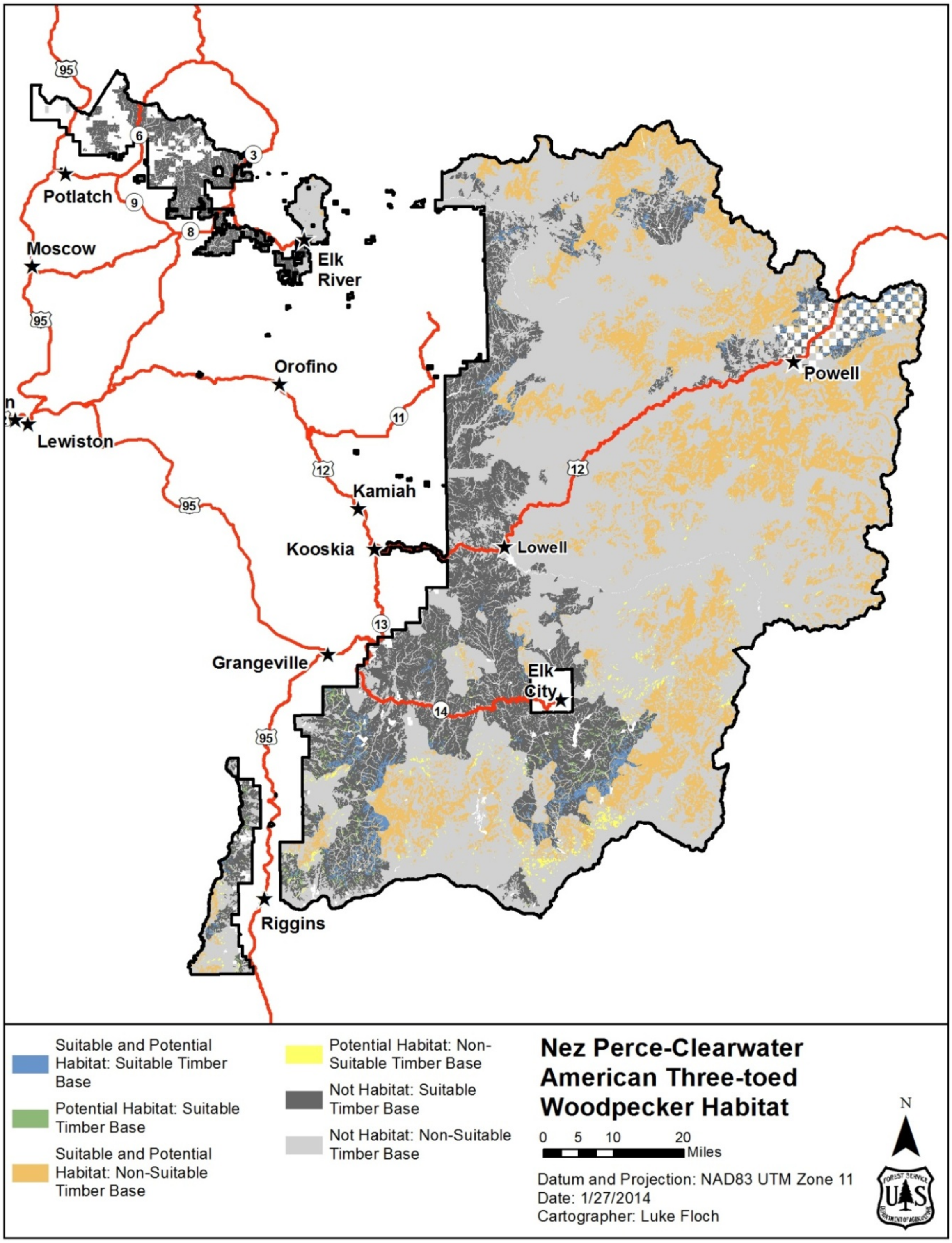

Figure 18-62. Distribution of estimated suitable American three-toed woodpecker habitat on the Nez Perce-Clearwater National Forests

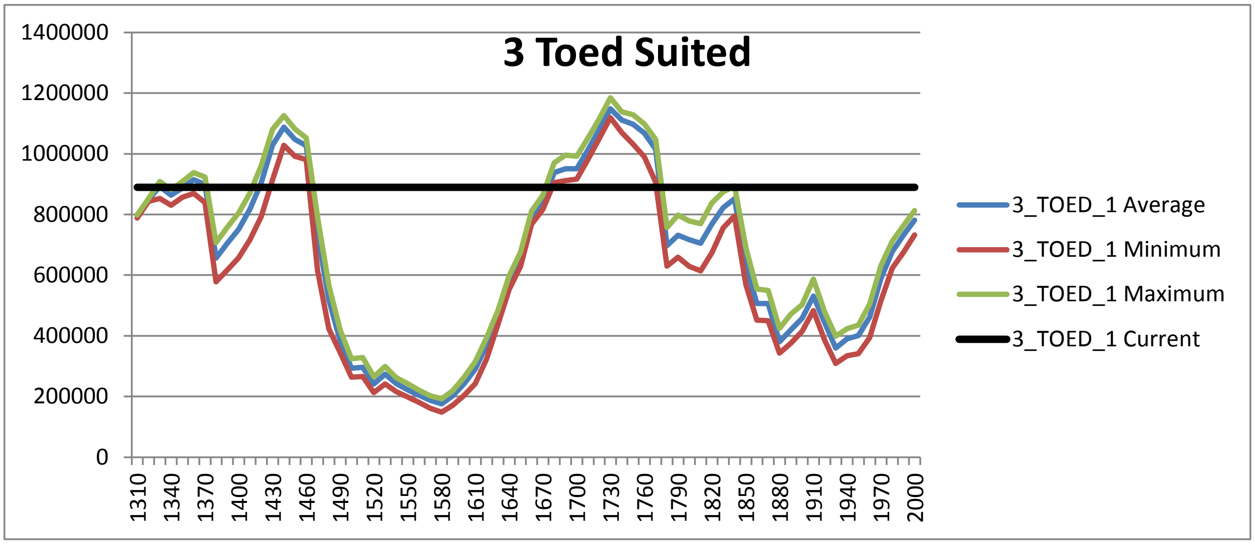

Figure 18-63. Estimated Historical Range of Variation for suitable American three-toed woodpecker habitat

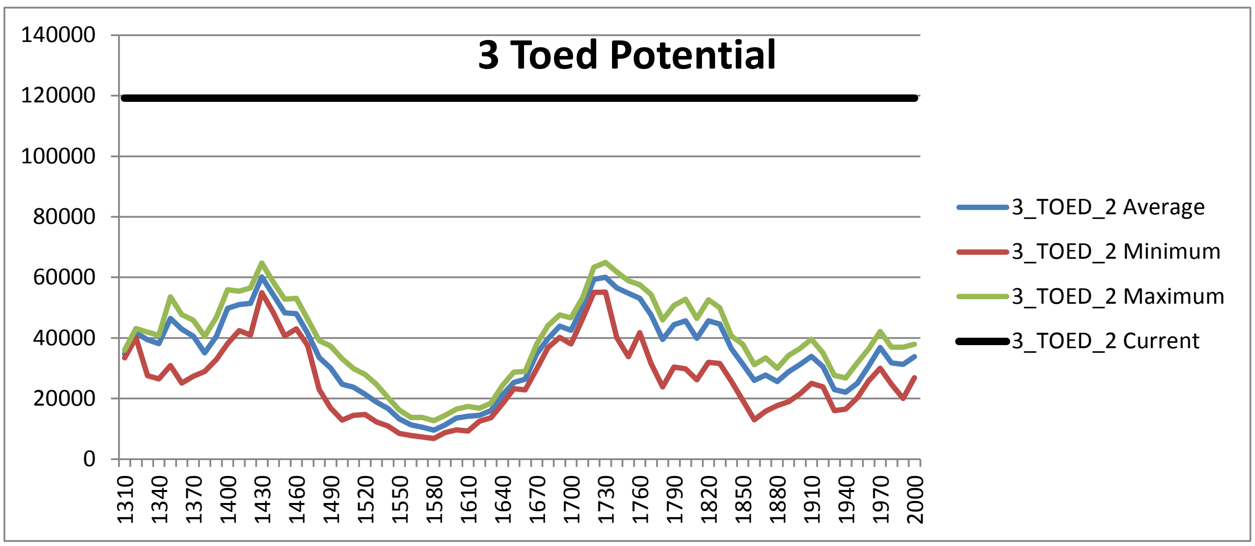

Figure 18-64. Estimated Historical Range of Variation for potential American three-toed woodpecker habitat

Mountain Quail

Based on SIMPPLLE modeling of the best available science, the planning area contains 507,793 acres of estimated suitable habitat. Figure 18-65 depicts the estimated suitable habitat for the species as modeled. No historical evidence suggests that mountain quail existed in the mid-upper reaches of the Selway River and Salmon River drainages compared to “potential” habitat depicted in Figure 18-65.

Figure 18-66 depicts the HRV (estimated suitable and potential habitat) for the species as modeled.

Figure 18-66 indicates that the current estimates of mountain quail habitat are departed from the HRV (less than existing) for estimated suited habitat. However, modeling depicts the data based on the presence of key habitat attributes. Actual habitat conditions may contain other attributes that are less suited for this species. Known existing conditions for riparian areas indicate that riparian conditions have degraded since historic conditions. In addition, the introduction and establishment of invasive plants, increased human development in lower portions of mountain quail habitat, and the introduction of nonnative animals have degraded mountain quail habitat on NFS lands. The range retraction of the species indicates a clear and present need to restore habitat condition for this species in the planning area.

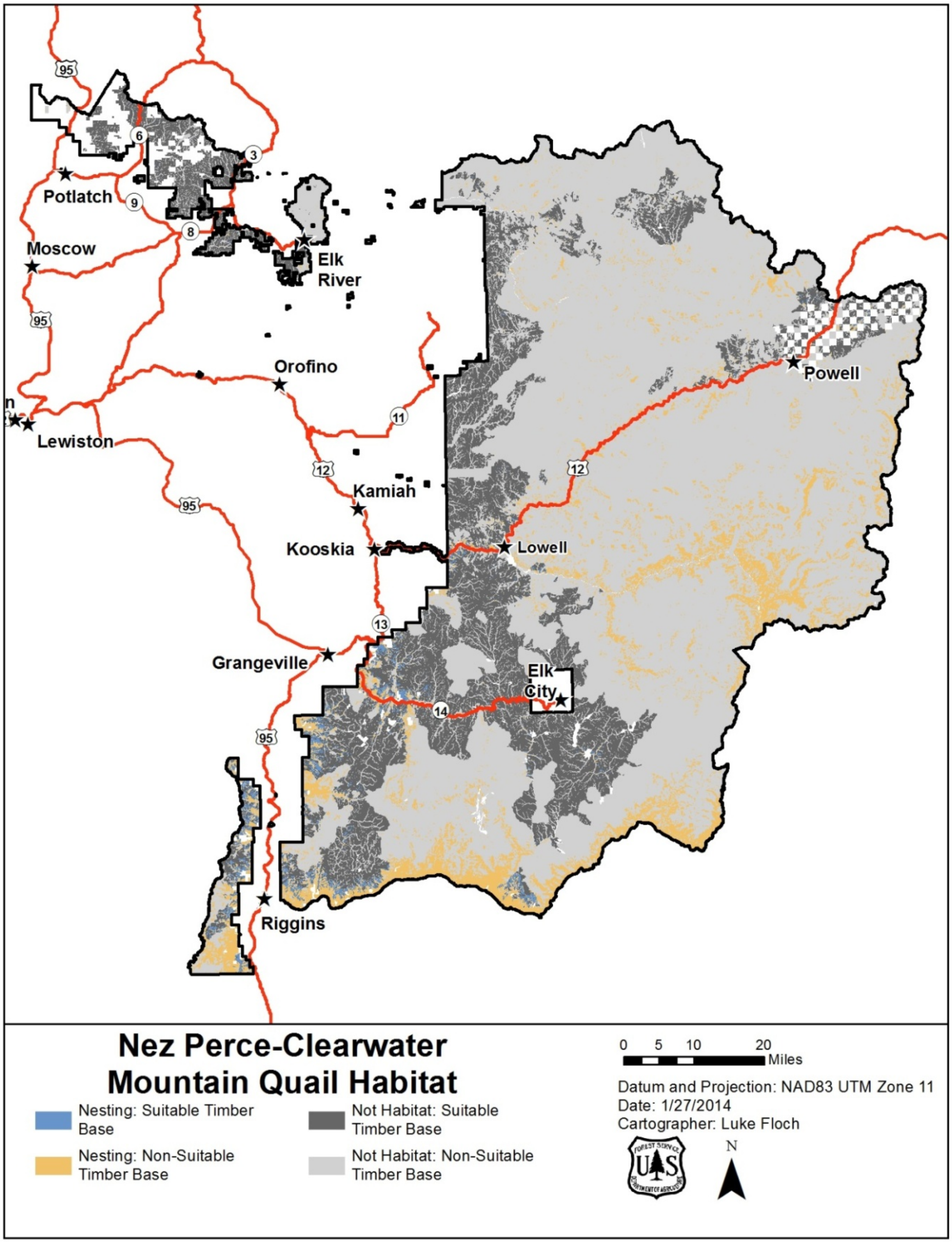

Figure 18-65. Distribution of estimated mountain quail habitat on the Nez Perce-Clearwater National Forests

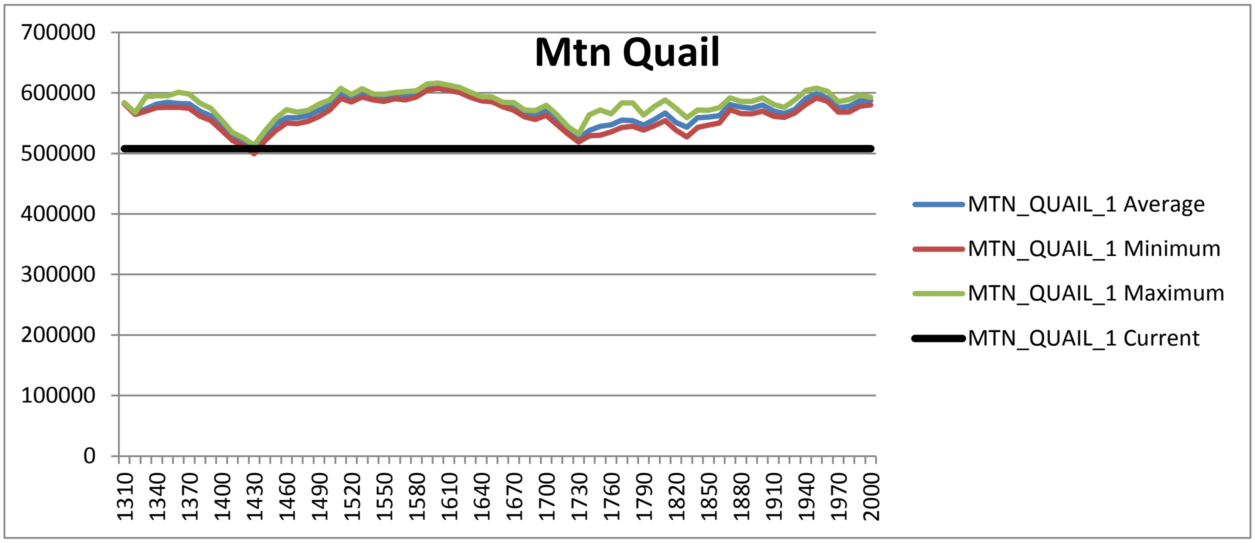

Figure 18-66. Estimated Historical Range of Variation for mountain quail habitat

18.1.6.2 Other Species of Conservation Concern: Not Modeled

The following species were not modeled:

- Fringed myotis—This species was not modeled due to the lack of definable parameters
- Townsend's big-eared bat—This species was not modeled due to the lack of definable parameters
- California myotis—This species was not modeled due to the lack of definable parameters
- Coeur d'Alene salamander—This species was not modeled due to the lack of definable parameters
- Bighorn sheep—This species was not modeled based on other rationale for its selection as an SCC

18.1.7 *Forest Plan Revision Landscapes (Sections and Biophysical Settings) relevant to Terrestrial Wildlife Species*

18.1.7.1 Idaho Batholith and Bitterroot Mountains

The Forests consider the Idaho Batholith and Bitterroot Mountains to be the primary ecological settings for planning purposes. These two ecological settings are relatively the same as described and used in the 2005 Idaho CWCS (IDFG 2005), and are contained within the Central Idaho and Lower Clark Fork, Columbia Plateau, and Blue Mountains ERUs as defined by ICBEMP (Wisdom et al. 2000).

Other Incorporated Ecological Sections

The Palouse Praire (similar to part of the ICBEMP Columbia Plateau ERU) and Blue Mountains (similar to the ICBEMP Blue Mountains ERU) Ecological Sections used in the CWCS have been incorporated into the Bitterroot Mountains and Idaho Batholith Ecological Sections for planning purposes. However, the Blue Mountains Ecological Section has unique differences in topography, wildlife species, and habitat conditions that are recognized in the Idaho CWCS (IDFG 2005). The differences between the Bitterroot Mountains and Idaho Batholith Ecological Sections should be recognized at a finer scale because of wildlife habitat conservation issues and strategies. The wildlife habitat conservation issues and strategies disclosed at the ICBEMP and Idaho CWCS levels will be discussed at the Forest and Habitat-type Group levels.

Breaklands Biophysical Setting

This setting primarily occurs in the Idaho Batholith and Bitteroot Mountains Ecological Sections. The landscape[5] is dominated by steep slopes and deep canyons through which flow the Clearwater, Lochsam Salmon, Selway, and South Fork Clearwater rivers.

In the Idaho Batholith, surface soils are derived from granite, border zone, and basalt geologies. Landslides and surface creep are the dominant erosion processes. Stream channels are typically v-shaped draws with high sediment delivery efficiency. Channel gradients are steep. Water movement is largely on the surface. Large wood and sediment moving through stream systems depend on debris damming and sediment loading. Channels are prone to debris torrents. Riparian habitats comprise 5% to 10% of the landscape.

Habitat Characterizations: Featured tree species in breakland habitats include shade-intolerant ponderosa pine and Douglas-fir. Douglas-fir grows well on the breaklands, except on the driest sites. Dense stands dominated by ponderosa pine or Douglas-fir stands are susceptible to western pine beetle and root disease, respectively. Douglas-fir, because of its susceptibility to root disease, typically does not live beyond 150 years, except in isolated, open-grown stands. Grand fir often co-dominates with Douglas-fir in moist habitats protected from frequent wildfire. Both Douglas-fir and shade-tolerant grand fir are prolific on northerly aspects in much of this landscape, creating dense stands that threaten the long-term survival of shade intolerant species.

North Idaho Old Growth type 1 (Green et al. 2011) and large, open-grown ponderosa pine with isolated Douglas-fir characterize the old growth[6] forest features on southerly aspects. Because of steep terrain (which favors increased intensity and spread of wildfires), mixed coniferous old forest patches on breakland landscapes are typically small, localized, and uncommon. The typical old forest character is large, old “legacy” or “relic” trees[7] on ridges and riparian habitats that have survived one or more lethal episodes. Patches of old forest (typically north Idaho Old Growth types 3 and 4) can be located on gentle terrain and moist habitat “inclusions” within this landscape. Mixed severity fire, root disease, and periodic Douglas-fir beetle infestations can

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[5] Landscape: Spatially heterogeneous geographic areas characterized by diverse interacting patches or ecosystems….Landscape ecology emphasizes the relationships of pattern, process(es), and scale ...(with) conservation and sustainability (adapted from Wu and Hobbs 2002).

[6] **Old Growth**: The culmination of stand development resulting from forest succession and lack of stand-replacing disturbances within the natural life span of the oldest trees. In moist, mixed coniferous forests, these stands are composed mainly of shade-tolerant and regenerating tree species. In dry forest types (e.g., ponderosa pine), old growth attributes are isolated, large trees. Old, seral and long-lived trees from a past fire disturbance may still dominate the upper canopy, snags and coarse woody debris are available, in all stages of decomposition typical of the site, as inclusions and patchy understories, understories may include tree species uncommon in the canopy, due to inherent limitations of these species under the given conditions.

[7] **Legacy trees:** Old trees that have survived stand-replacing natural disturbances or spared from timber harvest.

create increasing amounts of snags during mid-seral to late-seral successional classes (Bollenbacher et al. 2009; USDA Forest Service 2008).

Wildlife Uses: Southerly exposed habitats provide mature, open forest conditions for flammulated owls, pygmy nuthatches, and white-headed woodpecker. At low elevations, burned trees and large live trees provide habitat for Lewis' woodpecker. Mature and old forest habitats are preferred by the California myotis, flammulated owl, pygmy nuthatch, and white-headed woodpecker. Dense, shrub-dominated draws, dissecting ponderosa pine, and Douglas-fir forest stands are preferred by mountain quail. Locally occurring harsh habitats features, such as rock outcrops of basalt and limestone, caves and abandoned mines, and talus slopes, provide habitats preferred by a variety of wildlife species.

Native grasses and shrubs, occurring during the early stages of forest succession or permanent grass/shrubs habitats, provide winter, spring, and fall forages for elk, bighorn sheep, and mule deer. Bunchgrass, shrubs, and young forest habitats provide quality bighorn sheep, elk, and deer winter forages. On northerly aspects, relatively moist conditions of grass/shrub openings created by stand-replacing disturbance do not persist beyond one to two decades, due to rapid reforesting of young conifers. During extreme winter conditions with deep snow or cold, big game species often use young Douglas-fir as an alternate forage. North-slope habitats often provide denser mid-seral, mature, and older forest habitats for northern goshawk and pileated woodpecker.

Typically, wildlife habitats in Idaho Batholith Breaklands are drier on all aspects than breaklands found in the Bitterroot Mountain Breaklands.

Disturbance Processes: The primary disturbance process affecting plant succession, composition, and distribution is fire. Most fires are minor ground fires and relatively small. The influences of both low- and mixed-severity[8] fires typically create or maintain a patchy mosaic of under-burn and irregular-sized openings with a periodic creation of snags. Steep terrain favors rapid, upslope spread of wildfires. Dryer sites within this group can have a stand-replacing fire. Fire-free intervals can range from 5 to 50 years on the drier types to over 200 years on moister sites. Steep slopes and narrow riparian habitats promote a fire-return interval in riparian and moist habitat inclusions that rarely exceeds 150 years. On southerly aspects with warm, dry open-grown Douglas-fir and ponderosa pine habitat types, stand-replacing fire in the driest stands is unusual. Without fire, stands develop to the pole stage and mature forest. Because tree establishment is episodic and slow, stands may be uneven-aged or may consist of numerous even-age clusters of trees.

Northerly aspects support warm, dry Douglas-fir, grand fir, and ponderosa pine habitat types with succession dominated by ponderosa pine on the driest sites, Douglas-fir and western larch on moderately dry sites, and grand fir on the moister sites. Early seral species (shrubs, forbs, and grasses); Douglas-fir; ponderosa pine; and grand fir readily re-establish following wildfire episodes. Mixed- and high-severity[9] fires typically create variable effects in these steep riparian

[8] **Mixed-severity Fire:** Fire that either causes selective mortality in dominant vegetation, depending on different species' susceptibility to fire, or varies in time or space between understory and stand-replacement. Mixed-severity fires include patchy, mosaic-creating fires and other fires that are intermediate in effects

[9] **High-severity (aka, stand-replacement, lethal-severity, lethal) Fire:** Fire that kills or top-kills above ground parts of the dominant vegetation, changing above ground structure substantially. The majority (more than 75%) of the above-ground, dominant vegetation is either consumed or dies as a result of the fire. A fire that kills most of the

habitats. A sustained supply of large standing and down, dead wood for wildlife is available as the result of episodic (wildfire and insect/disease outbreaks) and chronic (endemic tree pathogens, competition for tree growing space, windthrow) disturbances.

The fire regime typically creates a mosaic of burned and unburned patches between 50 and 1000+ acres[10] (Green et al. 2011). Patches on dry aspects are uneven-aged, reflecting diverse fuels and non- to mixed-severity wildfire severity. Patches on moist aspects are even-aged, reflecting uniform vegetation and fuel conditions and wildfire severity.

18.1.7.2 Uplands Biophysical Setting

This setting primarily occurs in the Idaho Batholith and Bitteroot Mountains Ecological Sections. This landscape is a mix of gentle-to-steep slopes, forming shallow canyons and containing relatively productive conditions for vegetative growth.

Surface soils are derived from granite, border zone, and basalt geologies. The warm, moist climate, in combination with deep, volcanic ash soils, creates high site productivity. Surface creep is the dominant erosion process, mass wasted areas are local and uncommon. Stream channels are typically U-shaped draws with low-to-moderate sediment delivery efficiency. Major channel gradients are gentle. Water movement is largely on the surface. Large wood and sediment moving through stream systems depend on episodic stream flows. Steep slopes are common but are relatively short. Riparian habitats are extensive, comprising 15% to 30% of the landscape.

Habitat Characterizations: Primary tree species are grand fir, Douglas-fir, and western larch. Ponderosa pine is common on warmer, drier micro-sites, subalpine fir and Engelmann spruce on cooler, moist micro-sites. Grand fir mosaic sites appear as diverse community structure with "patchy" tree cover. Compared to the surrounding area, the grand fir mosaic is characterized by increased soil moisture, strongly acidic soils, and allelopathic plants (Ferguson 2000). Conifer reforestation can be retarded or completely unsuccessful due to these conditions. Patches of old growth with natural openings of tall shrubs and forbs are important characteristics of the grand fir mosaic.

Lodgepole pine often occurs on micro-sites with other conifers. Dense, uniform tree cover is typical. Dense stands dominated by Douglas-fir stands are susceptible to bark beetle and root diseases. Early seral species (shrubs, forbs, and grasses) and the full array of mixed conifer species readily re-establish following lethal wildfire episodes. Featured tree species is ponderosa pine.

Old forest is typically associated with relatively broad, riparian habitats of major streams. At higher elevations of the Bitterroot Mountains, mixed stands of old grand fir, alder, western coneflower (*Rudbeckia occidentalis*), and occasionally Pacific yew (*Taxus brevifolia*), occur as the 'grand fir-mosaic'. Old forest stands, regardless of forest type, typically occur where moisture or soil conditions are resistant to all but the most extreme wildfire conditions.

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trees, to be replaced by new trees, is called a stand-replacing fire.

[10] Large patch size range approximates the area of relatively consistent forest vegetation. Patches are often defined by the distance from the canyon bottom to major ridge, major topographic, or aspect breaks. This area is could also be defined by relatively consistent fuel conditions, fire behavior (spread, intensity) and vegetative response.

North Idaho Old Growth Type 3, 4, and 7 (Green et al. 2011) characterizes the old forest features. The typical old forest character is dominated by large, old grand fir. Because the uneven terrain encourages low- and mixed-severity wildfires, old forest patches historically have been uneven-aged, shade-tolerant species residing in patches ranging from 300 to 1,500 acres (Green et al. 2011). Smaller patches of old forest (typically North Idaho Old Growth Type 3) can be located as “inclusions” where topography and/or or climatic factors locally protect sites from frequent fires. North Idaho Old Growth Type 3 seldom occurs in extensive stands. Infrequent wildfires favor the accumulation of large standing/down dead wood. Large, dead wood accumulations typically range from 20 to 40 tons per acre. A few large live (“legacy” or “relict”) trees (typically grand fir, Douglas-fir on the uplands, Engelmann spruce, or western red cedar (*Thuja plicata*) in riparian habitats), persist following lethal wildfire.

Wildlife Uses: Meadows, grand fir mosaic, and young forest habitats provide elk and deer spring, summer, and fall forages. Gentle, southerly exposed grassy ridges and basins provide conditions favored by elk for calving. Mature grand fir forest habitats, where tree canopy closure moderates snow depths and the understory is dominated by Pacific yew, are preferred by moose. Moose also successfully forage in all seasons in shrub habitats that follow stand-initiation disturbances. These conditions typically occur in grand fir cover types following stand reinitiation. Large patches of mature and old forest habitats provide nesting and foraging habitats for pileated woodpecker, and denning and prey habitats for fisher. Mid-seral and mature forest habitats are are typically used by northern goshawk.

Disturbance Processes: The primary landscape disturbance processes affecting plant succession, composition, and distribution are highly variable, lethal (stand-replacing) wildfire (occurring at intervals of 150 to 250+ years [Keane et al. 2002]). Though this landscape readily ignites by summer lightning, wildfire episodes are typically limited to upland habitats burning at low-lethal intensity and spread. Irregular terrain discourages rapid spread or intense wildfires. Strong wind episodes, in combination with extended drought, are the conditions believed necessary to create large, lethal wildfires that have been documented in similar landscapes. Relatively short, steep slopes and extensive riparian habitats result in a fire-return interval in riparian and moist habitat inclusions that can exceed 300 years. Low-severity fires can burn on ridges (drier inclusions), beginning in stem-exclusion, at a rate two to three times as often as mixed- and high-severity fires.

This complex fire regime typically creates a mosaic of mixed-to-lethal burned uplands and nonlethal or unburned riparian habitats. Small openings created by the more frequent low- and mixed-severity fires results in a mix of seral and climax tree species and ages.

Patch sizes of local mixed-to-lethal burns generally approximate the area of relatively uniform wildfire features (general aspect, distance from the canyon bottom to major ridge, vegetation conditions,dominant tree species, density, standing/down dead wood). Green et al. (2011) concluded that approximately 46% of old growth mixed conifer forests occur in patches of 300 to 1,500 acres. Patches are generally even-aged, reflecting uniform wildfire severity. A more frequent and low-severity wildfire regime “functions” outside of riparian habitats.

18.1.7.3 Subalpine Biophysical Setting

The subalpine setting occurs at the higher portions of the planning area. This landscape is characterized by broad ridges and steep slopes. Glaciated, frost-churned ridges; umbric old surface; and high elevation stream terraces occur within this setting. Surface soils are derived from granite and border zone geologies, overlaid with volcanic ash. Surface creep is the dominant erosion process. Stream channels are characterized by V-shaped draws and high sediment delivery efficiency. Glacial troughs are characterized by U-shaped draws and low sediment delivery efficiency. Channel gradients are mixed. Water movement is largely on the surface. Because of small streams and mixed gradients, large wood and sediment move slowly through the stream systems. Steep slopes are common but are relatively short. Riparian habitats comprise 10% to 20% of the landscape.

Habitat Characterizations: Lodgepole pine cover types tend to dominate the major broad ridges. Inclusions of subalpine fir and Engelmann spruce cover types typically occupy riparian habitats in glaciated troughs. Patches on dry aspects are even-aged, reflecting uniform vegetation and fuel conditions and stand-replacing wildfire severity. Patches on moist aspects are uneven-aged, reflecting diverse vegetation and fuel conditions and mixed-severity wildfire. The fire regime typically creates a mosaic of burned and unburned patches between 50 and 1000+ acres. Because of cold, generally moist northerly exposed terrain (which favors infrequent large wildfires), Green et al. (2011) concluded that approximately 55% of old growth Engelmann spruce/subalpine fir forests occur in patches between 100 and1,100 acres. On habitats dominated by lodgepole pine (dry ridges and rocky basins), patches ranged from 1,000 to 3,200 acres.

The cool, moist climate supports lodgepole pine on drier habitats and shade-tolerant subalpine fir and Engelmann spruce on moister habitats. Lodgepole pine stand structure is typically single-storied and even-aged. In subalpine fir and Engelmann spruce stands, stand structure is often a mix of age classes. Lodgepole pine stands reaching 80 years of age with stand sizes greater than 8 inches in diameter, often experience severe mortality by mountain pine beetle, which creates snags and down fuel leading to potential severe fire effects depending on time since the infestation (Keane et al. 2002). Whitebark pine occurs as inclusions within lodgepole pine stands or as co-dominants in mixed stands of subalpine fir. The harshest environments (driest, coldest sites) are often open stands of whitebark pine or grass and exposed rock. Featured tree species in subalpine habitats are whitebark pine and quaking aspen. Whitebark pine has historically been common throughout the subalpine setting. Whitebark pine, however, is very susceptible to blister rust. On lodgepole pine-dominated sites, stand-replacing fire was likely most common. Subalpine fir is susceptible to wooly adelgid. Both lodgepole pine and subalpine fir readily re-establish following wildfire episodes. Featured tree species are western larch and whitebark pine and, locally, ponderosa pine and western white pine.

North Idaho Old Growth Types 2, 5, 6, 8, and 9 (Green et al. 2011) dominated by subalpine fir and/or whitebark pine, with local inclusions of mountain hemlock, characterize the old growth forest features.

Wildlife Uses: Episodic (wildfire and insect/disease outbreaks) and chronic (endemic tree pathogens, competition for tree growing space, windthrow) disturbances provide large down, dead wood for some species and forest openings for other species. Large patches of dead, dying lodgepole pine support American three-toed woodpecker habitat. Mature and old forest habitats are favored by boreal owl. Summer forages favored by elk occur in permanent meadows and early succession forests growing on deep, moist (productive) soils.

Canada lynx reside in this landscape yearlong, relying on snowshoe hares for prey. Here, are where dense stands of tall shrubs and/or young lodgepole pine are found and where subalpine fir/Engelmann spruce limbs extend down beyond the deepest snow conditions. These conditions typically occur in young lodgepole pine stands between 20 and 40 years old and in dense mid-seral, multi-storied subalpine fir/Engelmann spruce stands. The highest populations of wintering snowshoe hare populations are associated with dense conifer/shrub habitats capable of hiding snowshoe hares from forest predators. Preferred snowshoe hare winter habitats exceed 31% horizontal cover at mid-winter snow depths.

Disturbance Processes: The dominant upland disturbance processes in this setting are associated with episodic insect mortality in lodgepole pine–dominated stands, followed by mixed-lethal and lethal wildfires. Lethal fires are more prevalent in mature or diseased lodgepole pine and less frequent in subalpine fir and whitebark pine stands. Severe wildfire originating in more productive forest types often influence fire severity in these habitats. Fire severity is affected by periodic outbreaks of mountain pine beetle that lead to large fuel loads and a pulse event for snag creation. Mixed landscape and vegetative conditions result in fire return intervals in riparian and moist habitat inclusions that often exceed 150 years.

18.1.8 *Forest Habitat-Type Groups (Fine-scale)*

On the Forests, forested habitat conditions for wildlife have been described in, *Target Stands for Multiple Objectives* (Target Stand Document) (USDA Forest Service 2013). Target stands are used to achieve landscape-level desired future conditions. The target stand does not prescribe treatments but simply represents the desired condition at various phases of stand development. The Target Stand Document characterized habitat-type groups, which may contain variations based on the inherent diversity of habitat-type groups in the planning area (USDA Forest Service 2013).

Generally, the majority of wildlife species described in this Assessment are associated with the following habitat-type groups to meet all or part of their life-cycle needs at fine and mid- scales:

- Warm/Dry (Habitat Type Group 1)
- Moderately Warm/Dry (Habitat Type Groups 2 and 3)
- Moist Mixed Conifer (Habitat Type Groups 4, 5, and 6)
- Cool and Wet/Moist Subalpine Fir (Habitat Type Groups 7 and 8)
- Cool/Cold Upper Subalpine (Habitat Type Groups 9, 10, and 11)

Fine-scale grass and shrubland and riparian area habitat-type groups are not defined and described in the Target Stand Document (USDA Forest Service 2013). Grass and shrubland and riparian area habitats support mountain quail and Coeur d' Alene salamander for all or part of their life-cycle needs. Descriptions of these habitats are located in the vegetation and aquatics sections of the Assessment.

The Target Stand Document specifically mentions five SCC species (white-headed woodpecker, pygmy nuthatch, fisher, boreal owl, and flammulated owl) because they are currently Regional Forester Senstive Species (RFSS) and/or management indicator species (MIS) under the current Forest Plan (USDA Forest Service 2003). Indirectly, the Target Stand Document also references other woodpeckers, including other potential SCC such as the Lewis's woodpecker and American three-toed woodpecker.

Wildlife species not selected as SCC are also known or expected to use these habitat-type groups. Some species are closely associated with the compositional, structural, and other habitat characteristics attributed to old-growth-type forests for their individual life-cycle needs but are not old-growth "dependent". Some of these ecosystem attributes may be represented by old-growth conditions defined by Green et al. (2011).

One or more of these habitat-type groups are located within the three biophysical settings used by the Forests:

1. Breaklands
2. Uplands
3. Subalpine

18.1.8.1 Warm/Dry (Habitat Type Group 1)

In Version 1.0 of the Target Stand Document, the Warm/Dry group had not been developed. This category is high priority to complete. The Warm/Dry group represents unique dry ponderosa pine breakland areas that are often an emphasis for fuel management and ponderosa pine restoration (USDA Forest Service 2013).

This group is characterized by very dry ponderosa pine or Douglas-fir climax forests with bunchgrass understories and a high-frequency, low-severity fire regime. These areas often lie at low elevations, at the transition from forested to open savannah or grassland communities. These sites are more often targeted for fuels or ecosystem prescribed fire treatments rather than commercial timber projects (USDA Forest Service 2013).

Applicable objectives for this group are likely to include ponderosa pine restoration, grass forage production, and open forest conditions consistent with the frequent historic fire regime. These types may be particularly sensitive to changing climate conditions in terms of potential timber suitability (USDA Forest Service 2013).

This group is particularly important for the following SCC species:

- White-headed woodpecker
- Lewis's woodpecker
- Fringed myotis
- Bighorn sheep
- Mountain quail (winter)

18.1.8.2 Moderately Warm/Dry (Habitat Type Groups 2 and 3)

These habitat type groups cover the transition from dry to moist sites, including ponderosa pine and Douglas-fir climax habitat types and more moist grand fir climax types with grass or shrub understories. Diverse species composition is possible, including ponderosa pine and Douglas-fir on the drier sites and western larch, grand fir, subalpine fir, Engelmann spruce, and lodgepole pine on the moistest sites. Fire intervals are generally from 5 to 50 years and are low-to-moderate severity (USDA Forest Service 2013).

These groups are particularly important for the following SCC species:

- White-headed woodpecker
- Pygmy nuthatch
- Lewis's woodpecker
- Flammulated owl
- Fisher
- Townsends' big-eared bat
- California myotis
- Fringed myotis
- Mountain quail (summer)

18.1.8.3 Moist Mixed Conifer (Habitat Type Groups 4, 5, and 6)

The habitat types in ***Group 4*** (moderately warm and moist grand fir) are characterized by mixed species stands of grand fir, Douglas fir, lodgepole pine, Engelmann spruce, and occasionally western larch or ponderosa pine, with diverse shrub and forb understories. These habitat types are common at mid elevations on north slopes and lower slopes in slope positions or geographic areas too dry for western redcedar. The habitat types in ***Group 5*** (moderately cool and moist western redcedar) are characterized by mixed species stands of western redcedar, grand fir, and Douglas-fir, with diverse shrub and forb understories. Western white pine, larch, and ponderosa pine are less frequent components. These habitat types are common in the western portion of the subbasin on lower slopes and northerly aspects but become increasingly rare toward the headwaters. The habitat types in ***Group 6*** (moderately cool and wet western redcedar) are characterized by stands of grand fir and western redcedar, with fern and herb understories.. Douglas-fir and western white pine are less common. These habitat types are generally limited to riparian areas along streams and moist lower slopes in the western part of the subbasin.

This group is particularly important for the following SCC species:

- Flammulated owl
- Fisher
- Lewis's woodpecker
- Townsend's big-eared bat

18.1.8.4 Cool and Wet/Moist Subalpine Fir (Habitat Type Groups 7 and 8)

In this category, **Group 7** (cool and moist subalpine fir) is characterized by stands of subalpine fir, Engelmann spruce, and lodgepole pine, with brush understories. Western larch, whitebark pine, and Douglas-fir are less common components. Subalpine fir/menziesia is the habitat type in this group most frequently found in the subbasin. These habitat types are common and occur at upper elevations on north aspects and moist lower slopes (Green et al. 2011, USDA Forest Service 2013). **Group 8** (cool and wet subalpine fir) is characterized by stands of subalpine fir, Engelmann spruce, and lodgepole pine, with shrub, forb, or graminoid understories. Subalpine fir/bluejoint reedgrass is the habitat type in this group most frequently found in the subbasin. These habitat types are uncommon and occur at upper elevations in riparian areas (Green et al. 2011, USDA Forest Service 2013).

This group is particularly important for the following SCC species:

- Boreal owl
- American three-toed woodpecker

18.1.8.5 Cool/Cold Upper Subalpine (Habitat Type Groups 9, 10 and 11)

In Version 1.0 of the Target Stand Document, the Cool/Cold Dry Upper Subalpine groups have not been developed. Developing these groups is a high priority. The Cool/Cold Dry Upper Subalpine Group contains whitebark pine restoration opportunities, which are of particular interest due to its listing as a sensitive species (USDA Forest Service 2013). The cool lower elevation portion of this group may also apply to terrestrial SCC wildlife.

Two variations, a whitebark pine emphasis (Variation 1) and a non-whitebark pine emphasis (Variation 2) have been identified but not yet developed. Integrated objectives for this category have not yet been developed.

The following SCC may be associated with this habitat-type group at the cool end of one or more habitat type groups:

- Boreal owl
- American three-toed woodpecker

18.1.9 *Other Fine-Scale Habitats*

The following habitat categories are not defined and described in the Target Stand Document (USDA Forest Service 2013).

18.1.9.1 Grasslands and Shrublands

Grasslands and shrublands are those areas where the combination of soils, precipitation, topography, and natural role of fire perpetuate nonforested plant communities. Three grassland series, dominated by bluebunch wheatgrass, Idaho fescue, or carex species, and five shrubland series dominated by stiff sage, smooth sumac, curl leaf mountain mahogany, snowberry, and hackberry occur in the canyons of westcentral Idaho and adjacent areas. The extent of the shrublands within the Forests can be estimated based upon the extent of nonforested areas as identified by FIA plots (approximately 15% of the breaklands and less than 5% of the uplands are nonforest).

The following are grasslands and shrublands stressors:

- Livestock grazing levels and practices (primarily historic)
- Invasive plants and noxious weeds

- Fire intensity, size, and frequency greater than natural conditions

The following are current conditions of grasslands and shrublands:

1. Specific information regarding the condition of grasslands and shrublands on the Forests is limited or non-existent
2. Recent information gathered within representative areas indicate >50% of these areas retain high native species integrity and <25% display low native species integrity
3. Canyon grasslands are especially vulnerable to invasive weeds. Many invasive weed species have the ability to flourish since they are adapted to hot, dry environments and are not particularly palatable to wildlife and livestock. The remote and rugged nature of the canyon grassland offer unique challenges for invasive weed management.

The following SCC are associated with this habitat-type group:

- Mountain quail—where permanent water is closely available
- Rocky Mountain bighorn sheep—only in the Lower Salmon River Canyon area

18.1.9.2 Riverine Riparian and Wetlands

Riverine riparian and wetlands across the Forests vary greatly in their characteristics, and scale of their occurrence. The description of these habitats is located in the Aquatics portion of the Assessment.

Associated Species—The following SCC are associated with this habitat-type group:

- Coeur d'Alene salamander

18.1.9.3 Old Forest Habitat

Old forest habitat is an important source habitat condition that provides essential denning, nesting, foraging, and cover habitat for many wildlife species. The majority of the wildlife SCC species are associated with old-forest habitat to various degrees.

Old growth is a dynamic structural condition that is associated with both mid-seral successional stages dominated by early seral conifer species and late-seral successional stages dominated by later-seral and climax conifer species. Old forest habitats are distinguished by old trees and related structural attributes, which include tree size, signs of decadence, large snags and logs, canopy gaps, and understory patchiness (Green et al. 2011). Old forest habitat develops when structural elements (e.g., large snags, logs, understory structure) are found near old, large trees, typically those defined as legacy trees. A wider recognition of mid-seral old growth forest stand conditions has grown out of a national effort to describe old-growth forest attributes and conduct restoration in those types of forests (Franklin et al. 2007; Wisdom et al. 2000).

Due to differences in forest/habitat types, site quality, climate, and disturbance patterns, old forests may vary extensively in tree sizes, age classes, and presence and abundance of structural elements (Helms 1998).

In 2003, the USDA Forest Service (Regions 1, 4, and 6), BLM (Oregon, Washington, Idaho, and Montana), USFWS (Regions 1 and 6), Environmental Protection Agency (Region 10), and

National Marine Fisheries Service (NW Region) signed an Interagency Memorandum of Understanding whose purpose was to cooperatively implement *The Interior Columbia Basin Strategy* through 2012 (USDA Forest Service 2003a,b). A specific component of this strategy is "Terrestrial Source Habitats Maintenance and Restoration." This component specifically highlights that, "Old forest in the dry and moist forest potential vegetation groups [PVGs] is relatively scarce therefore management direction shall address steps appropriate to prevent the loss of this habitat and promote long-term sustainability of these existing stands. Restoration direction shall be developed to increase the geographic extent and connectivity of these vegetation groups addressing active and passive management options, where appropriate (such as harvest, thinning, prescribed fire and wildland fire for resource benefit)" (USDA Forest Service et al. 2003a).

The term "old-forest" rather than "old-growth" was adopted by the ICBEMP terrestrial landscape assessment team for their analysis (Hann et al. 1997). Spies and Duncan (2009) have also stated that the term "old-growth", because it had taken on so many social connotations, would not provide the same opportunity to distinguish older forest conditions that historically developed with disturbance from those that developed without disturbance. To facilitate the ICBEMP terrestrial assessment, the following old forest stages (called structural stages) were defined:

- Old-forest multi storied
- Old-forest single storied

For the terrestrial assessment conducted by Hann et al. (1997), structural stages were assigned to Physiognomic Types. Old-forest structural stages were assigned to the following Physiognomic Types:

- Late-seral Shade-intolerant Multi-layer Forest (old-forest multi storied structural stage was assigned to this type)
- Late-seral Shade-tolerant Multi-layer Forest (the old-forest multi storied structural stage was assigned to this type)
- Late-seral Shade-intolerant Single-layer Forest (the old-forest single storied structural stage was assigned to this type)
- Late-seral Shade-tolerant Single-layer Forest (the old-forest single storied structural stage was assigned to this type)

Wisdom et al. (2000) used the structural stages to define source habitat for the wildlife assessment in ICBEMP. This analysis was founded on the terrestrial dynamics assessment conducted by Hann et al. (1997), using the Physiognomic Types and other classification schemes. The term "old-forest habitat" may better represent the desired habitat condition for SCC compared to "old growth" for several reasons, including the belief that the definitions and variables that define old growth vary considerably with no single set of attributes or definitions that describes all types of old growth, particularly that produced by disturbance processes.

For example, some old-growth definitions exclude forests with fire influences, even where fire is a part of the historical disturbance regime. In other cases, such disturbance is incorporated in the old-growth concept. It is, however, generally agreed that old-growth forests share several traits in common. For example, they contain relatively mature old trees with little-to-no evidence of postsettlement activities. Thomas et al. (1979) emphasize that there is no single all-inclusive definition for old growth characteristics, which vary by region, forest type, and local conditions. Spies and Duncan (2009) states that a universal old growth definition is not desirable and that forest ecologists should develop unique definitions for each forest type, taking into account forest structure, development, function, and patterns of human disturbance. However, old-growth conditions are a key element of the old forest spectrum for SCC species associated with old forest attributes and conditions. Old growth conditions also support small wildlife species diversity (Groves 1994).

Planning Area: The minimum criteria for defining old forest habitat should use a subset of the large tree size class and associated canopy cover classes, species composition, snags, and coarse woody debris described in USDA Forest Service (2014). Because data for these various attributes are not available a subset of the large tree size classes ($\geq$15 inchess d.b.h. and $\geq$20 inches d.b.h.) was used to identify vegetative size class conditions that have the potential, at least in terms of some basic criteria, to be potentially old forest habitat. Green et al. (2011) should be a key factor in defining the late-seral porion of the “old forest”wildlife habitat definition.

The following SCC are associated with old forest habitat attributes and conditions:

- White-headed woodpecker
- Pygmy nuthatch
- Lewis’s woodpecker
- Flammulated owl
- Fisher
- Boreal owl
- American three-toed woodpecker
- Fringed myotis
- Townsend’s big-eared bat
- California myotis

18.1.9.4 Fine- or Meso-filter Elements

The following habitat attributes can be considered as either fine- or meso-filter elements, or both for SCC and non-SCC species (Hunter 2005).

Snags and Coarse Woody Debris

Snags (standing dead trees) are ecologically important habitat structures (for nesting, feeding, perching, and/or roosting) for a wide variety of wildlife species. Historically, the presence of snags, hollow and dead portions of live trees, and woody debris depended on a variety of factors, including vegetative patterns and distribution, site potential, and disturbance regimes. Historical quantities and conditions of snags and coarse woody debris would mirror the vegetative species that occurred on a site and represent the kinds of habitats and mortality agents that operated there (USDA Forest Service 2010a).

Studies of young and mature stands that incorporate a large, old tree cohort provide greater biological diversity than stands of comparable age lacking such a cohort. Forest management practices, as depicted with the variable (tree) retention concept (described by Franklin et al. [2007]), serve to maintain structural (biological) diversity through all forest succession stages. Once they fall, snags become down wood that provide other habitat structures (including den sites) for a different and very wide suite of wildlife species and some plant species.

For some very small or sedentary species (e.g., fungi and some invertebrates), these down wood may constitute entire habitats. For larger creatures (e.g., a mammal that uses logs for dens), these may be a critical element of their overall habitat (Hunter 2005).

Down wood is also critical for nutrient cycling, moisture retention, providing effective microsites for tree regeneration, diversity of soil micro-organisms, and hydrologic function. Snags are short-term and vary greatly throughout the life cycle of a forest stand. If a stand originates following a fire, the resulting young stand may begin under a high number of snags. However, most snags only remain standing for a few years, to a very few decades. How long these snags remain standing is a function of the structure, species composition, and age of the previous stand; the fire severity; snag size; and site factors such as soil characteristics, slope position, and landscape position. An insect or disease outbreak may rapidly increase the number of snags. A severe windstorm may rapidly reduce the number of snags (while increasing the amount of down wood). Root pathogens may provide gradual input of snags until all the trees are killed, but depending upon the particular pathogen, these snags may not remain standing for very long. Various severe weather conditions may serve either to increase or decrease snag numbers.

Vegetative composition and diversity, including within-patch structure containing large live trees and snags and large down wood are the critical components for most native wildlife species. Snags are naturally created over time and as various disturbance processes occur across the landscape. Live trees >15.0 inches d.b.h., are important contributors to snag recruitment in later seral stages. Retaining selected live, large trees in timber harvest units also contributes to both within-stand structural diversity and future snags and large down wood during the mid- and late-seral successional stages.

Conserving deadwood in a forest managed for timber means avoiding the destruction of existing deadwood and leaving some dead or dying trees behind after a logging operation to support wildlife species diversity (Groves 1994, Hunter 2005).

The following SCC are associated with snags, logs, and other coarse woody debris habitat attributes:

- White-headed woodpecker
- Pygmy nuthatch
- Lewis's woodpecker
- Flammulated owl
- Fisher

- Boreal owl
- American three-toed woodpecker

Patches

The isolation of patches or distance between patches plays an important role in many ecological processes. Wildife habitat management is managing patch size and habitat quality over time as stands as early seral stage habitats grow and progress through subsequent seral stages of development. In actively managed areas, remnant large-diameter trees may lack habitat attributes of old-forest habitat, such as large-diameter snags and logs, canopy gaps, signs of decadence, legacy trees, and understory patchiness (USDA Forest Service 2010a). Managers need to consider patch size and habitat distribution to ensure wildlife habitat connectivity is retained (USDA Forest Service 2010a).

Large patches typically include th following features (USDA Forest Service 2010a):

- A “relatively” similar (i.e., essentially even-aged) stand development stage throughout (i.e., stand-initiation, stem exclusion, stand-reinitiation, mature, and old forest), approximating the historic range of availability and well distributed on the forest landscape
- Perimeters located on ‘fire defensible’ topographic (combinations of major ridges, streams, and existing roads) or landscape features (aspect and/or landscape breaks)
- Periodic intermediate disturbances, such as pre- and commercial thinning, low- and mixed-severity fire inclusions
- A variety of forest structure, such as forested riparian habitats, mature clumps/legacy trees, and small openings (gaps/inclusions), or sparse understory due to low- and mixed-severity disturbances)

Habitat associations with middle-aged and older forest attributes of larger tree sizes, standing dead/down large trees, and patch sizes serve as surrogates for other species or group of species. Large patches of mature and old forest ensure the availability and diversity of habitat conditions preferred by fisher, northern goshawk, pileated woodpecker, and interior forest species.

For example, in ponderosa pine forests, suitable habitat for white-headed woodpeckers, among others, are favored by retaining large patches of mature and late mature forest and ensuring the presence of large standing and down wood for rearing and foraging (IDFG 2005, USDA Forest Service 2010a). Green et al. (2011) concluded that approximately 47% of old growth ponderosa pine and mixed conifer forests occur in patches of 1,000 to 6,000 acres. Patches on dry aspects are uneven-aged, resulting from non- to mixed-severity wildfire. Patches on moist aspects are even-aged with uniform vegetation and fuel conditions resulting from stand replacing fires.

Promoting larger patches of these forest habitats requires both consideration for retention (where habitat componets are in short supply or lacking) and creation (where large sized trees or other plan components are needed to perpetuate their future availability for wildlife). Methods to conserve and restore habitat and habitat components across the landscape should consider making smaller patches larger and build upon existing patches to increase their size if outside the HRV. Conserving and restoring patches can result in habitats becoming less fragmented on the landscape; connectivity is restored or improved and landscapes become more in sync with historical conditions (USDA Forest Service 2010a).

Large patches, within the HRV, contribute to the retention of mid-forest and mature-forest habitats preferred by fisher, northern goshawk, and pileated woodpecker and interior forest habitats, and better represent natural conditions prior to Euro-American settlement.

The following SCC are associated with patch-related habitat attributes:

- White-headed woodpecker
- Pygmy nuthatch
- Lewis's woodpecker
- Flammulated owl
- Fisher
- Boreal owl
- American three-toed woodpecker

Springs, Pools, and Other Small Wetlands

Smaller wetlands can play a key role in the conservation of biodiversity. The unique flora and fauna that occupy springs and the essential role these springs play in providing water for wide-ranging terrestrial animals are a classic example. In addition small, often ephemeral, pools characterize many forests and grasslands where water table confitions allow pool and ponds to form (Hunter 2005).

These sites often support special examples of invertebrates and amphibians because they lack predatory fish and are likely to be very important to breeding water birds, amphibians, and invertebrates within forests manad for multiple uses such as timber production (Hunter 2005).

Since these wetlands are small, independent ecosystems, they are really too small to be part of a coarse-filter strategy and therefore should best considered in a mesofilter context (Hunter 2005).

18.1.10 *Conclusions*

This Assessemt has used broad-scale information from the ICBEMP, the Idaho CWCS, and other best-available science to indicate that each of the 13 selected terrestrial SCC require management direction in the Nez Perce-Clearwater National Forests LRMP revision. This Assessment discloses the amount and distribution of existing habitat for 8 SCC as modeled using the best available information on these species, as well as the broad-scale status of the remaining 5 SCC that were not modeled.

Each of these broad-scale assessments and the best available science document the need to restore and/or maintain habitat and address specific risks to species persistence. This Assessment documents strategies and opportunities to restore habitats in short supply and/or that have been degraded and to manage risks to habitat and species-specific needs.

The information in this Assessment discloses the many needs for terrestrial SCC management that may be viewed by some as constraints on vegetation management. However, the information in this Assessment clearly states that if properly approached, vegetation management can proceed with a restoration emphasis in many cases. Considering the large amounts of actively managed acres that are contain the ecosystems in need of restoration the Forest should be able to integrate these restoration needs into the program of work for resource management through the subsequent planning cycle. Thus, instead of constraining vegetation management, these restoration needs are actually opportunities for vegetation management for the foreseeable future.

The ICBEMP recognizes that trends in forest structure have seen a significant increase in mid-seral stages at the expense of both early and late-seral stages in the ERUs encompassing the planning area. Throughout the basin, mid-seral, shade-tolerant forests seem to be at nearly twice their historical levels (Hann et al. 1997). A widespread change has been the transition of Pacific and interior ponderosa pine old forests to mid-seral stands of interior Douglas-fir and grand fir-white fir.

The ICBEMP recommends managing mid-seral stands for increased vegetative diversity and structure. The ICBEMP disclosed the implications of the results for managing old-forest structural stages include consideration of (1) conservation of habitats in subbasins and watersheds where declines in old forests has been strongest, (2) silvicultural manipulations of mid-seral forests to accelerate development of late-seral stages, and (3) long-term silvicultural manipulations and long-term accommodation of fire and other disturbance regimes in all forested structural stages to hasten development and improvement in the amount, quality, and distribution of old-forest stages.

Other best available science also recognize these trends and recommend management to restore the ponderosa pine ecosystem (Casey et al. 2012; Crist et al. 2009, IDFG 2005, Mehl and Haufler. 2001, Nez Perce Tribe 2011; NPCC 2003 and 2004a,b). Conservation strategies are in place in Regions 4 and 6 immediately adjacent to the planning area for ponderosa pine ecosystems and associated wildlife species (USDA Forest Service 2010a, Mellen-McLean et al. 2013, USDA Forest Service 2011).

This Assessment also complements the 2005 Idaho CWCS, which discusses 12 of 13 of these SCC species as Idaho SGCN and recommends actions for these species as well as the ecosystems that support them. This Assessment also complements the Northwest Power and Conservation Council (NPCC) 2003 Clearwater and 2004 Salmon subbasin plans and the 2011 Nez Perce Tribe Clearwater River Basin (ID) Climate Change Adaptation Plan (Nez Perce 2011).

Lastly, the Nez Perce-Clearwater National Forests have taken a first step to integrate multiple resource objectives by preparing a management guide titled *Target Stands for Multiple Objectives* (Target Stands Document) (USDA Forest Service 2013). This guide describes the development of target stand conditions for the Primary Habitat Type Groups on the Forests through an integrated interdisciplinary process. This document describes desired conditions for, and specifically names, several of the SCC in this Assessment, and indirectly names other SCC. This guide also reiterates the ecosystem restoration recommendations made by the ICBEMP and Idaho CWCS and other best available science documented in this Assessment.

The Target Stands Document is incomplete at this time. It is recommended that this document be completed as soon as possible for incorporation by reference into the Forest Plan revision. When complete, this document can complement the recommendations made by the ICBEMP and Idaho

CWCS and other best available science documented in this Assessment, and interface with the Forest Plan revision.

Various references used in this SCC Assessment recognize and recommend the restoration of ecosystems that have notably declined and have known composition, structure, and function departure issues within the planning area (Crist et al. 2009 IDFG 2005, Mehl and Haulfer 2001 and Wisdom et al. 2000). Clear and present opportunities exist for the Nez Perce-Clearwater National Forests to use integrated and innovative Plan components that use silvicultural methods to restore these ecosystems that also support terrestrial SCC while producing timber to support local economies. In light of the increased severity of wildfire and stresses on these ecosystems, the need is urgent.

18.1.11 *Potential Plan Components*

Potential Plan components to sustain SCC may include desired future conditions, objectives, standards, and/or guidelimes and can be developed based on the following recommendations from the best available science contained in this Assessment:

- Managing old forest, which includes old-growth conditions appropriate for cover-types
- Protecting and restoring the remaining large-diameter ponderosa pine ecosystem, including retaining all remaining large-diameter (≥15 inches d.b.h.) ponderosa pine trees, reducing late-seral tree competition to sustainable levels, and re-establishing historical fire regime patterns
- Reducing the extent and influence of shade-tolerant forests in areas needed to protect and restore ponderosa pine and white pine
- Reducing the risk of stand-replacing fires in late-seral ponderosa pine; using understory thinning and prescribed burns to enhance development of ponderosa pine old forests and to reduce fuel loads while minimizing impacts to wildlife species
- Manipulating mid-seral forests to accelerate development of late seral stages where needed while providing early-seral forests to benefit other wildlife species
- Managing snags and down logs, which includes retention and long-term management
- Protecting and restoring riparian habitats
- Protecting bat maternity and winter roosts
- Reducing or eliminating the threat of disease transmission to bighorn sheep
- Retaining patches of undisturbed habitat in vegetation management areas that provide microhabitat and microclimate conditions capable of supporting species diversity
- Providing forest stand conditions that reduce soil compaction and retain and reduce damage to ground cover in timber management areas
- Managing the spread of, reducing the extent of, and eradicating established nonnative invasive noxious plants and animals to the extent possible

- Decommissioning roads to eliminate barriers to wildlife dispersal, reduce habitat fragmentation, and improve habitat security as soon as practicable
- Limiting or avoiding disturbances to unique wildlife habitats such as wet, fractured rock outcrops, calcareous substrates, talus slopes, isolated gorges and narrow canyons, and riverside sandbars

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18.2 Potential Aquatic Species of Conservation Concern

Please see discussions in Sections 1.3 and 5.2 of the assessment for additional information about aquatic conditions on the Nez Perce-Clearwater National Forests that support these aquatic potential species of conservation concern.

18.2.1 *Trout Group*

a) Spring/summer Chinook in Clearwater Basin

b) Westslope cutthroat

c) Redband rainbow

Spring/summer Chinook in Idaho are Ranked G5T1 and S1 and are considered critically imperiled in the state. Redband are ranked G5/S4 and are considered apparently secure; Westslope are G4/S3 and considered vulnerable by the state. Spring summer Chinook occur in both the Salmon and Clearwater Basin, but are only ESA listed in the Salmon (therefore, they are addressed as SCC for the Clearwater here). Both trout species are widespread in their range and occur in the planning area. Spring summer Chinook are listed by the state because of their ESA listing, declining population trends, and loss of habitat. Redband are listed by the state because essential population data is lacking for dessert populations; Westslope population data indicates numbers are declining. Redband inhabit different habitat than Westslope and spring Chinook as they tolerate warmer stream conditions whereas spring Chinook and Westslope typically reside higher in drainages and prefer colder stream temperatures. All three of these species are listed in one group as they are all susceptible to similar stressors such as degraded habitat, isolation from nearby populations, and climate change. Forest Service activities capable of interaction with stressors are road construction and maintenance, hauling, and chemical application (e.g., weed spraying) at or near areas where the species may be present.

18.2.2 *Pacific Lamprey (Entosphenus tridentatus)*

Pacific Lamprey are ranked G5 and S1 and considered critically imperiled by the state. They are listed on the state endangered list in part because they have low and declining populations. Historically they were widely distributed in the Snake below Shoshone Falls and juveniles were commonly seen in Idaho streams in the 1960s; now lamprey are only found in the Salmon and Clearwater drainages and tributaries to the Snake below Hells Canyon Dam. They are irregularly distributed in the Clearwater drainage (Cochnauer and Claire 2003). These prehistoric fish are anadromous and spend at least a year and half in the ocean as parasites attached to fish. Adults return to tributary streams and spawn in the spring and summer, dying soon after spawning. Juveniles burrow in sand and silt and can live in freshwater up to seven years before migrating to the ocean. Larval lamprey rear in tributary streams with high water quality, large woody riparian vegetation, and overhanging banks (Cochnauer and Claire 2003). Further, they can be clustered in patches of the highest quality habitat (USFWS 2010).

Recent inventory (2002–2004) by the Idaho Department of Fish and Game has documented the absence of Pacific lamprey in locations were they were know to occur as recently as 1980s. These streams where Pacific lamprey are no longer found include Potlach River, Musselshell Creek, and Lawyer Creek. Extensive IDFG sampling in Lolo Creek did not find lamprey ammocoetes, however Nez Perce Tribe biologists have documented few adults captured in fish traps. IDFG 1958 reported lamprey distributed throughout the North Fork Clearwater River.

Pacific lamprey are now considered extirpated from the North Fork Clearwater River above Dworshak reservoir.

In the South Fork Clearwater River, inventories conducted by Idaho Department of Fish and Game documented the presence of ammocoetes in Red River and the mainstem river but failed to find them in tributaries other than Red River. Adult lampreys were introduced into the lower reaches of Newsome Creek in the late 2000s, and ammocoetes may now be present.

In the Selway River, ammocoetes have been documented upriver of Moose Creek, indicating that adult lampreys are able to pass Selway Falls on their upstream migration. Ammocoetes were relatively abundant in specific sites downriver of Moose Creek in 2012, although only one or two age classes may have been present, based on the uniform size of all specimens observed. Observations of ammocoetes have been made on the mainstem Lochsa River, but more comprehensive surveys are needed. Idaho Department of Fish and Game personnel have also documented lampreys in the Lochsa River, as well as the mainstem Salmon River.

Known stressors are temperatures greater than 22 C, degraded habitat and water quality, isolation, and dewatering. Forest Service activities capable of interaction with stressors are road construction and maintenance, ditch construction and operation, rapid water removal for in-channel work, hauling, and chemical application (e.g. weed spraying) at or near areas where the species may be present.

18.2.3 *Western Pearlshell (Margaritifera falcate)*

This species is rated as G4/G5 and S3 by the state. Although considered vulnerable, it is not included on the state of Idaho's Comprehensive Wildlife Conservation Strategy. This species is broadly distributed in Nez Perce/Clearwater planning area, although populations are not continuous and can be patchy yet densely populated where they do occur. Western Pearlshell mussels prefer cold to cool flowing streams at relatively low gradient. They are found in sandy to cobble substrate in streams as narrow as two meters and as broad as the mainstem Salmon and Clearwater rivers. They are dependent on salmonids to transport offspring upriver to suitable rearing habitat. Known populations occur in all the mainstem rivers and in Lolo Creek, American River, Red River, and many others. Comprehensive distribution data and population data are needed.

Known stressors are altered fish populations, degraded habitat and water quality, isolation, and dewatering. Forest Service activities capable of interaction with stressors are road construction and maintenance, rapid water removal for in-channel work, hauling, and chemical application (e.g. weed spraying) at or near areas where the species may be present.

18.2.4 *Pristine Pyrg*

This species is rated G3 and S2 by the state and is considered imperiled in the state ranking. Idaho included this aquatic snail on their list because of habitat degradation. This animal typically occurs in springs, spring outflow channels and spring dominated streams. Seeps and streams generally have slow flow, coarse substrate and shallow clear cold water. Seeps and streams are often found in dry sagebrush habitat dominated by basalt substrates, although some habitat has been found in other parts of the west in some Douglas fir stands. This species is known to occur in one location on the Nez Perce National Forest in the Salmon River basin

(Stagliano, et al. 2007)and occurs in a few locations near the forest on private land. Survey data and population status in the planning area is unknown. Local populations in other parts of the western United States are known to have been extirpated by road construction and habitat conversion, water removal, and grazing (Frest and Johannes 1997). Known stressors are degraded habitat and water quality, and dewatering. Forest Service activities capable of interaction with stressors are road construction and maintenance, water removal, grazing, and chemical application (e.g. weed spraying) at or near areas where the species may be present.

18.2.5 *Literature Cited and Source Information*

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18.3 POTENTIAL PLANT COMMUNITIES OF CONSERVATION CONCERN

18.3.1 *Existing Information*

Forest Service Handbook 1909.12, Chapter 10

18.3.2 *Informing the Assessment*

Per the Land Management Planning Rule (April 2012), the Forest Service is directed, within Forest Service authority and consistent with the inherent capability of the plan area, to maintain or restore ecosystem integrity and provide for the diversity of plant and animal communities (FSH 1909.12, Chapter 10, 12.12).

The Forest Service coordinated with the Idaho Department of Fish and Game (IDFG) to obtain the knowledge necessary to prioritize levels of conservation concern and resource needs. Because Natural Heritage rankings and the status of rare communities can change, this Assessment will be considered a draft until the Forest Plan revisions are signed.

18.3.3 *Identifying Plant Communities of Conservation Concern*

The following information was used to identify plant communities that merit consideration as potential communities of conservation concern. The identification of rare plant communities that occur on the National Forests was completed using data collected from these sources:

- Forest Habitat Types of Northern Idaho: A Second Approximation (Cooper et al. 1991)
- Idaho Natural Heritage Program rare plant community records (2013)
- Review of potential species of concern with botanists and ecologists from IDFG, the Nez Perce Tribe, the Bureau of Land Management (BLM), and academic and other knowledgeable individuals
- Review of Nez Perce and Clearwater National Forests EAWS assessments

18.3.4 *Current Conditions*

18.3.4.1 Plant Communities of Conservation Concern

Floristic conservation and management is generally limited to the species level during project planning and analysis. No clearly outlined procedures exist for determining rare plant communities that may be of conservation concern. However, the guidance provided in the planning directives indicates the importance of considering the ecological significance and/or rarity of plant communities in a context that is broader than the planning area (FSH 1909.12). Some general rare habitats are broadly defined habitats that may contain different plant communities within them. These general rare habitats are generally very limited geographically due to topography or unusual site conditions. General knowledge and information for some of these special habitats have been reviewed in past EAWS documents, but most of these habitats have not been the subject of significant management emphasis. More defined, specific plant associations are also included in this document. The main source for these plant associations includes the Idaho State Heritage program’s review of ecologically significant areas documented in the establishment records of Research Natural Areas. Other rare plant habitats have been identified via regional plant community classifications and knowledgeable individuals. The purpose of this review is to summarize what is known about these communities and to determine which communities might be subject to potential forest plan components. Table one summarizes these rare communities including primary effects and potential planning needs.

Aspen

Aspen (*Populus tremuloides*) stands are scarce across the Nez Perce–Clearwater National Forests, yet these tree communities are important for a number of reasons. Aspen forests provide breeding, foraging, and resting habitat for a variety of animals (USDA 2002). Young stands provide browse for large wild ungulates. Many other mammals, such as rabbits, porcupines, and mice, feed on the bark and other parts of the tree. Beavers also consume the leaves, bark, and twigs and use the stems for constructing dams and lodges. Aspen communities provide important feeding and nesting sites for a diverse array of birds (DeByle 1981). Livestock also use aspen for browse and can adversely impact growth and regeneration. Almost all species gain some benefit from these trees, including thermal cover, shade, or hiding. Deer also use aspen stands for fawning grounds (Kovalchik 1987).

Due to extensive root sprouts, aspen have the ability to stabilize soil and watersheds. The trees also produce abundant litter that contains more nitrogen, phosphorus, potash, and calcium than the leaf litter of most other hardwoods. The litter decays rapidly, forming nutrient-rich humus, which reduces runoff and aids in percolation and recharge of groundwater. Evaporation from the soil surface is also reduced. More snow accumulates under aspen than under conifers, and snowmelt under aspen begins earlier in the spring. Soil under aspen thaws faster and infiltrates snow more rapidly than soil under conifers does (Brinkman and Roe 1975). This relatively rapid process may allow snow-free areas for wildlife and moderates seasonal runoff in a watershed.

The understory of most aspen communities is luxuriant compared to the understory of associated coniferous forests. The combination of more abundant sunlight and favorable moisture conditions in many aspen stands often leads to a rich forest floor of grasses, forbs, and shrubs. Studies in Colorado have found a disproportionately high number of vascular plant species in aspen stands in relation to the aspen stands' total coverage (Strohlgren et al. 1997). This high diversity has also been observed on the planning unit, where field observations reveal approximately twice as many plant species as other forested habitats would typically contain. The native species present generally include representatives from meadows, warm and cold forests, and grasslands. This remarkable array of species is the result of a diverse mix of moisture and light regimes offered by aspen habitats. However, several native and some nonnative weed species also are well represented. Aspen is valued for its aesthetic qualities at all times of the year. The yellow, orange, and red foliage of autumn particularly enhances recreational value of aspen sites.

Generally, aspen is in decline throughout its range. Reasons for this decline may include genetics, site quality, environmental variables, grazing, or lack of appropriate disturbance. Aspen form clones that are connected by a common parent root system, so impacts to a stand may affect many or all of the stems present. Aspen is not shade tolerant; therefore, being a seral species, it is maintained or promoted through prescribed burning or clearcutting, which results in a profusion of sprouts for several years after the disturbance (USDA 2002). Thus, succession to conifer dominance may be considered a threat. In parts of the species' range, localized studies have reported little or no aspen regeneration, due to winter elk browsing (Baker et al. 1997). However, more extensive studies have found successful regeneration at landscape scales in areas of low elk use (Suzuki et al. 1999). The actual condition of aspen forests across the West is highly variable, and the presence of conifers and elk in aspen stands may or may not indicate a progressive loss of aspen.

Another potential threat to aspen stands and the diversity that they support is invasion by nonnative plant species that are adapted for transitional conditions in the moisture and light regimes found in aspen stands. These invasions may have long-term, negative consequences for native diversity, especially in vegetation types such as aspen that are small, scattered, and rare on the landscape in parts of their range (Chong et al. 2001).

In the planning area, aspen is so uncommon that modeling is not practical. The available aspen geographic information system (GIS) layer for Region 4 does not accurately reflect species distribution in the planning unit. Aspen occur as scattered individuals or very small and sparse stands across the Forest. Stands are perhaps more common in the northeast portion of the forest in the headwaters of the North Fork Clearwater River. More aspen likely occurs than is currently known, but even so, the total amount on the Forests would still be very small.

Broadleaf Riparian Forests

Riparian forest communities including black cottonwood, white alder, red alder, and water birch grow as isolated groups along the main rivers or larger tributaries where high summer moisture exists. Seedling establishment requires fresh substrate of point bars or other depositional material that is typically provided by fires or flooding. Riparian forests are known to support a number of uncommon mosses and lichens as well as critical habitat and travel corridors for various wildlife species. These riparian habitats are largely reduced and fragmented to small pockets or isolated trees. Causes for this reduction, which has occurred throughout much of the assessment area, include fire suppression and consequent reduction in water yield fluctuations; streamside road construction; floodplain constriction; agricultural use; and dredge removal of valley substrates. Nonnative species such as black locust, blackberry, chestnuts, and several willow species have invaded and largely displaced native riparian forests, especially in the Salmon Basin. Restoration or maintenance of these riparian forests will require restoration efforts along with the elimination of these reducing factors.

Coastal Disjunct Communities

Low-elevation canyons on the west slope of the Bitterroot Mountains in northern Idaho harbor a unique forest ecosystem. While it bears many similarities to that west of the Cascade crest, it also contains Rocky Mountain biotic elements that make it globally unique (Lichthardt and Moseley 1994). Researchers who have studied this ecosystem consider it a relict or refugium of conditions that were more widespread in the Rocky Mountains during the Miocene and Pliocene; these conditions became restricted as the climate became drier with the gradual rising of the Cascades during the Pliocene and Pleistocene (Steele 1971; Crawford 1980; Lorain 1988; Lichthardt and Moseley 1994).

Several warm, low-elevation river canyons of the Clearwater Basin contain coastal elements, including both animal and plant communities, that are rare inland. During glacial advances of the Pleistocene, these canyons—the first deep canyons south of the extent of glaciation—may have provided a refugium for plants with relatively high heat requirements. Plant communities in these canyons reflect the warm-moist extreme of northern Idaho habitats. These canyons also provided essential upstream and downstream migration pathways during several major climatic fluctuations that occurred between the Pleistocene and the present (Steele 1971, Brunsfeld and Sullivan 2005).

While Pacific coastal disjunct plant species are part of the flora on the seaward slopes of the Rocky Mountains from southeastern British Columbia to the Salmon River (Steele 1971; Lorain 1988), the refugium ecosystem is most strongly expressed in 2 somewhat separate areas: along the lower North Fork Clearwater River, and at the confluence of the Lochsa and Selway rivers in north-central Idaho. These river canyons provide habitat for over 40 vascular plant species and an unknown number of mosses and lichens that are disjunct from the coast. Some of these species are rare and occur nowhere else in the Rocky Mountains (Lorain 1988). This moist canyon ecosystem also contains many plants and animals that are endemic to the Clearwater Mountains and that may represent descendants of Miocene elements that were better adapted to the developing Rocky Mountain climate than to the climate of the coast (Daubenmire 1975).

The present climate and soil features are important elements in the maintenance of the refugia. The canyon refugia are thought to express a unique climate resulting from a combination of low elevation, mountainous terrain, and the dominant influence of Pacific-maritime weather patterns (Daubenmire 1975). Temperatures within the canyons are moderate due to the low elevation. Although the mouth of the North Fork Clearwater River lies some 300 miles inland, the elevation at that location is only 980 feet. In addition, these deeply incised canyons lie at the western edge of a great mountain mass that receives abundant orographic precipitation and that is oriented to maximally intercept prevailing weather patterns, which bring warm, moist coastal air masses inland. The high precipitation and moderate temperatures closely parallel Pacific coastal climates (Crawford 1980). Soils are formed predominantly from coarse-grained crystalline rock types. In addition, volcanic ash resulting from the cataclysmic eruption of Mount Mazama covers much of the region, often to a depth of several inches (Steele 1971). The comparatively high water-holding capacity of ash-influenced soils compared to that of soil derived from coarse-grained crystalline rock implies the importance of ash content for plant growth (Lichthardt and Moseley 1994).

The coastal disjunct communities vary according to how the individual species utilized various environmental components. The core communities are found at the lowest, warmest elevations and include the greatest number of disjunct species, along with several endemics. Generally, the local range of plants considered core disjunct species is below 3,400 feet, but range varies throughout the canyons. The lush vegetation of these lower slopes and valley bottoms is characterized by the maidenhair fern (*Adiantum aleuticum*) understory union and includes an unusually high diversity of fern species (Lichthardt and Moseley 1994). Coastal disjuncts in this core occurrence also include devilsclub (*Oplopanax horridus*), ladyfern (*Athyrium filix-femina*), and wildginger (*Asarum caudatum*), plant associations of the western redcedar (*Thuja plicata*) forests. Red alder (*Alnus rubra*), a coastal disjunct tree species, is representative and has been used to define the North Fork refugium (Steele 1971). Coastal disjunct species also occur at slightly higher and cooler positions but virtually always within moist plant associations of the western redcedar forests.

Defining the actual distribution of the coastal disjunct communities is difficult due to the variable species biology and subsequent placement across the landscape, especially above the lower core communities. The existing mosaic of vegetation types in the Clearwater River canyons is the result of extensive stand-replacing fires in the first half of the 20th century. Catastrophic fires swept through the area in 1910 and 1919 and along the Lochsa River again in 1934. Some areas, such as the lower Lochsa River canyon, have burned repeatedly (Lichthardt and Moseley 1994). The Lochsa River and portions of the North Fork probably have burned more severely because of their southwest-to-northeast orientation; due to prevailing weather patterns, this orientation favors the development of large fires. The severity of these fires has left some areas with a mosaic of shrub fields and long-term, disclimax seral forest, which are not habitats that would support many coastal disjunct species.

In addition to large-scale fires, past timber harvest, especially on private lands, and the filling of Dworshak Reservoir removed large areas from the coastal disjunct core distribution. Permanent alteration of much of the Lochsa/Selway refugium resulted from the construction of U.S. Highway 12 and settlement of the river corridor. A large portion of the remaining habitat has been impacted by construction of roads, campgrounds, and administrative sites. While low-elevation terraces near the rivers are protected from timber harvests, upslope forests that support these maritime species are still potential harvest sites. The response of individual species to various management activities would vary according to the activity and the species biology in question. However, the integrity of the coastal disjunct community as a whole would not be expected to remain intact with most management activities. As a result of past activities, much of the most representative, core areas of coastal disjunction are generally fragmented today.

Grand Fir Mosaic

The Grand Fir Mosaic (GFM) is a unique landscape pattern in which grand fir stands are interspersed with nonforested openings in a random patchwork that looks like a mosaic from the air. Plants present are considered warm and mesic species. Elevations are generally between 4,200 and 6,000 feet, with colder-site species occurring above and below this zone, which suggests the Grand Fir Mosaic climate is warmer than normal for these elevations (Sommer 1991). Typical areas have an Umbrept soil type and an alder vegetative component. This community is fairly well represented on the planning unit; the concern for this community is not its rarity, but its sensitivity to management and the effects management might have on an uncommon assortment of species of concern. In addition it is often very difficult to regenerate these habitats after harvest.

Red baneberry (*Actaea rubra*) and the endemic evergreen kittentails (*Synthyris platycarpa*) are the 2 most important indicators of the Grand Fir Mosaic. If evergreen kittentails is present on a site, the site is grand fir mosaic, or grand fir mosaic is nearby (Ferguson and Johnson 1996). Specific forest habitat types present typically include grand fir/arrowleaf groundsel (*Abies grandis/Senecio triangularis*); grand fir/Pacific yew, wildginger phase (*Abies grandis/Taxus brevifolia/Asarum caudatum*); Sitka alder/minerslettuce (*Alnus sinuata/Montia cordifolia*); grand fir/wildginger, wildginger phase (*Abies grandis/Asarum caudatum/Asarum caudatum*); and grand fir/wildginger, menziesia phase (*Abies grandis/Asarum caudatum/Menziesia ferruginea*). Nonforest openings are usually dominated by Sitka alder (*Alnus sinuata*) or brackenfern (*Pteridium aquilinum*) and may hold a diverse array of forbs and grasses.

The grand fir mosaic has a slower rate of secondary succession and generally poor conifer regeneration, due to soil chemistry (Ferguson and Johnson 1996). Pocket gophers (*Thomomys talpoides*) inhabit forest openings of the grand fir mosaic and further slow the process of secondary succession on the sites they inhabit (Ferguson and Johnson 1996). The slow rate of secondary succession and poor conifer regeneration require special management attention to ensure that large disturbances do not eliminate plant communities that form the mosaic.

In addition to hosting almost all occurrences of the Clearwater endemic, evergreen kittentails, the Grand Fir Mosaic hosts several other rare plant species with Forest Service or state status. These rare species include Payson's milkvetch (*Astragalus paysonii*), green bug-on-a-stick (*Buxbaumia viridis*), California sedge (*Carex californica*), Dasynotus (*Dasynotus daubenmirei*), Oregon bluebells (*Mertensia bella*), and Idaho barren strawberry (*Waldsteinia idahoensis*). Most of these species are regional or global endemics.

Grasslands

Many grassland communities exist on the planning unit. These communities range from dry, low-elevation foothill grasslands, dominated by bluebunch wheatgrass, to moist, highly productive, higher-elevation mountain grasslands dominated by Idaho fescue. Within the broader landscape context, the moist grasslands are relatively rare and ecologically significant. Refer to the assessments for grasslands, federally listed species, and species of conservation concern. Also see the grassland associations listed in the Specific Rare Plant Communities section below.

High Subalpine/Barrens

The open, highest subalpine habitats are a diverse group of communities that include rocky ridges and outcrops, barrens, fellfields, and scree at or above the general timberline. Collectively these sites are sometimes referred to as alpine; however, probably no true alpine communities exist on the planning unit (Bingham 1987; Henderson 1993). True alpine or tundra habitat results from cold soil temperatures and a short growing season that precludes development of forest communities. Weather-beaten and stunted whitebark pine and subalpine fir grow from the rock crevices atop even the highest peaks in the Seven Devils, the Bitterroots, and the Gospel Hump area. The steep slope gradients and erosional stress of these mountains preclude the perched and poorly drained small plateaus and soil development that might support the developed alpine tundra communities often found elsewhere at these and higher elevations.

In these barrens, plants generally form rock gardens, but some slight soil development has been observed at a few locations. At these highest sites, some plant species that are often represented in true alpine communities do occur. Plants occupying these harsh environments have to be adapted to withstand strong winds, ice shearing, desiccation, solar radiation, and a very short growing season. Such plants are matted or cushioned, low in stature, and are often succulent, hairy, or heavily cutinized to conserve moisture. Examples of such plants include species of phlox, buckwheats, sandworts, and pussytoes.

This high subalpine, pseudo-alpine zone is much more fragile than the typical subalpine communities found below; both natural and human-caused threats are present. Erosional processes can damage these communities, and mountain goats and other wildlife trample and graze the vegetation. Human trampling of these environments is on the increase as interest in high-elevation hiking and mountain climbing grows. In some areas, the more accessible summits have been severely trampled and have lost their vegetation. Many species of these rocky and barren habitats found in the high subalpine community are locally rare or uncommon throughout their range. A full accounting of all the species present has not yet been accomplished.

Hot Spring Plant Communities

Thermal springs occur at a variety of elevations and habitats throughout western North America. The waters of such thermal systems vary widely in temperature and mineral content. These factors can combine to influence the surrounding vegetation, though the ecology and composition of plant communities around such springs are not well known. In some places, patterns of vegetation have been found to be most influenced by salinity, while in other locations, the most important factor was soil structure, pH, or moisture (Brotherson and Rushforth 1987). However, most studies have indicated soil temperature is the most significant physical factor influencing plant species composition in geothermally heated environments (Stout and Al-Niemi 2002). Plants growing at such sites may be subjected to high temperatures and pH, and to heavy metals that may be toxic to plants.

The extreme environments of thermal springs are a sharp contrast to the general habitat conditions found on the Nez Perce–Clearwater National Forests. Research in Yellowstone shows some plants can be maintained in thermal areas through the winter, due to warm temperatures (Stout and Al-Niemi 2002). While the adjacent plant community would be dormant under an extensive, long-lasting snow cover. With such different ecological operating factors, the plants that grow at these sites would be expected to be unusual or unique for the general forest setting. A good example of such range separation is the occurrence of Venus-hair fern (*Adiantum capillus-veneris*) in thermal springs in British Columbia, far disjunct from the plant's normal range in the southern United States (Hitchcock and Cronquist 1973). Casual observations at some of the local thermal springs have noted the presence of plants that otherwise do not occur on the forest, having typical ranges in much warmer environments elsewhere (Hays 2013).

Stout and Al-Niemi (2002) noted some similarities among the plant communities of the Yellowstone thermal areas. Many of the plant species present are commonly considered weedy, exotic, or both. The occurrence of weedy species at some hot springs on the planning unit has also been observed (Hays 2011, 2013). These species likely occur because they flourish in a wide range of soil conditions and geographic areas. These habitats are often situated in forest openings and are transitional by nature, conditions that also favor such weedy species. Many of the hot springs on the planning unit are popular with the public, and in some cases, human activity has altered the thermal features and impacted the adjacent ground. Human-caused damage likely has contributed to the general degradation of these areas and the influx of weedy species at these sites.

Documentation of the plant communities of the local thermal springs is nonexistent. At least 9 such springs exist on the Nez Perce–Clearwater National Forests, with variable use patterns. One has been commercially developed, and some of the more popular springs have been trampled severely; assessment or recovery of these areas would be difficult. Other springs in more remote locales may provide information about the plant community composition. A field assessment of the composition and habitat condition of these sites is needed before determinations can be made about appropriate management.

Subalpine Larch

Subalpine larch occupies a limited range that includes the northern Rockies and northern Cascades (Arno 1970, Knudsen et al. 1968). This species can be found on high mountains in southern British Columbia and Alberta, north-central Washington, north-central and east-central Idaho, and western Montana (Arno 1970; Hitchcock and Cronquist 1973). Subalpine larch exhibits a highly discontinuous distribution, which is believed to be a remnant of a continuous range that existed when cooler, more extensive timberline habitat was present (Arno 1970; Arno and Habeck 1972). On the planning unit, subalpine larch is limited to the highest Bitterroots on the eastern boundary and a small representation on the high ridge dividing Bargamine Creek from Sable Creek and the upper Selway Basin.

Typical subalpine larch stands are often isolated pockets of open, park-like groves, less than 0.05 acre (0.2 hectares [ha]) (Arno and Habeck 1972). Subalpine larch is a dominant species occupying the timberline habitat type within the subalpine fir (*Abies lasiocarpa*) series (Pfister et al. 1977). Principal associates include whitebark pine (*Pinus albicaulis*), subalpine fir, and Engelmann spruce (*Picea engelmannii*) (Arno and Habeck 1972). Major undergrowth species include mountain-heather (*Phyllodoce empetriformis*), smooth woodrush (*Luzula hitchcockii*), and grouse whortleberry (*Vaccinium scoparium*) (Arno and Habeck 1972; Cooper et al. 1991; Pfister et al. 1977). Subalpine larch typically occupies sheltered north aspects, and dry winds and high temperatures probably contribute to poor germination on southern slopes (Arno and Habeck 1972).

This long-lived tree often forms pure stands 500–1,000 feet (150–300 m) above the elevational limits of other conifers; at these higher elevations, environments are very harsh, with mean temperatures below freezing for 6 months of the year (Arno 1990). Subalpine larch can be thought of as a pioneer species, establishing itself on rocky surfaces or cracks between boulders. Soil development on subalpine larch sites is extremely poor due to low temperatures and short growing seasons, which retard microbial and chemical activity (Arno 1990; Arno and Habeck 1972). The species also proliferates after fire, avalanche, or other site disturbances. At the highest timberline elevations, subalpine larch fills a vacant niche representing the potential climax. This species can grow at higher elevations than other conifers because it has superior resistance to winter desiccation (Arno 1990).

The species has several adaptations that allow it to live in these extreme environments. Young subalpine larch have very flexible boles, which allow the trees to occupy snowslide and snow creep sites (Arno and Habeck 1972). Subalpine larch can begin producing cones when they are 100 years old, but they generally do not produce seed in quantity until they reach 200 years of age (Arno and Habeck 1972). Large seed crops are infrequent. For the first 20–25 years, growth is typically very slow. This strategy allows for extensive establishment of the root system and decreases the probability of top-kill from windthrow or heavy snowpack (Arno 1990). Subalpine larch apparently become deeply rooted; thus, soil moisture near the surface seems to have no influence on their growth (Arno and Habeck 1972). Periods of drought do occur in late summer but have minor effects on tree vigor. Dominant subalpine larch usually live 400–500 years, but many trees reach 700 years, and the oldest individuals may live up to 1,000 years (Arno 1970).

Many timberline bird and mammal species are associated with alpine larch communities. Mountain goat, bighorn sheep, hoary marmot, pika, mule deer, elk, black bear and grizzly bear, red squirrel, and snowshoe hare are among the mammals that feed in alpine larch stands. Blue grouse feed heavily on the needles. Two studies suggest that alpine larch foliage may be one of the most important summer foods for blue grouse (Arno and Habeck 1972). Alpine larch provides concealment and thermal cover in an otherwise open habitat. Woodpeckers and other cavity nesters utilize the hollowed-out portions of larger trees. Larger mammals may utilize alpine larch stands as windbreaks or burrows (Arno and Habeck 1972). Grizzly bears often den in alpine larch stands in Banff National Park (Arno 1990). In addition to being valued as wildlife habitat, subalpine larch is important for outdoor recreation and aesthetics (Arno 1990). Photographers and hikers appreciate the changing colors of alpine larch, which is a translucent bright green in summer and lemon yellow and gold in fall. Alpine larch also contributes to watershed protection by stabilizing snow loads on steep northern slopes and thus reducing the threat of avalanches. Alpine larch is considered useful for high-elevation reclamation projects (Arno 1990).

Subalpine Parks

Treeless summits and ridges in the otherwise densely forested mountains of northern Idaho have a relatively unique flora compared with surrounding communities. Although small in area, these subalpine parks add greatly to the biotic diversity of the regional landscape and are habitats for several vascular taxa considered rare in Idaho (Moseley 1993). These open habitats occur across the planning unit from the Salmon to the North Fork Clearwater, but they have virtually no representation on the Palouse District due to the lower elevations there. Moseley (1993) found such sites generally above 5,800 feet in the Coeur d'Alene and Saint Joe basins farther to the north. This elevation is probably applicable in the northern Clearwater region as well, where these communities primarily occur in mountain hemlock or more mesic subalpine fir forests. Below this elevational limit, forests generally dominate; where grasslands are dominant, they are composed of bluebunch wheatgrass and Idaho fescue communities. Grading to the south, the elevational limit is probably higher and more variable, with parklands occurring in forests of subalpine fir, lodgepole pine, and whitebark pine. These southern parks are often more poorly defined due to a less demarcated gradation of the parks into the more open dry forests and grasslands of lower elevations or the open subalpine communities of the upper elevations.

The origin of subalpine parks was originally hypothesized to be a result of repeated fires but was later shown to result from a combination of low soil moisture on slopes exposed to the wind and heavy snow accumulation on leeward slopes (Daubenmire 1981). The conformation of the mountainous topography concentrates the force of wind and thus ensures the transfer of much snow and probably some rain from the windward to the leeward slopes. The windward slope usually has a southerly aspect. In these areas, where the summers are essentially rainless, plant growth depends on water stored in the soil during winter precipitation. On the southerly slopes, the reduced reception or retention of precipitation, early melting of a thin snow mantle, and intense exposure to the sun collectively bring about a deep and regular desiccation of the soil (Daubenmire 1981). The conditions created by this interplay of topography and snow transfer are too extreme for tree seedlings to survive. Additionally, the snow blown from the southern slopes falls just beyond the crests of the ridges and accumulates there as a deep snow comb. This accumulation results in a shortened summer; cold, wet soil; and trees that are either stunted and misshapen or unable to establish (Daubenmire 1981).

Floristic studies have been very limited in the parklands, and only very general communities have been determined. Daubenmire (1981) found that the small differences in microrelief affect differences in degree of snow removal or accumulation, with the resulting variation further complicated by differences in drainage, stoniness, depth of soil, and direction and degree of exposure. These factors result in a low degree of repetition of community types, with only a few generalizations warranted. Where soils are coarse and very stony, forb communities dominate. In areas of relatively deep and stone-free soils, grasslands dominated by green fescue (*Festuca viridula*) are common. On the leeward side of the ridges, plants are physiologically adapted to areas of abnormal snow persistence and cooler temperatures. Trees are often dwarfed and distorted or absent. Areas of the deepest, most persistent snowdrifts are represented as a treeless park that supports a flora composed of species more typically occurring in the high subalpine or even alpine positions (Daubenmire 1981).

Daubenmire (1981) partitioned subalpine parks into 2 broad types: xerophytic parks on the windward slopes of ridges and summits, and snowbank parks on the lee sides. Building upon Daubenmire's classification, Moseley (1993) recognized 3 classes of vegetation in the mountain parks of north Idaho: graminoid, cliffs and ledges, and talus slopes. On the planning unit, these general categories describe the parklands in the central and northern Clearwater Basin, but the categories are less applicable in the southern Clearwater Basin and the Salmon Basin.

The graminoid community corresponds to Daubenmire's (1981) xerophytic park. This community is dominated by graminoids, largely green fescue, and also contains a high cover of beargrass (*Xerophyllum tenax*) and elk sedge (*Carex geyeri*) in some areas. There is a high diversity, but low coverage of forbs. The cliffs and ledges vegetation class roughly corresponds to Daubenmire's (1981) snowbank park, because it occurs on the lee sides of summits and ridges. Unlike Daubenmire's study areas, which had relatively gentle slopes, the north-facing habitats of Moseley's study area occur on glaciated cirque headwalls. On the Nez Perce–Clearwater National Forests, both situations occur with regularity on the fringe of the north slope. The talus can occur within both the graminoid community on south slopes and on the cooler, moister north slopes. This habitat is made up of stabilized blocks of base rocks or granite, often several feet in diameter, with little soil development between the blocks. While talus sites are independent of the precipitation transfers that have created the other parkland communities, they are spatially associated with these other parklands and support a different plant community. Islands of stunted or matted trees, wild raspberry (*Rubus idaeus*), and common juniper (*Juniperus communis*) are often representative.

To the south, these communities are less defined, due to climatic and topographic factors. The continental climate is drier, resulting in more open forests in general, and the higher, cooler elevations cause snow levels to hold longer on the south slopes. The orientation of the topography also results in fewer south slopes at the higher elevations. South-facing park grasslands do occur; however, they are drier than the north-facing communities, with less green fescue and more fleeceflower (*Polygonum phytolaccaefolium*) and other subalpine forbs, which increase on the more exposed soils. The mountain form of big sage (*Artemisia tridentata vaseyana*) also becomes a defining component in some of these southern parklands. These more lightly vegetated slopes are less defined in the open drier forests. However, the snowbank communities on the north and east aspects are highly developed on the higher ridges found in the southern portions of the planning unit.

Historically, some of these parkland areas were subjected to grazing, primarily by sheep in the early and mid-1900s. Cattle use of subalpine areas was probably light and is very low today. One allotment that accesses the west margin of the Gospel Hump Wilderness is still active. Past road construction has impacted some of the open balds and facilitates increasing recreational traffic into the subalpine areas. The soils of these areas are rich in humus that is easily pulverized during the dry summers and either blows away or is later washed away; therefore, trails become knee-deep ruts over time (Daubenmire 1981). Increased recreational use, especially motorized use of these grasslands, is currently the most significant contributor to the degradation of these habitats. Fortunately, in these higher, cooler elevations, the open grassland habitats are not highly susceptible to weeds, even along disturbed road corridors, trails, or dispersed sites. While invasive species do occur, they are rarely more than waifs or small populations.

Longer-term climate change may pose a threat to these habitats, though the particular effects are uncertain. An increase in precipitation that would increase soil moisture, especially in summer, would likely cause forest encroachment and the potential reduction of these open habitats. An increase in temperature or a decline in precipitation that potentially would lead to further decline in soil moisture could cause an expansion of the parklands. A decrease in snowfall could cause a decline in the snowbank park communities on the leeward side of the ridge, while an increase in snowfall might expand these northside parklands.

Western Redcedar Groves

For this report, a cedar grove refers loosely to any ancient stand of western redcedar that is in a very late or climax stage of succession. These forest communities are unique because they are extremely rare and given the centuries required for their development are not considered a renewable resource. Determining the extent of this community on the planning unit is difficult, because stand databases fail to capture such sites for various reasons. A report by the Idaho Conservation Data Center (Lichthardt 1999) attempted to document quality cedar groves for conservation purposes.

These stands have escaped repeated, catastrophic fires and the commercial logging that has characterized the region for a century. Trees 5–11 feet in diameter generally occur in stream bottoms as isolated individuals, in streamside stringers, or in small stands commonly referred to as groves. The term “grove” comes from the wide spacing of the trees and their open, park-like understory. The few groves of giant western redcedar that remain provide opportunities for research, reference areas for extremely advanced forest succession, and habitat for rare plants. Although groves located along roads and pack trails have long been used as campsites, they are also valued by the public for nature trails, solitude, and education (Lichthardt 1999).

Western redcedar greater than 5 feet in diameter are the oldest trees in the northern Rocky Mountains, with estimated ages of 1,000–2,000 years (Parker 1979). Accurately determining the age of large western redcedar is difficult because heart-rot fungi render the trees hollow, thus tree rings are not available to count. Using a conservative method based on growth rates of individuals of various sizes, Parker (1986) estimated the age of a western redcedar 8.9 feet in diameter at breast height (dbh, 4.5 feet) to be 2,820 years. Although the requisite 5-foot diameter criterion is arbitrary, this measurement succeeds in distinguishing a very rare subset of old-growth cedar (Lichthardt 1999).

Because of their great age, western redcedar groves are rare elements of biodiversity. While most plant associations represented in the groves may be common and widespread, the stands represent a rare seral/structural stage of these associations. In addition to being rare elements themselves, ancient western redcedar stands with fern understories are typical habitat for rare members of the genus *Botrychium*, fern allies known as grapeferns or moonworts, and remnant stands may provide optimum habitat, at least in the Clearwater region. Most occurrences of Mingan moonwort (*Botrychium minganense*), the single occurrence of mountain moonwort (*Botrychium montanum*), and some occurrences of lanceleaf moonwort (*Botrychium lanceolatum*) occur in such groves of western redcedar. Also, the rare western redcedar/shieldfern plant association described by Steele (1971) occurs in such a grove (Lichthardt 1999).

Studies of vegetative diversity indicate that such old-growth forests generally are not more diverse overall than younger, second-growth forest (Halpern and Spies 1995); however, some individual species require ancient forests in order to persist on the landscape. Along with the moonworts previously discussed, many species of bryophytes and lichens require old-growth forests. This is especially true for nitrogen-fixing cyanolichens, which generally are absent from younger forests (McCune 1993). In some forest types, old-growth forests have been found to have up to six times the mass of certain lichen species as compared to younger forests of the same type (Esseen et al. 1996). Lesica et al. (1991) found that many uncommon ground-layer mosses and liverworts were found more commonly in old forests than in younger forests. The importance of lichens and other lower plant forms is not often appreciated; however, they form an integral component of many forest ecosystems. These plants provide food and habitat for many animals (Sillett et al. 2000), contribute to nutrient cycles, and represent a major part of species diversity (Lesica et al. 1991).

The environmental factors most likely controlling the distribution of bryophytes and lichens in these groves are light, humidity, climate equableness, quantity and quality of coarse woody debris, and long-term continuity of the woody vegetation (McCune and Antos 1982; Lesica et al. 1991). Many of these factors, and the occurrence of species tied to them, depend on stand structure that is uniquely different in older cedar groves. These oldest forests have an increased spatial heterogeneity of resources and environments that may enable higher species diversity among some moss and lichen species. Many species may be particularly sensitive to fire and thus are found only in forests such as cedar groves that have long-term resistance to burning due to the moist microclimate (Halpern and Spies 1995). Furthermore, many of these species have limited dispersal mechanisms and can only move into a forest if it maintains suitable habitat conditions for very long periods of time (Sillet et al. 2000), as would be the case in these ancient cedar groves.

These western redcedar groves are irreplaceable and should therefore be a high conservation priority. They offer opportunities for research and interpretation and are highly valued by Forest visitors. These groves provide habitat for rare plants and are themselves important elements of biodiversity. The rarity of such stands and the significant alteration by recreational use and management of adjoining stands are well documented (Lichthardt 1999). Many of the remaining groves of remnant cedar are not susceptible to cutting, because of Forest Service policies mandating stream buffer zones. However, cutting up to the edge of a grove alters its understory composition and climate. The use of groves for campsites (developed and undeveloped) is a threat to groves near roads, and some groves have been severely impacted by such use. The understories and soil surface are especially affected. Some groves border on clearcuts, which change the climate along the edge of the grove and introduce a variety of dry-site forbs and exotics. Some groves have been impacted by severe natural disturbance from windthrow (Lichthardt 1999). Two Special Interest Areas (SIA) on the Palouse District— the Morris Creek and Giant Western Redcedar groves—and the DeVoto Grove on the Powell District are managed for interpretive use. As a result, the Giant Western Redcedar and DeVoto groves have suffered significant disturbance. Forest Service policy requires that SIAs be managed for public enjoyment; this designation may be in conflict with preserving the special values of remnant cedar groves (Lichthardt 1999).

Lichthardt (1999) noted that some forests in the Northern Region have specific programs to identify and preserve priority groves of ancient cedar. On the planning unit, some groves have been given SIA designation, but no specific conservation measures or planning designations are in place for these sites. Though current forest management policies generally exclude old growth from management, these policies could change. Cedar groves are a rare subset of old growth, and many smaller groves or pockets within other general stands have no protection and potentially would remain unknown through project planning. Under current policies, such small inclusions could be lost during harvest within management units. A discussion of the need to appropriately manage these special forest communities is warranted, along with a discussion of the potential measures that would be required. Lichthardt (1999) made several recommendations regarding management and management designation of cedar grove sites. These primarily involved the need for a formal Conservation Strategy, protection of sites containing known and yet to be discovered remnant cedar stands, maintenance of buffer areas adjacent cedar stands to protect the interior environment, and the designation of the Pete King Creek Cedar Grove as an SIA.

Wetlands

Wetlands consist of areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Such plants include those that require saturated soils to survive and those that gain a competitive advantage over others because they can tolerate prolonged wet soil conditions longer than competing plants can.

Wetland communities are important because of their botanic diversity, ecosystem function, and use by wildlife. Many of the wetlands on the planning unit are within riparian zones around streams, but other wetlands can be found anyplace water collects and creates anaerobic conditions that prevent tree growth. Water collection may be due to topography, soil conditions, natural or human-caused alteration of the ground, or other factors. Several types of wetlands exist, but those of special importance include wet meadows and sphagnum fens. Detailed mapping of wetlands occurs for parts of the planning unit, particularly on the Nez Perce National Forest portion; however, for much of the forest, detailed mapping is not available. Past mining, road construction, and railroad activity in some riparian areas, along with the conversion of portions of broad meadows, has probably resulted in a slight decline in wetlands from historic levels. The reduction may be significant at some specific sites; however, overall, wetland areas are largely unchanged over the planning unit.

Under the system of wetland classification established by Cowardin et al. (1979), sites are defined by systems, classes, and water regimes. Wetlands on the planning unit are primarily of the Palustrine System. Typically included in this system are vegetated wetlands traditionally referred to as marshes, swamps, bogs, fens, and prairies (Cowardin et al. 1979).

The wetland class describes the general appearance of the habitat in terms of either the dominant life form of the vegetation or the physiography and composition of the substrate. Life forms are used to define classes because they are easily recognizable, do not change distribution rapidly, and have traditionally been used to classify wetlands (Cowardin et al. 1979). The four common wetland classes that occur on the Nez Perce–Clearwater National Forests are forested, shrub, emergent, and moss or lichen. Numerous shoreline classes of wetlands exist, but the vegetative communities are poorly developed at such sites, and representation on the forest is limited to riparian habitat conservation areas (RHCAs). For these reasons, shoreline wetlands are not included in this assessment.

- Forested wetlands are characterized by woody vegetation that is 6 meters tall or taller.
- Shrub wetlands include areas dominated by woody vegetation <6 meters tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted

because of environmental conditions.

- Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. Perennial plants usually dominate these wetlands.
- Moss/lichen wetlands include areas where mosses or lichens cover substrates other than rock and where emergents, shrubs, or trees make up <30% of the area cover. The only water regime is saturated. This wetland type does not often occur over large areas but is found throughout much of the forest as small inclusions within the other vegetative classes. Where this wetland type does occur, distinct plant communities are generally found.

Wetlands often form a mosaic composed of multiple vegetation classes and varied water regimes. Within these vegetative classes, assorted plant communities can occur. These communities are generally distinct and characterized by indicator species and plant assemblages. Wetland communities also provide habitat for several plant species of concern. Following is a brief floristic description of the more common general wetland communities and species of concern that may be present. For discussion purposes, wetland communities are separated into forested wetlands, emergent meadows, and fens, all of which may have significant shrub inclusions or components.

<u>Forested wetlands.</u> On the planning unit, forested wetlands usually are associated with riparian areas. Cooler sites generally support tree species such as lodgepole pine, subalpine fir, and Engelmann spruce, while warmer sites may support western redcedar. Wetland species found in the forest are generally different from those found in more open communities. Typical representatives would include arrowleaf groundsel (*Senecio triangularis*), small-fruit bulrush (*Scirpus microcarpus*), bigleaf sedge (*Carex amplifolia*), wood reedgrass (*Cinna latifolia*), ladyfern (*Athyrium filix-femina*), and tall bluebells (*Mertensia paniculata*). Open shrub inclusions of mountain alder (*Alnus incana*) and assorted willows (*Salix* spp.) are frequent. Bluejoint reedgrass (*Calamagrostis canadensis*) and tall mannagrass (*Glyceria elata*) often dominate the ground at these inclusions. Rare species that may occur in certain aquatic communities include the threatened water howellia (*Howellia aquatilis*), light hookeria (*Hookeria lucens*), sweet coltsfoot (*Petasites frigidus palmatus*), naked-stem rhizomnium (*Rhizomnium nudum*), Sierra wood-fern (*Thelypteris nevadensis*), and short-style sticky tofieldia (*Triantha occidentalis brevistyla*).

<u>Emergent meadows</u>. A variety of subcommunities can be found in the meadows, depending upon the moisture regimes and temperatures present. Most of these meadows are dominated by water sedge (*Carex aquatilis*), but higher, cooler elevations may be dominated by Holm’s Rocky Mountain sedge (*Carex scopulorum*) or other sedges. Supporting or codominant species can vary widely depending upon site conditions. Rare plants that may occur in various communities of emergent meadows include tall swamp onion (*Allium validum*), northern moonwort (*Botrychium pinnatum*), least moonwort (*Botrychium simplex*), Buxbaum’s sedge (*Carex buxbaumii*), bristlystalked sedge (*Carex leptalea*), sticky goldenweed (*Pyrrocoma hirtus* variety *sonchifolius*), and Douglas’ clover (*Trifolium douglasii*).

- Riparian Meadows. Open riparian meadows are often dominated by the common species California false hellebore (*Veratrum californicum caudatum*), Canby’s licorice-root (*Ligusticum canbyi*), bluejoint reedgrass (*Calamagrostis canadensis*), western polemonium (*Polemonium occidentale*), bigleaf lupine (*Lupinus polyphyllus burkei*), and many others. In colder conditions, species such as Labrador tea (*Ledum glandulosum*), marsh marigold (*Caltha biflora*), Jeffrey's shooting star (*Dodecatheon jeffreyi*), and elephant's head (*Pedicularis groenlandica*) are typical. Shrubs including alder, willows, and bog birch (*Betula glandulosa*) may be present in these wetlands as scattered individuals or as extensive shrub islands. These riparian wetlands typically form a mosaic of types with bog and tree inclusions.

- Broad Herbaceous Meadows. These meadows support an array of plant associations that vary depending upon moisture levels. Significant overlap occurs in the plant communities because the moisture gradient changes are often very gradual. The moist end is generally dominated by water sedge, but large forbs such as camas (*Camassia quamash*), sweet marsh butterweed (*Senecio foetidus*), and globe penstemon (*Penstemon globosus*) may also be abundant. In areas that are slightly drier, sedges and grasses that have intermediate moisture requirements increase in coverage; such species include thick-headed sedge (*Carex pachystachya*), Hood's sedge (*Carex hoodii*), and tufted hairgrass (*Deschampsia cespitosa*). These meadows may be wet in the spring and dry by summer's end.
- Mesic Grasslands. As moisture further declines in the mesic meadows, grasses become more common in the species mix, including species such as Wolf's trisetum (*Trisetum wolfii*), timber oatgrass (*Danthonia intermedia*), California oatgrass (*Danthonia californica*), and mountain brome (*Bromus marginatus*). The wetter forbs decline, and species such as wild strawberry (*Fragaria virginiana*) and cinquefoil (*Potentilla gracilis*) become common. These mesic grasslands form the drier end of the meadow communities and are transitory to upland habitats. In some areas, this meadow type has been significantly reduced by development and weed infestations. In other areas, the adjacent upland slopes that historically supported forest have been cleared to increase pasture for grazing or have been slow to regenerate due to site conditions. The resulting grasslands that extend from the mesic grasslands onto the upland slopes are dominated by introduced grasses and sometimes referred to as foothill grasslands.

Fens. Sphagnum moss and a flora consisting of mostly obligate wetland species dominate these perennially saturated wetlands. The soils are anaerobic and frequently peat forming. Fens can be large or small and may exist in forest openings or mixed in with any of the other wetland communities. Species composition can vary across the planning unit, but in general, species may include slender cottongrass (*Eriophorum gracile*), woodrush sedge (*Carex luzulina*), Holm's Rocky Mountain sedge (*Carex scopulorum*), alpine nerve sedge (*Carex neurophora*), Cusick's sedge (*Carex cusickii*), inland sedge (*Carex interior*), fewflower spikerush (*Eleocharis pauciflora*), and marsh marigold (*Caltha biflora*). In cold situations, the same species found in colder riparian meadows may increase coverage in fens. Species of concern that are expected to occur in bog habitats include bristlystalked sedge (*Carex leptalea*), Mendocino sphagnum (*Sphagnum mendocinum*), short-style sticky tofieldia (*Triantha occidentalis brevistyla*), and Blandow's helodium (*Helodium blandowii*).

Whitebark Pine

Refer to the assessment for forested vegetation and federally listed plant species.

Table 18-12. Summary of Effects and Potential Plan Components for Rare Plant Communities

Community of Concern	Primary Effects	Potential Plan Components/ Management Considerations
Aspen	• Livestock grazing • Fire suppression • Weed invasion	Restoration/enhancement through implementation of fire or mechanical treatments.
Broadleaf Riparian Forests	• Road construction • Invasive species, esp. trees and shrubs • Mining activities	See plan components for aquatics (RHCA).
Coastal Disjunct	• Road construction • Timber harvest • Recreational use of river corridor	See plan components and assessment for mesic forest Species of Conservation Concern (SCC).
Grand Fir Mosaic	• Timber harvest resulting in unusually slow succession and community loss	See general vegetation plan components.
Grasslands	• Livestock grazing • Weed invasion • Weed treatments • Recreation • Rare plant monitoring	See plan components and assessment for grasslands, federally listed plant species, and plant SCC.
High Subalpine/Barrens	• Recreational uses • Climate change	None identified
Hot Springs	• High recreational use • Soil compaction • Weed invasion • Hydrologic alteration	Particular need for inventory of communities and assessment of impacts and threats.
Subalpine Larch	• Climate change • Fire suppression	None identified
Subalpine Parks	• Climate change • Recreation	None identified
Western Redcedar Groves	• Timber harvest • Recreation	None identified Investigate need for special designation.
Wetlands	• Road construction • Recreation • Livestock grazing • Climate change • Hydrologic changes	See plan components and assessment for aquatics.
Whitebark Pine	• Disease • Fire suppression • Climate change • Succession • Insect outbreaks	See plan components and assessment for forested vegetation and federally listed plant species.

Existing knowledge suggests that no strong needs for plan components exist for any of the listed general rare plant communities, because current management practices and resource use on the planning unit are not likely to lead to community loss. However, opportunities may exist for resource improvements, particularly in grasslands and with aspen restoration efforts. Discussion should take place concerning designation and formal protection of western redcedar groves. The communities all have varying levels of need for further documentation of occurrence and assessment of threats. Of particular concern are hot springs communities, which are very few in number, largely unknown, and heavily impacted at some locations.

Specific Rare Plant Communities

Direction to assess rare plant communities is provided in the Planning Rule. The primary sources of plant community information are the Idaho Natural Heritage Program and Cooper et al. (1991). The state program has maintained a database that ranks plant communities; however, the program has not been maintained for many years, due to lack of funds. Cooper et al. list several incidental and rare habitat types but provide little information about ranking, rarity, or location. Table 18-13 includes rare communities that are included in Cooper's list of rare habitats or plant ranked S1 or S2 by the state if they are known to occur on the planning unit. The information provided is based on state records, Cooper et al. (1991), and local knowledge. The purpose of assessing these communities is to determine which of them may have resource conservation needs that could drive plan components.

Table 18-13. Summary of Rare Plant Communities, Nez Perce–Clearwater National Forests

Community	Rank	Comments
Bluebunch wheatgrass/Sandberg bluegrass/arrowleaf balsamroot	S2S3	Mostly on the Salmon; large areas of habitat, but largely displaced and severely threatened by weeds
Bluebunch wheatgrass/Wyeth buckwheat	S1	Probably more common in Salmon grasslands, but reduced and threatened by weeds; Bull Run RNA
Douglas fir/blue huckleberry	S2	Uncommon
Douglas fir/Idaho fescue/Idaho fescue phase	S2	Incidental; little known
Douglas fir/Idaho fescue/ponderosa pine phase	S2	Incidental; little known
Douglas fir/ninebark/pinegrass phase	S2?	Possibly more common; Bull Run RNA
Douglas fir/twinflower	S1	Rare habitat; little known
Fewflower spikerush	S1	Common species, but rarely forming communities on FS land; limited to protected wet meadows; Moose Meadow RNA
Grand fir/beargrass	S1	Mostly NP; widespread and probably more common; several RNAs
Grand fir/beargrass/blue huckleberry phase	S1	Mostly NP; widespread; probably more common; No Business RNA
Grand fir/beargrass/goldthread phase	S2	Mostly NP; widespread and probably more common; No Business RNA
Grand fir/maidenhair fern	S1	Rare habitat; generally in RHCA; No Business RNA; Mill Creek
Grand fir/ginger/menziesia phase	S2	Probably more common; Upper Newsome RNA
Grand fir/goldthread	S2	Widespread on NP; probably more common; No Business RNA
Grand fir/mountain maple/mountain maple phase	S2	Little is known
Grand fir/ninebark/goldthread phase	S2	Mostly on NP; probably more common; Bull Run RNA
Grand fir/oakfern	NR	Uncommon in cool, mesic forests in the South Fork Clearwater
Grand fir/Pacific yew/clintonia phase	S2	Probably more common; Warm Springs RNA
Grand fir/Pacific yew/ginger phase	S2S3	Probably more common; several RNAs
Grand fir/spiraea	S2	Uncommon, but widespread
Grand fir/twinflower/twinflower phase	S1?	Mostly NP; probably more common; No Business RNA
Grand fir/twinflower/beargrass phase	S2?	Mostly NP; probably more common; Warm Springs RNA
Idaho fescue/Hood’s sedge	S1	In Salmon grasslands; threatened by weeds; little is known
Idaho fescue/Junegrass	S2S3	Uncommon mesic grassland in Salmon Canyon; threatened by weeds; supports many species of concern
Lodgepole pine/western huckleberry	S2	Open forest wetland community; Sneakfoot RNA
Menziesia/common juniper	S1	Rare community at Fish Lake RNA; little is known
Mountain alder/ladyfern	S2	Probably well represented in GFM; often in RHCA; in Four-Bit RNA and North Fork; probably more common
Mountain hemlock/beargrass/beargrass phase	S2?	Possibly more common
Mountain hemlock/beargrass/whortleberry phase	S2?	Possibly more common
Mountain hemlock/beargrass/smooth woodrush phase	S2?	Possibly more common; Rhodes Peak RNA
Mountain hemlock/menziesia/smooth woodrush phase	S2?	Possibly more common; Bald Mountain RNA
Mountain hemlock/smooth woodrush	S2	Possibly more common; in 3 subalpine RNAs
Mountain hemlock/twisted stalk/menziesia phase	S1?	Rare; little known; Upper Hemlock RNA

Community	Rank	Comments
Ponderosa pine/Idaho fescue	S2	Possibly more common; threatened by weeds
Ponderosa pine/ninebark	S1S2	Incidental habitat; Elk Creek RNA
Subalpine fir/bluejoint reedgrass/Labrador tea phase	S2	Relatively common in cool, wet forests; south NP; east CW
Subalpine fir/white rhododendron	NR	Selway Crags; mostly in wilderness
Thermal springs communities	S2	Largely unknown; see discussion
Western hemlock/devilsclub	NR	Known from 1 location in the Palouse Basin; in RHCA
Western redcedar/Dryopteris ssp.	S1	Rare on the North Fork Clearwater; associated with disjunct communities and cedar groves
Western redcedar/ginger/Pacific yew phase	S2	Mostly on Clearwater; not uncommon; in several cedar groves and Four-Bit RNA
Western redcedar/ladyfern/maidenhair fern phase	S2	Fairly common in warm mesic forests; Dutch, Four-Bit RNAs
Western redcedar/maidenhair fern	S2	Common in warm mesic forests; several RNAs
Western redcedar/oakfern	S2	Probably more common; several cedar groves across the Clearwater unit.
Western redcedar/skunk cabbage	S2	Rare on the North Fork and Palouse districts; in RHCA

S1 – Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences)
S2 – Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6–20 occurrences)
NP – Nez Perce National Forest
CW – Clearwater National Forest
RNA – Research Natural Area
NR – Not ranked
RHCA – Riparian Habitat Conservation Area

Plant communities as presented here are based upon potential vegetation (Cooper et al. 1991). For this reason, most of the general forested habitats are the vegetative representation of ecological factors such as moisture, temperature, and light for a given area. Forest communities can be disturbed and in general will return to the same plant community or habitat type given enough time because ecological factors remain relatively constant. Thus, the continued existence of these forest communities into the future is ensured so long as disturbance processes are not extraordinary enough to change the environmental factors or soils appreciably. However, severe disturbances involving land conversion will change habitats and the potential plant community.

The majority of the listed plant communities are believed to be more common than the rankings may indicate. This belief is based upon stand observations and the extensive experience of local workers who have spent many years determining habitat types on the unit. Much of the information utilized by the state was acquired from Research Natural Area (RNA) establishment reports or focused surveys in areas of interest, such as cedar groves, areas of coastal disjunction, or other ecologically sensitive areas. Coverage of the forest in general was much more limited.

As indicated by the comments in Table 18-13, some associations are included in wetlands or have a high affinity for RHCAs and thus have few threats. Some others, particularly the grassland communities, are subjected to a number of threats, primarily improper grazing and invasion of nonnative species. Concerns for these communities are accounted for through range plan components addressing proper grazing management and control of invasive species as well as plan components addressing some federally listed species. Likewise, no specific plan components are needed for any plant community identified in Table 2 because these other habitats are accounted for in existing plan components, representation is included within protected areas or they are based upon potential vegetation and expected to persist through time.

18.3.4.2 Trends and Drivers

The following are primary drivers of the trends described for the identified plant communities:

- Reduction of grassland communities, due to forest encroachment
- Reduction of open pine savanna habitats, due to forest encroachment
- Noxious weed introduction/expansion, particularly in dry forest/grassland habitats
- Climate change as a limitation, especially to high-elevation communities
- Livestock grazing and recreational use in grassland habitats
- Grazing and fire suppression potentially reducing aspen recruitment
- Slow succession of the GFM after harvest
- Recreational impacts to hot springs and cedar groves
- Timber harvest immediately adjacent to cedar groves
- Reduction of whitebark pine, due to disease, insects, and succession

18.3.4.3 Information Needs

The level of information available varies among the different communities; however, in general, the following information needs have been identified:

- Better information is needed on distribution and occurrence for most of the identified communities across the planning unit.
- Better information is needed on the composition of some plant communities, especially hot springs.
- Improved GIS modeling is needed for some communities of concern.
- Better understanding of community ecology is needed, especially the long-term and short-term response to forms of disturbance.

Given limitations in funding and workforce, most of this information will have to come from extended observations and limited study and analysis at the project level. This limitation will make gathering additional information for many of these plant communities more difficult.

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18.4 Potential Botanical Species of Conservation Concern

18.4.1 *Existing Information*

- https://fishandgame.idaho.gov/content/page/idaho-natural-heritage-program-technical-reports
- http://www.idahonativeplants.org/

18.4.2 *Informing the Assessment*

Per the Land Management Planning Rule (April 2012), the Forest Service is directed, within Forest Service authority and consistent with the inherent capability of the plan area, to maintain or restore ecosystem integrity and provide for the diversity of plant and animal communities. Furthermore, the Forest Service is directed to recognize and manage species of conservation concern (SCC). To be considered an SCC, the species must be known to occur in the plan area and the Regional Forester must have determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long term in the plan area. Per the above, the responsible official must comply with the Forest Service Handbook (FSH 2013), which directs that potential SCC should not identified when a species is secure and their continued long-term persistence in the planning area is not at risk or insufficient scientific information is available to conclude that there is a substantial concern about the species' capability to persist in the plan area over the long term.

Coordination with the Idaho Department of Fish and Game (IDFG), Nez Perce Tribe, adjacent land management agencies and other interested parties contributed to the knowledge necessary to prioritizing levels of conservation concern and species needs. The initial assessment of rare plant species occurring on the Forests was completed using criteria described in the Planning Rule (USDA 2012) and Forest Service Handbook (2013). Because the status of rare species and Nature Serve global ranks can change, this Assessment is considered "draft" until the Forest Plan revisions are signed.

18.4.2.1 Ecosystem Integrity

Ecosystem integrity includes elements addressing biological diversity and species (population) viability.

Biological Diversity—Forest management practices that retain a full array of forest ecological components and species habitats (i.e., biological diversity) are expected to provide "inocula" to re-establish species into suitable habitats. Franklin et al. (2007), cites the primary objective for retaining an array of forest ecological components is to provide elements of biological diversity that might otherwise be lost with traditional silvicultural practices. The creation and maintenance of structurally complex managed-stands is being developed as a primary approach to managing forests. Applying ecosystem management principles to incorporate biological diversity includes adapting vegetation management practices (such as longer stand rotations and retaining downed dead and live wood features). Forest management practices, as depicted with the variable (tree) retention concept (Franklin et al. 2007), serve to maintain structural (biological) diversity through all forest succession stages.

Species Viability—Species viability is influenced by total population size, habitat, and catastrophic fluctuations at the ecoregion or larger scale. A viable species is defined as consisting of self-sustaining populations that are well distributed throughout the species' range. Self-sustaining populations are those that are sufficiently large and have sufficient genetic diversity to display the array of life history strategies and forms that will provide for their persistence and adaptability in the planning area over time (USDA 2000).

18.4.2.2 Ecosystem Diversity

Initial assessment of ecosystem diversity within a plan area relies on a review of the broad landscape-level ecological conditions (coarse filter) and plant species-level diversity within their expected landforms (fine filter). The abundance and distribution of species are linked to the availability, distribution, and inherent productivity of preferred habitats. Comparing current and historical vegetative and structural diversity may indicate if available species habitat deviates from historical conditions. Deviation below historical levels may result in available habitat limiting species populations and distribution.

Habitat loss is generally recognized as the greatest impact on the sustainability of productive and diverse populations of species of concern. Through an ecosystem approach, the Forest Plan provides the framework to maintain or restore ecosystem elements necessary to conserve most species. Conditions or features continually shift in response to ecosystem processes, forest disturbances, or invasive species. These factors characterize the biological potential of the habitat to support an overall or local population of a given species. This strategy addresses the availability of both short- and long-term habitat conditions (i.e., structure, function and ecologic processes) and assumes the following:

- Natural processes influence local, native populations (including species viability) on varying landscape scales (mountain ranges, ecological provinces, species range)
- Species adapted with historic disturbance regimes and habitat conditions
- Native populations are the product of the quality and availability of their respective habitats
- Forest succession (from early seral shrubs/forbs/grasses to old coniferous forest) is essential for both habitat and species diversity
- Managing forest vegetation and road/trail access can degrade/benefit terrestrial species, depending on the species and its specific habitat sensitivity/preference (e.g., managing to provide dense conifer stands reduces some species requiring open sunlight but increases species requiring shaded conditions).

18.4.2.3 Identifying Potential Species of Conservation Concern

The following information was used to identify species which merit consideration as potential species of conservation concern. The identification of rare plant species that occur on the National Forests was completed using data collected from a number of sources:

- NatureServe (natureserve.org/explorer)
- https://fishandgame.idaho.gov/content/page/zoology-publications-idaho-natural-heritage-program
- http://www.fws.gov/idaho/species/IdahoSpeciesList.pdf.
- Terrestrial Resources, Clearwater NF (http://www.fs.fed.us/r1/clearwater/terra_org/terra.htm)
- 2011 Sensitive Species List (http://www.fs.usda.gov/detail/r1/plants-animals)
- Review of potential species of concern with botanists and ecologist from the State Fish and Game Dept., Nez Perce Tribe, BLM, academic and other knowledgeable individuals.

- Forest Service Handbook 1909.12 Land Management Planning Handbook, Chapter 10 (2013).

18.4.3 *Current Conditions*

18.4.3.1 Potential Plant Species of Conservation Concern

Using the best available scientific information available, species known to occur in the plan area for which there is substantial concern about the species' capability to persist over the long term are grouped in the following guilds where they share common habitats and threats to their persistence in the plan area. These guilds are briefly addressed as far as general threats. Some species may occur in more than one guild. Table 1 summarizes the occurrence and habitat trends on the planning unit and rangewide for each species grouping. Finally a brief description of the ecology and distribution for each potential SCC for the Forest is provided.

Species Guilds

Mesic Forest

- Deerfern (*Blechnum spicant*)
- Lance-leaf moonwort (*Botrychium lanceolatum* var. *lanceolatum*)Mingan moonwort (*Botrychium minganense*)
- Mountain moonwort (*Botrychium montanum*)
- Northern moonwort (*Botrychium pinnatum*)
- Least moonwort (*Botrychium simplex*)
- Pacific dogwood (*Cornus nuttallii*)
- Clustered lady's slipper (*Cypripedium fasciculatum*)
- Chickweed monkeyflower (*Mimulus alsinoides*)
- Sweet coltsfoot (*Petasites frigidus* var. *palmatus*)
- Licorice fern (*Polypodium glycyrrhiza*)
- Sierra wood-fern (*Thelypteris nevadensis*)

Species of the mesic forest guild are tied to generally older, moist forest habitats that have been reduced from historic levels through management activities and development. While actual population levels during historic times are not known, it can be assumed they have declined with the decline in available habitat. After decades of fire suppression and the more recent decline in harvest activities, in many areas mesic forests are getting older; however, this recent trend has not yet offset the previous decades of decline. In general it is well established that older forests are much reduced from their historic extent, especially in the lower elevations.

In addition, some of these species are limited to areas of coastal refugia—a narrow subset of moist forests characterized by low elevations, warm temperatures, and high precipitation that mimics the coastal climate. These special forest habitats have also been reduced from historic levels due to harvest, and much more dramatically by the filling of Dworshak reservoir.

All of these species are susceptible to most forms of forest management, although the degree may vary by species. In general, these species would be affected by uneven aged methods, but may persist if habitat conditions are left relatively intact. They would not withstand even aged harvests. In general it is assumed these species have declined with management activities because known occurrences are limited to habitats that are generally undisturbed or little disturbed, while disturbed sites of similar potential vegetation are never or rarely occupied by these species. The level of documentation varies from species to species and may be based upon observations or formal monitoring in some cases.

Grasslands (including open pine forest savannas)

- Broadfruit mariposa **(***Calochortus nitidus*)
- Palouse thistle (*Cirsium brevifolium*)
- Idaho hawksbeard **(***Crepis bakeri* var. *idahoensis*)
- Giant helleborine (*Epipactis gigantea*) (seeps)
- Howell's gumweed (*Grindelia howellia*)
- Puzzling halimolobos (*Halimolobos perplexa* var. *perplexa*)
- Hazel's prickly phlox (*Linanthus pungens* ssp. *hazeliae*)
- Spacious monkeyflower (*Mimulus ampliatus*) (seeps)
- Plumed clover (*Trifolium plumosum* ssp. *amplifolium*)

Grassland habitats are well known to have been significantly reduced by agricultural conversion and general development both rangewide and on the planning unit. Populations of plant SCCs that are limited to these reduced habitats have declined as a result, and in some cases most of the surviving occurrences are on NFS lands. Ongoing threats, primarily from grazing, increased weed infestation (and weed treatment) and general degradation, are readily observed. Without protection or mitigation of the ongoing situation these habitats and the SCCs dependent upon them will continue to decline toward extirpation.

Rocky Habitats (outcrops and scree)

- Howell's gumweed (*Grindelia howellia*)
- Hazel's prickly phlox (*Linanthus pungens* ssp. *hazeliae*)
- Brunsfeld's lomatium (*Lomatium brunsfeldianum*)
- Salmonflower biscuitroot **(***Lomatium salmoniflorum*)
- Chickweed monkeyflower (*Mimulus alsinoides*)
- Gold-back fern (*Pentagramma triangularis* var. *triangularis*)
- Idaho stonecrop (*Sedum valens*)
- Nail lichen (*Pilophorus acicularis*)

These rare species have a high affinity for rocky habitats that have been greatly reduced through past and ongoing road construction, road maintenance, rock mining, and weed presence and treatments at these sites. Main arterial roads throughout the planning unit and beyond are generally located along the main river bottoms, which historically provided much of the habitat for these species. In building these roads these habitats were removed or significantly altered. Mining of rock that provides material for a variety of operations specifically targets such habitats for what is often complete utilization. These sites are open and subject to ongoing disturbance, and thus have a high risk for weed infestations. Thus a large portion of the habitats and occurrences of these species has been damaged or extirpated long before the status of the species were considered (or in some cases, before the species were even described), and many sites are under continued stresses and threats.

Meadows

- Least moonwort (*Botrychium simplex*)
- Northern moonwort (*Botrychium pinnatum*)
- Sticky goldenweed (*Pyrrocoma hirta* var. *sonchifolia*)
- Douglas clover (*Trifolium douglasii*)

These particular meadows are seasonally moist in the spring, but may be dry late in the summer. They are limited in area and generally found around the fringe of wetter meadows or occupy swales in or near drier forest types. Rangewide these sites would have been much more common in the Palouse region and other areas that have been subject to agricultural developments and general land conversion. They are much less common by nature on the planning unit, where such habitats are under continued threats of grazing, weed infestation and often recreational pursuits. All the species in this guild are quite rare with *Pyrrocoma* and *Trifolium* being endemic species with limited geographic ranges. *Trifolium* in particular has been greatly reduced from its historic levels due to developments.

Transitional

- Pacific dogwood (*Cornus nuttallii*)
- Dasynotus (*Dasynotus daubenmirei*)

See the species specific information to review information for these species.

Table 18-14. Summary of Species of Conservation Concern Considerations by Species Guild

Guild	Downward Population Rangewide	Downward Population Plan Area	Habitat Decline Rangewide	Habitat Decline Plan Area	Susceptible to Forest Management
Mesic Forest	Assumed	Assumed	Yes	Yes	Yes - variable
Grasslands	Assumed	Assumed	Yes	Yes	Yes
Rocky Habitats	Assumed	Assumed	Yes	Yes	Yes
Meadows	Assumed	Assumed	Yes	Yes	Yes
Transitional	Sp. summary	Sp. summary	Sp. summary	Sp. summary	Sp. summary

Species Summaries

Potential SCC are further discussed in greater detail in this section. The species are presented in alphabetical order.

Deerfern (*Blechnum spicant*)

Deerfern is a coastal disjunct species of maritime climates in north Idaho. It is generally found in mid-elevation, moist, mineral rich soils of shaded western red cedar and western hemlock habitats. Rarely the species occurs in wet areas of other series (Blake and Ebrahimi 1992). It has an affinity for draws and riparian areas where it prefers the slope above and adjacent to the wettest plant communities. It rarely forms a part of these wet communities, but is associated with the slightly drier maidenhair fern and wild ginger. On the Forests, it is found primarily in the North Fork Clearwater basin, the headwaters of Lolo Creek, and several small occurrences on the Palouse RD. Most occurrences are of very few or even single plants. A very few small occurrences are separated in the upper South Fork Clearwater basin.

In general it is believed that deerfern would be adversely affected by mechanical harm associated with timber harvest and even-aged management that would greatly alter the light and temperature regimes that define the narrow set of ecological parameters the species requires. In western Washington, deerfern has withstood harvest and related treatments (Blake and Ebrahimi 1992). However, disjunct and peripheral populations often behave differently from those populations found in optimum habitats. Idaho populations have been noted to occur where air temperatures are strikingly colder, the growing season shorter and snowfall more abundant and persistent (Cousens 1981). Disjunct populations are possibly more susceptible to hydrologic and solar alterations.

Inconclusive observations of deerfern in northern Idaho suggest that disturbance may benefit some populations by creating suitable habitat for spore germination. Plants in monitored plots on the Idaho Panhandle National Forest seem to respond favorably to disturbance and are more robust, bearing more sporophylls than plants of undisturbed habitats. This may be a short-term response and the increase in sunlight may ultimately burn the plants out, since this species naturally seems to prefer shaded moist sites (Blake and Ebrahimi 1992). After several years of monitoring, plants that were most common in riparian areas and were disturbed but not burned intensely were found to increase, however plants also increased in undisturbed control plots. There are several reasons that could account for this including workers spreading spores or workers simply finding more plants due to more visits allowing more time to find them. Sporophyll production in open disturbed sites continued to be greater (Hammett 2001). Thinning and timber harvest activities that do not mechanically remove existing plants and leave much of the canopy intact would not be expected to harm the population. Deerfern populations and habitat often occur in or near the riparian areas, which are protected by standard riparian buffers, though many occurrences are found away from the riparian areas.

Moonworts (*Botrychium lanceolatum* var. *lanceolatum, Botrychium minganense, Botrychium montanum, Botrychium pinnatum, Botrychium simplex)*

Due to similarity and the tendency of these species to often occur together, they are treated together in this assessment. Little is known about the moonworts on the Forests. Range-wide, general habitat for moonworts varies from dry meadows, grass/forb openings, lodgepole pine and Engelmann spruce to dry grand fir. In northern Idaho moonworts are often associated with riparian areas and moist sites under older western red cedar (Mousseaux 1996). In general lance-leaf moonwort, Mingan moonwort and mountain moonwort occur in forests, while northern moonwort and least moonwort occur in certain meadow types and edge communities. However, these species do overlap across their ranges. Across the forest there are very few occurrences of each species ranging from just one for mountain moonwort to eleven for Mingan moonwort. There are three occurrences of northern moonwort, eight of least moonwort and four of lance-leaf moonwort, but the identification is uncertain for a couple of the latter species.

All *Botrychium* species are believed to be obligately dependent on mycorrhizal relationships. The subterranean generation depends on fungus for nutrients, while the roots of the above ground generation lack root hairs and probably depend on the fungus for absorption of water and minerals (Chadde and Kudray 2001). Little is known about the mycorrhizal fungi associated with *Botrychium* species other than their presence with the two generations. The mycotrophic condition is important to the ecology of *Botrychium* species in several ways. Nutrition supplied through a fungal symbiont may allow the ferns to withstand repeated herbivory, prolonged dormancy, or growth in dense shade (Kelly 1994, Montgomery 1990). The fungal/fern relationship has implications for the occurrence of genus communities, the distribution of the species across the landscape, and associations with particular vascular moonworts and strawberries (Wagner 1999). *Botrychiums* may exist underground for many years before an above ground plant develops.

Threats to *Botrychium* species vary and are not well understood. The only well-documented threat resulting in a population decline was drought combined with fire (Johnson-Groh and Farrar 1996). However, this research was conducted in prairies rather habitats found locally. The species with a close affinity for old growth cedar would be expected to be intolerant of disturbance simply because they only are found in these forests that have been without significant disturbances for very long periods of time. Thus it is anticipated forestry activities may affect existing populations negatively, although no research has been reported (Chadde and Kudray 2001). Because other species may occur in edge habitats with disturbed sites, threats may include natural plant succession and potentially the same human activities that have also apparently resulted in creation of suitable habitat. Some threats that directly affect the above ground sporophyte and may be less serious, since the below ground part of the life cycle is so important. Several years' worth of leaf buds are pre-formed underground, therefore, removal of the current years above ground growth does the plant no permanent harm (Wagner and Lord 1956).

Simple removal of above ground leaf tissue may be inconsequential to the ability of moonworts to survive, although removing sporulating individuals may eventually have an effect (Johnson-Groh 1999). It has been suggested that photosynthesis may be important and that broad scale leaf removal or damage could threaten *Botrychium* populations (Chadde and Kudray 2001). Mycorrhizae are the most limiting factor for *Botrychium* establishment, distribution and abundance (Johnson-Groh 1999). Therefore adverse actions to the mycorrhizae may be expected to also have deleterious effects on *Botrychium*.

Low intensity ground fires would not adversely affect established populations and the fungal associates or alter the suitability of the habitat for moonworts so long as overall stand structure is maintained and the duff layer is not eliminated. The timing of the burn is also important. Research has shown populations are significantly reduced or eliminated if burning coincides with spring emergence of plants (Johnson-Groh and Farrar 1989). The direct effects of burning have been confounded by variability in burning conditions and plant numbers.

In general even-aged management would have the greatest effect on forested habitats by opening the canopy and disturbing the soil surface. Thinning would maintain enough overstory canopy to sustain suitable habitat, however the skidding of logs and the construction of temporary roads could alter the soil surface and fungal relationships could be disrupted. Livestock and wild life grazing would provide the greatest threat to meadow populations, though recreational activities could be important at some sites.

Broadfruit mariposa (*Calochortus nitidus*)

Broadfruit mariposa, a regional endemic lily in west-central Idaho and adjacent Washington, is found in grasslands and dry, open forests on basalt soils. Occupied microsites are usually small, level to low gradient positions where spring moisture collects. Historically it was more common in deeper soils of the Camas and Palouse Prairies, but most of this habitat has been converted to agriculture. Today, the suitable microsites are mostly limited to thin soiled ground in canyons where agricultural development is not feasible. When in bloom the species is easily found due to its showy nature; however, this is negated by the short time the large flowers are present and the tendency of populations to vary tremendously from year to year (Caicco 1992). Such limitations of the species' biology along with the effects of grazing, succession, recreation, and invasion of suitable habitat by weeds, make viability of many populations uncertain.

The lower Salmon River Canyon holds the majority of occurrences for this species, with populations ranging from just a few to a few thousand individual plants. In the Clearwater Basin it is quite rare with only few small occurrences being found in the western portions of the forest from the lower South Fork Clearwater north to the Elk Creek and Potlatch River basins of the Palouse RD.

Fire has been observed to have some beneficial impact on some native plant communities. Caicco (1988) stated that fire was an important ecological factor in maintaining the open nature of the plateau grasslands and woodlands, and thus may be important to the populated sites with deep loessal soils and moist bottomlands. Also most of the habitats for the mariposa probably burn on occasion so some of the historical populations would have been subject to periodic wildfires. Whether or not the mariposa is in some sense dependent on recurring fire in some or all habitats, however, is unknown. This species has a deep seated bulb that enables it to survive most fires (Mancuso and Moseley 1994). The timing of the fire may be significant as fire during its active growing period may prevent that plant from producing seed. Broadfruit mariposa also grows in rocky habitats which are naturally open and do not carry fire well. Other potential threats may include timber harvest in some dry, open forest types, recreational activities and grazing. All these activities have the potential to cause an increase in weeds that may have a negative indirect impact on this and other native species. General habitat degradation and the conversion of native grasslands to weeds represent the greatest threat to broadfruit mariposa and its associated plant community. In general the grassland habitats of the Salmon Canyon have been greatly reduced by weed invasion and the threats to these sensitive habitats are ongoing and possibly increasing through time as recreational uses increase and new species invasions continue. Based upon overall habitat trends it can be concluded that this endemic species has been significantly reduced from its historic distribution.

Palouse thistle (*Cirsium brevifolium*)

Palouse thistle is an endemic species found on the Palouse and Camas Prairies and adjacent areas of southeast Washington and northeast Oregon. It was referred to by Cronquist (1955a) as the

"the typical thistle of the Palouse region," but due to agricultural development, it is now virtually extirpated on the prairies, and remains in peripheral habitats such as open forest and canyon grasslands. Less than 1% of the Palouse Prairie is uncultivated, making it one of the most endangered ecosystems in the United States (Noss et al. 1995). Though several occurrences have been informally noted in the Salmon Canyon, they are often comprised of only a few plants in degraded habitats. Some occurrence has also been noted on the Clearwater portion of the Forest, but it is expected to be much rarer there and probably mostly limited to the lower South Fork and perhaps Middle Fork of the Clearwater River.

Threats for this species are the same as for other local endemic prairie/grassland species; mainly weed invasion, herbicides, development and some recreational activities that collectively continue to degrade the remaining native vegetation of these habitats. Herbicides meant to control weeds can also harm these rare species if not applied very carefully and unfortunately some applicators may not distinguish between native and invasive thistles. Bio-control agents introduced to control exotic thistles have also negatively impacted this and other native thistles.

Pacific dogwood (*Cornus nuttallii*)

Pacific dogwood is a coastal disjunct species that is limited in Idaho to the lower Lochsa and Selway rivers downstream the Middle Fork Clearwater to the Syringa vicinity. In this small area it generally occurs below 2,000 feet elevation (Lichthardt 1999), though some outliers extend as high as 3,600 feet. Once separated occurrence is known from the upper Clear Creek drainage at approximately 4,700 feet; however, there is some question whether this occurrence was naturally dispersed. It mainly occurs in western redcedar forests, where it was most abundant on southerly aspects. It may also occur in some moister habitats in the grand fir series. While the species occurs under shaded canopies, it appears well adapted for a role in secondary succession due to vigorous resprouting from the root crown following disturbance (Lichthardt 1999).

Until the late 1980s, concern for the species was centered on the very limited occurrence over a very small geographic area. However, in 1988, in response to reports of high mortality rates, a survey by scientists at the University of Idaho found numbers along the Middle Fork Clearwater River were insufficient to warrant sampling. Surveys in the Lochsa and Selway found 98% of shrubs were either dead or appeared to be affected by an unknown ailment. No resistant plants were found (Lichthardt 1999).

Dogwood anthracnose, caused by the fungus *Discula destructiva*, apparently reached the area in the 1980s. This disease is thought to be a recent introduction to North America and has decimated native populations of ornamental *Cornus florida* throughout the eastern United States. It is untreatable and generally fatal. Several rot diseases found in the Idaho populations are now thought to be related to the weakened state of Discula-infected trees. The fungus has been most devastating in forest understory populations (Lichthardt 1999). Monitoring throughout the 1990s seems to indicate that high stem mortality, declining stem production, low seed production and lack of seedling establishment appear to be leading to the extinction of the population, which appears is being maintained by basal sprouting (Lichthardt 2000). The lack of seed production and seedling establishment prevents the population from recovering.

The main management threat to this species would have been timber harvest as some trees were likely mechanically harmed. However, it has been noted that the species seems to do better in more open conditions or edge communities and the habitat may be benefitted by some harvest activities or fire management that maintains or creates open conditions that favor shrub growth.

Idaho hawksbeard (*Crepis bakeri* var. *idahoensis*)

Idaho hawksbeard is a very local endemic with almost its entire known range centered on the lower Snake and Clearwater basins to the Craig Mountain area. There are approximately 20 known occurrences. Outside of Craig Mountain, most populations are very small in number and area, often just one to ten plants covering a few square feet (Mancuso and Moseley 1994). One separated occurrence has been known from Hells Canyon and in 2005 two separated populations were found in the lower Salmon River Canyon. While this appears to be a noteworthy range extension for this rare species, the flora of Hells Canyon is generally unexplored due to remoteness and additional intervening plants could certainly occur in the lower Salmon Canyon as well.

Generally Idaho hawksbeard occurs within dry to seasonally mesic, open grassland slopes, benches and ridges. It occasionally extends to near the grassland-forest ecotone (Mancuso and Moseley 1994). Habitat types in which it occurs at Craig Mountain are bluebunch wheatgrass – Sandberg’s bluegrass/arrowleaf balsamroot and Idaho fescue – bluebunch wheatgrass (*Agropyron spicatum-Poa sandbergii/Balsamorhiza sagittata* and *Festuca idahoensis-Agropyron spicatum*) (Tisdale 1986). It also may be associated with rock outcrops in these grasslands as in the case of the Forests occurrences. These sites are in fair condition considering the relatively low elevation and proximity to weedy private ground, but the weed threat is significant and may be fragmenting occurrences and habitat in these general areas.

Much of the species range has been converted in the past due to agricultural development. Introduced weeds are an ongoing threat and several occurrences in the Sweetwater area are believed to be extirpated due to yellow starthistle invasion, and nearly all others are seriously threatened. At such degraded sites the abundance of Idaho hawksbeard is always reduced or is missing all together. These invasions are in turn closely linked to disturbance activities, most notably livestock grazing and sometimes road construction. Ironically, herbicide spraying to control weeds also poses a potential threat unless precautions are taken (Mancuso and Moseley 1994).

Few known sites outside of Craig Mountain have viable habitat and population dynamics. Considering general habitat degradation and the worsening weed condition, there are likely few viable sites elsewhere, yet the range of the species has still not been fully determined. Unless additional viable populations are found elsewhere, Craig Mountain probably represents the last stand for this species (Mancuso and Moseley 1994). Considering the greatly reduced range and habitat conditions of this local endemic species, all occurrences, including the two on the planning unit are of great conservation concern.

Clustered lady’s slipper (*Cypripedium fasciculatum*)

Clustered lady’s slipper is widespread in the western United States where it grows in a variety of forest habitat types. On the Forests most occurrences are in the North Fork and Selway basins. In north central Idaho, most occurrences are in warm, moist sites in mid-to-late seral conifer communities of a western red cedar habitat type, but a significant number of populations are in Douglas-fir and grand fir habitats. No unique habitat parameter is known that allows biologists to predict future occurrences with more than a very general specificity (Greenlee 1997). The wide variety of forest types potentially providing habitat does not translate into species abundance however. Limitations in the species biology and ecology result in this orchid being very rare throughout its range.

Clustered lady's slipper is a long-lived orchid that can remain dormant underground for an extended period of time. Vegetative plants may live for many years before reaching reproductive maturity. Like other orchids it is suspected to develop an association with mycorrhizal fungi. The small seed size and lack of endosperm indicate that fungal association is probably necessary for germination and establishment (Lichthardt 1995). This may be an important factor in controlling local distribution.

Clustered lady's slipper is highly sensitive to ground disturbance and canopy removal. Apparent population decreases have been observed where the overstory canopy was reduced (Lake 2002). The few plants found growing in full sunlight had yellowed and deformed leaves. Disturbance to the duff layer that results in exposed soil may also be detrimental to established populations. With even-aged management practices, the mycorrhizal fungal relationships believed to be necessary for seedling germination and health would be severed. Nor would the fungus tolerate the direct sunlight that would result from such activities. The species has never been found in clearcut areas and extirpation would be the expected result of this form of management (Greenlee 1997).

Thinning would often maintain enough overstory canopy to sustain suitable habitat; however, the skidding of logs and the construction of temporary roads would alter the soil surface and physically remove plants if present. Nonetheless, plants have been found persist after some forms of activity that avoid heavy mechanical disturbance and leaves the light, heat and moisture regimes intact. Some populations persist in areas that have undergone low intensity wildfire (Hays 1995) and in areas that underwent some form of intermediate harvest that leaves the duff layer and some cover intact (Lichthardt 2003). It is possible that intermediate harvest treatments in grand fir and Douglas-fir habitat types may represent a mixture of detrimental and beneficial effects; in the short term, individuals may be harmed by the timber harvest activities or canopy reduction, but in the long term populations may benefit from the reduced threat of stand replacing fire (Greenlee 1997).

A population of clustered lady's slipper in the South Fork Clearwater basin has been monitored for prescribed fire effects since 1996. The results suggest that plants in the burned area produce fewer capsules than those plants found outside the burn units. It appears that due to increased exposure the plants desiccate before seed capsules mature (Vance and Lake 2001). On the Clearwater NF, Pipp (1999) observed that plants declined for two years following an intense wildfire, before disappearing completely. Harrod et al (1997) noted that fruit production was significantly decreased in areas opened up by fire and at locations where the duff layer had been eliminated all plants were killed.

The direct effects of prescribed fire on clustered lady's slipper are complex. This should not be surprising, as fires are variable in intensity and pattern. The heat intensity and duration are dependent on numerous factors including site, depth and nature of litter, variable understory fuel levels and weather (Lichthardt 2002). Since clustered lady's slipper blooms in May and June, spring burns could eliminate current year's seed production, shock the plant into underground dormancy or injure individual plants. Earlier burns before emergence would mitigate these negative effects. However, depending on the fuels present, slower spring burns over moister soil may actually conduct heat into the ground more than fast fall burns.

Dasynotus (*Dasynotus daubenmirei*)

The entire distribution of this global endemic is limited to two locales on the Forests—around

Walde Mountain and reportedly near Fog Mountain—both on the central zone of the forest. *Dasynotus* inhabits forest openings within mid-elevation (3,000–5,000 ft), mixed coniferous forest, mostly in western redcedar and grand fir habitat types. Most of its range lies within the grand fir mosaic—a zone in which forest is interspersed with large alder and bracken fern glades. Plants are usually found in areas of at an early seral stage of development such as roadsides and in clearcuts in addition to openings created by fire (Lichthardt 1999). Less frequently, it can be found in shady draws with ferns, alder glades and one lodgepole pine community with bear grass.

Ecological processes that produce or maintain desirable early seral conditions include low- to high-severity fire, windthrow, forest tree root disease, and forest insect activity. Dasynotus has been observed to respond quickly after fires (Lichthardt 2001). All of these processes create small to large openings in the forest canopy, and result in the open conditions that favor this species. The disturbance needed for vigorous growth and population expansion has been reduced in recent years by fire suppression and limited timber harvest. Thus the general progression of succession is considered a threat to the species and without activities to maintain earlier stages of succession within its limited range, the species would be expected to decline. This is a resource concern given the very small and limited range of this endemic species.

The benefits and harm of a wide variety of management activities can be complex. Ground disturbance activities such as road and trail construction reconstruction and maintenance, vegetation treatments, fire suppression, mining, and recreation activities tend to have a positive influence on Dasynotus. Conversely, these activities may result in the introduction and spread of invasive plant species which may compete with and displace it. Dasynotus flourishes and reproduces under open stand conditions. When fires are suppressed, the ability to reproduce and expand may be limited. Activities that may trample or remove plants include the collection of special forest products, animal grazing, and actions of forest workers and visitors. Many occurrences follow open road corridors where herbicide application and drift associated with weed control may be an issue.

Giant helleborine (*Epipactis gigantea*)

Giant helleborine has a wide range from central Mexico northward throughout the western United States and into southern British Columbia. Within much of this large range it is rare and is a species of conservation concern in British Columbia and ten western states, including Idaho (Mancuso 1991, NatureServe 2014). In Idaho it is known from at least 64 sites, but is believed to be extirpated from a few of these (Idaho Heritage 2012). There is just one occurrence on NFS lands. A few other local occurrences are in the lower Salmon River Canyon and the Snake River in the Craig Mountain area. Suitable habitat can be found in the arid riparian area of the larger tributaries of the Salmon.

In general, giant Helleborine occurs in moist areas along streambanks, lake margins, seeps and springs, especially near thermal waters (Hitchcock et al. 1969a). In Idaho, most mountain populations are associated with thermal waters (Mancuso 1991), but nearly all low elevation canyon populations are associated with cold springs (Moseley and Bernatas 1991). Such habitats are often localized along a larger watercourse, and associated with various types of riparian vegetation. Giant helleborine occurs generally in open vegetation or in partially shaded sites, but never as an understory species in tall, dense riparian communities. Across much of its range the species shows some affinity for limestone (Brunton 1986); however, the local occurrences are found on both limestone and basalts.

Threats to this species include development and road construction in the canyon bottoms as well as invasive species such as Japanese knotweed and Himalayan blackberry that invade riparian areas. These invasives have greatly reduced the riparian habitat to this and all other native species in extensive areas of the Salmon River Canyon. An additional threat is roadside herbicide treatments, which could affect most local occurrences.

Howell’s gumweed (*Grindelia howellia*)

Howell's gumweed is a highly restricted regional endemic to northern Idaho and western Montana. Until recently the species was believed to be limited to an unusual distribution pattern with two disjunct population centers located some 150 miles apart: Benewah County in Idaho and Missoula and Powell Counties in Montana (Lorain 1991). However, in 2012 another Idaho occurrence was found 100 miles south of the Benewah County populations at Clear Creek in the central zone of the Forests.

Lorain (1991) describes the Idaho, habitat as open, grassy, bluffs surrounded by mixed conifer forest communities. Microhabitats are non-timbered openings that are exposed to direct sunlight, with some individuals in semi-shaded conditions from dry forest tree species. Slopes are low to moderate and are restricted to southern exposures. Plants are typically found growing in dry, skeletal, basalt-derived soils forming thin layers over basalt rock. Elevations range from 2750 to 2950 feet on the northern locations to about approximately 4,500 feet at Clear Creek. The thin soils and dry microclimate result in openings dominated by a grass and shrub understory with scattered ponderosa pine and Douglas-fir trees. Although these habitat types are relatively xeric, they occur within a regional macroclimate that supports western redcedar and in the north western hemlock communities. These grasslands were originally dominated by bluebunch wheatgrass and Idaho fescue, but now support many introduced weeds (Lorain 1991). The likely corresponding habitat types are (Cooper et al. 1991): Douglas-fir/bluebunch wheatgrass (*Pseudotsuga menziesii/Agropyron spicatum*), Douglas-fir/snowberry (*Pseudotsuga menziesii/Symphoricarpos albus*), and ponderosa pine/ninebark (*Pinus ponderosa/Physocarpus malvaceus*).

North Idaho locations of Howell's gumweed have a long history of overgrazing use by both sheep (prior to 1940) and cattle. Grazing has been terminated at the St. Maries occurrences but continues in Clear Creek. Howell's gumweed is an unpalatable species that tends to be left ungrazed (Shelly 1986). Trampling from cattle, however, could be a cause for concern (Caicco 1987) and it has been observed to occur in part of the Clear Creek population. The spread of introduced weeds poses perhaps the most significant indirect threat from overgrazing. Overgrazing contributes to soil disturbance and compaction that would alter species structure and composition over time, often resulting in the invasion of exotic weeds. Competition for suitable habitats from weeds, which have similar life history strategies, could substantially reduce the population size of Howell's gumweed (Lorain 1991).

Other probably less significant threats could be recreational uses, primarily off road vehicles. Such use has been observed at the St. Maries River occurrences, and could impact local portions of this population (Caicco 1987). Such use has also been noted at Clear Creek. Also a high degree of defoliation was observed on individuals and populations in Idaho during the 1990 field season (Lorain 1991). Additionally, insect predation of flowering and seed heads was observed by Heidel (1979) and could be responsible for a partial reduction in reproductive potential.

In Montana Howell's gumweed appears to be a seral species that prefers early successional sites and tolerates naturally or artificially disturbed habitats habitats, but does not tolerate canopy closure or shade (Shelly 1986). The majority of Montana sites occur in disturbed sites such as roadsides, timber sales, grazed pastures, and along trails. Most of the Idaho sites have undergone recent or past disturbances (Lorain 1991, Hays 2012a). Shelly (1986) believes that Montana populations may be persisting in fluctuating numbers within their known distribution based on the amount of suitable disturbed habitats. While certain activities may result in the extirpation of some individuals or populations, they subsequently create potentially new habitat for future populations. The degree of interspecific competition for early successional habitats may also be playing an important role in the species population biology.

The role of disturbance in the reduction or the maintenance of the species is not clear. At the time of discovery, one occurrence consisted of several thousand plants from along bluffs and in an old roadbed above the St. Maries River. This population has been revisited periodically over the years and monitoring plots have been established (Caicco 1987). During the 1990 field season this population was again relocated, but the numbers of individuals observed were much fewer (Lorain 1991). These open habitats are highly susceptible to weeds and the native communities are often largely compromised. It is possible some disturbance may benefit the species through habitat maintenance, but with the advent of widespread weed introduction in recent decades, the overall degradation of habitat may be resulting in species decline. More recent observations at Clear Creek have found the largest, healthiest populations are located in isolated openings that are virtually weed free and show little or no signs of disturbance (Hays and Robbins 2013).

Puzzling halimolobos (*Halimolobos perplexa var. perplexa*)

Puzzling halimolobos is a very narrow endemic species limited to Idaho and Adams counties. There are many occurrences within this small range, on either public or private land, especially in the adjacent areas of the lower Salmon River Canyon or Hells Canyon. The global range is approximately a 30 miles radius from Riggins. Habitat is open grassland and woodland communities with a substrate of small diameter, unstable scree from about 3,500 feet to nearly 7,000 feet (Moseley and Mancuso 1992). There is an often a clear affinity for harsh sites such as rock outcrops and scabs within these general habitats. It is probably more common than is currently known on exposed basalt substrates, though it is not limited to this rock type.

This plant is an annual weedy species that is adapted to disturbances that contribute to an unstable substrate (Moseley and Mancuso 1992). On the Payette NF a vigorous population was found in a burned area and in the associated fire lines (Hanson 1996). Fire may kill some plants and this could be detrimental during the active growing season since plants may be prevented from producing seed. In general however, habitat disturbance such as prescribed fire is expected to improve conditions for this species through reduction in fuels and competition. However, the conditions created that would potentially benefit this species would also favor aggressive introduced weeds that may have a competitive advantage. Fire exclusion and succession in some grasslands have probably reduced this species' local range from historic levels. Weed infestations and general habitat degradation of the grasslands have likely had a negative effect on the species as well. Grazing and road construction have probably offset these losses somewhat by providing surface disturbances to which this species is apparently adapted.

Hazel’s prickly phlox (*Linanthus pungens* ssp. *hazeliae*)

Hazel’s prickly phlox is a narrow endemic species with only 10 known occurrences that is largely limited to the canyon bottoms of the Snake and Salmon Rivers (ID Heritage Data 2012). One reported occurrence is far separated on private land in the Clearwater basin of Lewis County (Moseley 1992). On lands administered by the Forests populations occur in the Rapid River Canyon and are expected to occur in the Salmon River Canyon upstream from Riggins. At least four populations are known from the Riggins vicinity. Occurrences are very rare and focused surveys near known populations in late 1980s and early 1990s of the Hells Canyon NRA failed to find additional plants (Moseley 1989, Mancuso and Moseley 1991, Moseley and Mancuso1992). Moseley felt that the Idaho portion of the range was relatively well surveyed and that it is unlikely that many more populations would be found (Moseley 1992). Populations at each site are generally small, often with only a few plants.

The habitat is generally very steep or vertical outcrops and cliffs, usually of volcanic origin in xeric grasslands represented by bluebunch wheatgrass or green bush. Occasionally it is observed on colluvium at the base of cliffs (Moseley 1989). These habitat characteristics protect this species from most current threats. Increasing development and occasional road construction may pose threats, and because it is very showy species incidental collection is likely. Some populations are bisected by the trails and individual plants are vulnerable to disturbance by trail maintenance (Moseley 1992). Road construction or maintenance in these lower canyons could potentially impact existing plants as well. Livestock grazing is probably not a significant threat, due to its relatively inaccessible habitat and expected unpalatability. However, there is some threat of trampling along trails that would be used by livestock. The general grasslands where these rocky sites are found continue to be degraded, primarily by weed infestations and at least some sites herbicide application is a threat (Moseley 1989). Since the populations are so small, even the loss of a few individuals may have deleterious long-term effects to the population.

The high conservation concern for this species is based upon the very few occurrences and limited endemic range and extensive reduction of available habitat from large-scale past land conversions. Much of the cliff habitat for Hazel's prickly phlox was inundated when the pool behind Hells Canyon Dam was filled, since the cliff appears to extend below the pool surface (Moseley 1989). There could also have been some impacts associated with other hydrologic developments in the Snake Canyon. In addition, road construction further reduced habitat, by blasting a large amount of rock from the outcrop for the right-of-way. This may be particularly significant along the route of Highway 95, Salmon Canyon road east of Riggins and the road to Hells Canyon Dam. However, several plants have been observed on the blasted area of the outcrops in Hells Canyon so the long-term impacts to the population are not as deleterious as flooding. Reinvasion onto the blasted section of the outcrop appears to be slow (Mosely 1989).

Brunsfeld’s lomatium (*Lomatium brunsfeldianum*)

Brunsfeld’s lomatium is endemic to the Northern Rocky Mountains of Idaho where it has only been found in four river canyons: the Lochsa River, the North Fork of the Clearwater River, the St. Joe River, and the Coeur d’Alene River. It occurs only on moist rocky outcrops, talus slopes, and soil at the base of cliffs in the river valleys and canyons in the mesic cedar/hemlock forest of northern Idaho between 480–1800 m in elevation. The soil it occurs on in the St. Joe River canyon was classified as an Udorthent, which are young well-mixed soils with no horizon development, a high portion of rock fragments, a low clay fraction, and an udic moisture regime

(USDA NRCS 2003). The sites where it occurs generally have a south aspect and are possible ground water discharge areas (McNeill 2012).

Known sites occur on the north side of river drainages, which is also where most of the major roads are located. This puts Brunsfeld's lomatium at risk in a number of ways: encroachment by invasive species introduced by the initial road building and spread by current road maintenance and traffic, habitat destruction caused by additional road building, and eradication through herbicide application (McNeill 2012). Rock outcrops that support this species are also mined for gravel and this has resulted in the destruction of at least one known occurrence in the North Fork Clearwater basin (Hays 2012b). It is safe to assume that with road construction that cut into these rock habitats along these major streams along with the ongoing threats of maintenance of these corridors that this limited species has been reduced from its historic occurrence.

Salmonflower biscuitroot *(Lomatium salmoniflorum*)

This species is endemic to the lower Snake River Canyon of southeast Washington extending upstream along the lower elevations to the Clearwater River and some of its larger tributaries. There is a historic collection from far downstream from its range in Wasco County, Oregon (Moseley and Lichthardt 1998). In Idaho populations are known from two disjunct areas of the Clearwater River drainage. One cluster of populations occurs in the lower canyon between Lewiston and Cherrylane, along the Clearwater River, and a contiguous segment of the Potlatch River canyon upstream to about Juliaetta, Nez Perce and Latah counties. The other cluster of populations is in the vicinity of Kooskia, Idaho County, along the Middle and South forks of the Clearwater River and in the Clear Creek drainage, a major tributary of the Middle Fork just upstream from Kooskia. This cluster has the densest number of populations per occurrence and the densest number of plants in the populations (Moseley and Lichthardt 1998). Part of this latter group extends onto the only known occurrences on the Forests.

It has a high affinity for basalt substrates and can be found growing on outcrops, cliffs, ledges and the scree slopes at the base of these formations. It occurs on all aspects, but the community is always open with low cover of vascular plants, although northerly-facing populations usually have a high cover of mosses. Zonal vegetation of the surrounding canyon sides ranges from grassland, shrubland, and occasionally ponderosa pine woodlands in the lower canyon to grasslands, woodlands, and even coniferous forest dominated by western redcedar in the upper canyon (Moseley and Lichthardt 1998).

Threats to the species would include quarry operations than mine rock at such sources in the areas indicated. Roads have damaged some populations, but the species does recolonize road cuts, sometimes plentifully (Moseley and Lichthardt 1998). In some situations introduced weeds that have become so prevalent in these lower canyons could compete with the species. The conservation concern for this species stems from it being a narrow global endemic with a very limited occurrence, with only one occurrence on the planning unit. Also the sites that it inhabits are commonly mined for rock.

Chickweed monkeyflower (*Mimulus alsinoides*)

The main range of chickweed monkeyflower is west of the Cascades. According to Idaho Heritage data (2012), it is now known from five locations in Idaho, three of which are along the North Fork Clearwater River on the Forests. Habitat is generally found in shady places, especially mossy mats on cliffs or steep rocky areas. Occupied sites are often seeps on cliffs or seasonally wet rocky grasslands that will be very xeric most of the summer. The surrounding forests are moist and all Idaho populations are in the western red cedar zone. It is known to grow with *Lomatium brunsfeldianum* at one site and the habitat and threats would be similar.

Known sites occur on the north side of river drainages, which is also where most of the major roads are located. This puts *Mimulus alsinoides* at risk in a number of ways: encroachment by invasive species introduced by the initial road building and spread by current road maintenance and traffic, habitat destruction caused by additional road building, and eradication through herbicide application. Rock outcrops that support this species are also mined for gravel and this has resulted in the destruction of the largest known Idaho occurrence in the North Fork Clearwater basin (Hays 2012b). It is safe to assume that with road construction that cut into these rock habitats along these major streams along with the ongoing threats of maintenance of these corridors that this limited species has been reduced from its historic occurrence.

Spacious monkeyflower (*Mimulus ampliatus*)

Spacious monkeyflower is endemic to Idaho, where it is known only from approximately 15 widely scattered locations in the north-central part of the state. Almost all the plants are found within a few miles of each other in the lower Salmon River basin. This small annual plant occurs in very specialized habitat of rocky seeps or wet micro-sites, within open grasslands and dry ponderosa pine forests. At least one population is reported from a rocky meadow (Lichthardt 1999). Monkeyflower populations can be prolific or absent depending upon seasonal moisture. Thus surveys of suitable habitat may not always locate these plants.

Management activities such as thinning or prescribed fire could create or maintain more natural open conditions in areas of forest encroachment in some areas of preferred habitat. However, such encroachment generally would not take place on most of suitable habitat in the lower Salmon Basin. Being an annual in open grassy habitats, spacious monkeyflower and its habitat would be negatively impacted by weeds and by the herbicides used to treat such infestations. Grazing of livestock can also be detrimental through herbivory, trampling of moist sites the species requires and through increased dispersal of weed species. Generally timber harvest would not negatively impact the preferred habitat of this species, though if occurring near populations in open forests there is some potential for mechanical harm. Overall the species is likely reduced through the extensive general degradation of the canyon grasslands. While some occurrences have been found to be expansive and largely intact, others have been greatly reduced or eliminated by dense concentrations of introduced species that will always threaten all habitats across the entire range.

Gold-back fern (*Pentagramma triangularis* var. *triangularis*)

Gold-back fern is widely distributed in western North America from southern British Columbia, south through Idaho, Washington, Oregon, California and Mexico in northern Baja California (Yatskievych and Windham 1993). In the Pacific Northwest, it mainly inhabits Mediterranean habitats west of the Cascade Range. It is disjunct in Idaho, where it is known from only five locations, three from Hells Canyon and two from the Clearwater River basin (Gray et al 1998). There are also occurrences in Hells Canyon on the Oregon side of the river. The Hells Canyon populations are in grasslands a few miles from the west boundary of the analysis area. Habitats include open rocky slopes and rock crevices that may be moist in spring, but are very hot and dry much of the summer. While most occurrences are on rocks in grasslands, one of the Clearwater populations inhabits rocky slopes in mixed forests and is the only occurrence on the Forests.

Weeds pose a serious threat to the canyon grasslands, but do not generally overtake the open rocky substrate typically inhabited by this species. These sparsely vegetative communities provide poor forage are often on very steep rocky slopes, thus they are avoided by livestock. Trail maintenance has been identified as a concern at one site (Mosely and Bernatas 1991), while another is along a driveway on private land (Walker 1995). Due to the very small sizes of the few known populations, with only one being on the unit, there is a general conservation concern for this species.

Sweet coltsfoot *(Petasites frigidus* var. *palmatus*)

Sweet coltsfoot is of a circumboreal distribution, but in the Pacific Northwest was thought to be restricted to the Cascade Mountains and west. It also descends to the United States in Michigan and New England. The only known site in Idaho is found in the North Fork Clearwater basin as a component of a well-developed coastal disjunct community. Habitats are various across its range, but the local population occurs alongside a large creek in rocks mostly below the seasonal high-water line, with plants extending onto adjoining benches and terraces. The habitat type is a very mesic western red cedar - ladyfern plant association. While the known extent of the occurrence is protected in the riparian area, the species is not limited to such placement throughout its range and it is reasonable to assume it may occur upslope with other coastal disjuncts locally. Its response to disturbance is largely unknown, especially in an inland setting. With only one known occurrence in the northern Rocky Mountains is should be treated with great conservation concern.

Nail lichen *(Pilophorus acicularis*)

Nail lichen is a pacific coastal disjunct species with a main range along the coast from Alaska to California and in the Sierra Nevada, occurring rarely inland (McCune and Geiser 1997). There are 11 occurrences documented in Idaho. These are loosely centered on north central Idaho where five are found on lands administered by the Forests (ID Heritage 2012). In addition there are three observed but undocumented occurrences on the unit. All occurrences are very small being limited to individual rock outcrops along roads or trails and in some cases on single rocks. Occupied habitats are moist coniferous forests that are humid such as along river banks or near waterfalls (Vitt et al 1988). On the Forests, forest types range from cedar and western hemlock on the north zone to moister grand fir types on the south zone.

Threats to this species are associated with rock outcrops such as road construction or quarry operations. Any activity that could remove or damage rock outcrops, cliffs or scree slopes especially in partially shaded humid forests. Timber harvest generally would not be a concern, but any management that could significantly open the canopy and alter the light, temperature or moisture regimes of occupied sites could be harmful to the species.

Licorice fern *(Polypodium glycyrrhiza*)

The main range of licorice fern is along the west slopes of the Cascade/Coast Ranges from central California north to the Aleutian Islands. Only two inland locations are known; both are in the North Fork Clearwater basin on Forest Service lands. Licorice fern is considered one of the more maritime of the coastal disjunct species and is limited to warm, low elevation (1,800 ft) moss-covered rock crevices along streams, within moist, shaded, western red cedar forest. Despite this, one site has a cover type of grand fir and Douglas-fir; however, the plants are on the mossy north face of a boulder that is only a few feet from the edge of a large stream. In general, the species may or may not occur in the protected riparian area and with only two known inland occurrences should be treated with conservation concern.

Sticky goldenweed (*Pyrrocoma hirta* var. *sonchifolia*)

The range of sticky goldenweed includes central and southeastern Washington, the Blue and Wallowa Mountains of northeastern Oregon, and adjacent Idaho (Cronquist 1955b). Across this range it is rarely encountered and limited to a few widespread localities. In Idaho there are nine occurrences recorded by the State Heritage program, all but one in the Craig Mountain vicinity. There is one isolated occurrence on the Palouse Ranger District. All occurrences are small in size with a total population of approximately 200-300 plants, almost all of which are in a single population on Craig Mountain. Generally the populations are all less than an acre or even a few square feet with less than ten plants, some with one or two (Mancuso and Moseley 1994).

Mayes (1976) describes the habitat of sticky goldenweed as moist soils of mountain meadows and forest openings between 4000-6000 feet elevation. The population on the Palouse Ranger District is at approximately 2,800 feet elevation. They are usually inclusions within and surrounded by upland forest. These low gradient, headwater tributaries have formed graminoid-dominated wet and dry meadow complexes with variable hydrologic conditions that may be wet yearlong or only ephemerally in the spring. In some locations, other rocky, graminoid-dominated meadows not necessarily associated with drainage pathways occur as small openings within the upland forest matrix. Within drier meadows it seems most common in swale or small depression microsites, places that likely retain moisture longer than adjacent sites. Soils are gravelly to rocky, and may have a clay component. Although graminoids dominate, the meadow communities generally have a very rich forb component that may be the result of long standing and intense livestock use that has reduced the grass component (Mancuso and Moseley 1994).

It is speculated that the abundance and distribution of sticky goldenweed has been reduced because of adverse cumulative effects to the hydrology and vegetation of its meadow habitats. Many years of livestock grazing and in some cases logging of adjacent forests have probably altered the hydrology within portions of sticky goldenweed's meadow habitats. Ongoing, the indirect impacts of livestock grazing to the meadow habitats of sticky goldenweed are probably the most serious concern. It is unlikely that the species is grazed, but it would be subject to trampling and associated soil disturbance and weed increase. Other potential concerns include seeding of meadows to pasture grasses, road construction and ORV use in meadow habitats. The small size of most populations suggests sticky goldenweed may be sensitive to some of these changes (Mancuso and Moseley 1994). In addition to these past and ongoing impacts, the occupied meadow on the Palouse has also undergone channeling of the stream and construction of a railroad grade through the meadow bottom. This completely altered the hydrology of the meadow, making it much drier with flashier runoff and less storage capacity than historic.

Given the very small number of plants in very few populations in habitats that have been highly impacted and continue to subject to threats, the long-term viability of these occurrences is doubtful (Mancuso and Moseley 1994). Based upon a review of the species and its threats on Craig Mountain, Mancuso and Moseley (1994) state that sticky goldenweed appears to be barely hanging on in Idaho. With just one occurrence on NFS lands, there is high conservation concern for the species on the planning unit.

Idaho stonecrop (*Sedum valens*)

Idaho stonecrop is a recently described species endemic to a small portion of the Salmon River canyon (Bjork 2010). It mostly occurs on ground administered by the BLM and Payette National Forest on the south side of the river, but it also occurs at appropriate sites north of the river on the Forests. The total range of Idaho stonecrop could not be determined with initial surveys due to the rugged terrain and lack of access upstream from the easternmost populations encountered. The known occurrence extends sporadically from near Riggins upstream beyond the French Creek area. The continuance of suitable habitat eastward into these impassible areas suggests that Idaho stonecrop likely extends beyond the currently documented range. It has been found no higher than 1300 m elevation. So far, fewer than 10,000 individual plants have been encountered (Bjork 2010).

Idaho stonecrop occupies a variety of substrates including moss mats, soils, humus, and duff over granitic sand in warm ponderosa pine/Douglas-fir woodlands and canyon scrub communities. It also inhabits mossy ledges, crevices and cliff faces with green-bush (*Glossopetalon spinescens*) and other species typically composing an outcrop community. It almost always grows on north- and east-facing slopes. Few individuals occur on south- or west-facing slopes, suggesting that *Sedum valens* is best adapted to relatively cool, shaded conditions. The known population of *Sedum valens* occurs on siliceous rock of the Idaho Batholith, but at the western end of its distributional range, it extends onto the batholith margins, on contact-metamorphics with calcareous modification (Bjork 2010).

Sedum valens is a conservation concern given its limited known range, small population, and its proximity to a well-traveled recreation road. Since the first discovery of *Sedum valens*, large portions of the overall occurrence along the Salmon River road that represent a significant proportion of the global population have been destroyed during a road-widening project. Ongoing road work as well as weed control in the road corridor will continue to pose threats to this limited species.

Sierra wood-fern *(Thelypteris nevadensis*)

Sierra wood-fern is a Pacific coastal disjunct in northern Idaho where it occurs in two approximate populations. Generally, this species occurs along the west slopes of the Cascade Mountains, extending south through the central Sierra Nevada Mountains. The only occurrence east of the Cascade-Sierra crest is in a hyper maritime zone of the North Fork Clearwater River drainage in northern Idaho (Lorain 1989).

Across its range, Sierra wood-fern occurs in moist woods, seepages or springs, damp meadows, and steambanks from foothills to middle altitudes in the mountains (Hitchcock et al. 1969b). The Idaho population of Sierra wood-fern occurs within a cool, moist habitat at approximately 3200 feet elevation in a seep and along a streamside with other forest wetland species. Many of the species found in association with Sierra wood-fern are indicators of cooler habitat conditions. Along with deerfern it would appear this species represents the cooler end of the core coastal disjunct habitat in Clearwater Basin (Lorain 1989). The actual forest habitats are probably a western redcedar/lady-fern (*Thuja plicata/ Athyrium filix-femina*) habitat type within a surrounding community that is a western redcedar/oak fern (*Thuja plicata/Gymnocarpium dryopteris*) habitat type (Lorain 1989) (Cooper et al. 1991).

At the Elmer Creek occurrence there is an ongoing threat of trail maintenance due to the track running right through the center of the population. There is a threat from any activity that could mechanically harm existing plants or that might alter the hydrologic function of the seep. In areas of general habitat in the maritime forest communities across the unit, trail maintenance and other habitat altering activities such as road building and timber harvest pose the most significant threats to Sierra wood-fern. The conservation significance is also largely due to the very small occurrence of this species on the unit.

Douglas clover *(Trifolium douglasii*)

Douglas clover is endemic to the inland northwest where it occurs from Spokane County, Washington to Baker County, Oregon and adjacent Idaho (Hitchcock and Cronquist 1973). It has been extirpated from most of its range as only one population is extant for Washington State and less than 30 occur in Idaho, where most populations have been found on the Camas Prairie and meadows in the Craig Mountain area. Most of these occurrences are decades old and with habitat conversions are no longer expected exist. There are a few occurrences on the Palouse Ranger District of the Forests. Historically it was more common on the Palouse Prairie, but agricultural conversion has largely eliminated from that area. Habitat includes seasonally moist prairies or meadows and swales in open dry forests types or along low gradient streams. Generally it is found on basalt substrates (Hays 2000).

Agriculture has reduced the range of this endemic plant to a small portion of its historic range. Today, the primary threat to this species would be grazing and weed invasion, though off road vehicles are also a concern at some locations (Hays 2000). The larger areas of suitable habitat on private land have largely been impacted by livestock and often converted to weeds or pasture grasses. It is anticipated that the native plant communities are often absent or nearly so. Areas of habitat on the higher elevation, peripheral forest lands are marginal in nature and have also been impacted by past grazing. Suitable habitat for this species has been greatly reduced from historic levels and continues to be under significant threat. A very high conservation concern for this species derives from very few occurrences on public lands and active threats wherever its limited and narrow habitats still occur.

Plumed clover *(Trifolium plumosum* ssp. *amplifolium*)

Plumed clover is endemic to west central Idaho where it occurs in Idaho, Lewis, Nez Perce, Clearwater and Washington Counties. There are less than 40 occurrences documented from a limited area centered on the Camas Prairie, almost all of which are on private land. Most of these are very small and generally limited to 100 plants or less (Mancuso and Moseley 1994). There are only two occurrences documented on the Forests, which is peripheral to the small (less than 50 miles across) global range.

Suitable habitat is middle elevation prairies (3,000 to 4,000 feet), grasslands and open Ponderosa pine/Douglas-fir forests with gentle slopes. It also occurs along some edge habitats such as road corridors and along fences (Mancuso and Moseley 1994). Sites are flat to gently sloping and can be any aspect. Substrates are generally seasonally moist, shallow to deep, but well drained loess soils over basalt. Throughout the species' limited range, habitat has been greatly diminished through agricultural practices and general degradation. The suitable prairie and prairie habitats are generally tiny and fragmented (Mancuso and Moseley 1994). The suitable habitat is uncommon in the area, but microsites that potentially hold this species may occur throughout the grasslands or dry forest types.

There are many threats to this species though it responds well to or tolerates some forms of disturbance as indicated by many populations occurring along disturbed roadsides on the Camas Prairie. It also can be found in early to late seral grassland communities (Mancuso and Moseley 1994). After land conversion, the main threats to this species are livestock grazing and weed introduction. Because many sites are in close proximity to agricultural fields, mechanical disturbance and herbicide spraying are frequent potential threats as is roadwork for occurrences at such sites. Prescribed fire or thinning will maintain open forest slopes, which will benefit the habitat for this species, though it could also increase competing weeds. The open forest preferred by this species was probably subjected to periodic wildfires and burned on occasion. Whether or not the species is in some sense dependent on recurring fire in some or all habitats, however, is unknown. It is anticipated that with an increase in forest density resulting from fire suppression along with the increase of weeds, there is less habitat on National Forest lands today than historically. Prairie habitat, which is primarily on private lands have been virtually eliminated by agriculture and only small remnants remain today.

Plumed clover is another Palouse and Camas Prairie endemic that has undergone a substantial population decline following the large scale conversion of its native grassland habitat to farmland. This extensive habitat loss and degradation has resulted in an overall downward trend for plumed clover. With few exceptions, known populations are small and contain few plants. Additional populations undoubtedly exist, but these are also likely limited in extent. The large majority of plumed clover sites occur on private land where there are few protections and species conservation efforts are limited. Given the large reduction in this species limited habitat and distribution and the fact that only two occurrences are known from the planning unit, there is significant conservation concern for this species.

18.4.4 *Trends and Drivers*

The following are drivers of the trends described for the potential SCC:

- Reduction of grasslands due to forest encroachment
- Reduction of open pine savanna habitats due to forest encroachment
- Noxious weed introduction/expansion, particularly in dry forest/grassland habitats
- Very small populations sizes threatened by stochastic events and potential genetic concerns
- Climate change as a limitation especially to high elevation species and aquatic species
- Livestock grazing in grassland habitats

18.4.5 *Information Needs*

Given the lack of resources, the ability to obtain the needed information below will only come through extended observations and limited study and analysis at the project level, which limits the ability to gather information for some species that occur in less frequently managed habitats:

- Better information on distribution and occurrence of some species and their habitat
- Improved GIS modeling for species of concern
- Better understanding of species biology, especially long-term and short-term response to disturbance

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