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Forest Service

Sanpoil Vegetation Management Project: Biological Evaluation for Terrestrial Wildlife

Three Rivers Ranger District

Colville National Forest

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Introduction

The Colville National Forest (CNF) proposes two different alternatives for managing forest vegetation in the Sanpoil Project Area. The proposed action, would initiate forest management in the area which would include commercial treatment on about 5,890 acres. Pre-commercial thinning would occur on about 2,520 acres. Additional surface treatments would include 8,666 acres of underburning, 8,163 acres of mechanical and hand piling and pile burning. About 8 miles of roads would be reconstructed, and 2.6 miles decommissioned. About 3.7 miles of new temporary road would be constructed. Associated fish and wildlife habitat improvements would be completed.

This document analyzes effects to species listed as threatened or endangered under the US Endangered Species Act and US Forest Service sensitive species listed under the sensitive species list (2015) in which the project analysis was initiated. There are no major wildlife issues associated with the project comments through public scoping and the draft period have been considered.

Project Area Description

The project is located on the Republic Ranger District of the Colville National Forest north of the Colville Indian Reservation, east of Highway 21, and south of Highway 20. The town of Republic lies roughly 1 mile north of the project area. The Sherman Pass Scenic Byway (Highway 20) runs east-west along the north end of the project area. The project area contains a mix of moist and dry stand types. Special features include Bald Snow, Thirteen Mile, and Cougar Mountain Inventoried Roadless Areas; the Sanpoil River, wildland urban interface, and key ingress/egress routes including McMann Creek and Hall Creek Roads. The legal description of the area is T35N R32E Sections 24, 25, 36; T35N R 33E Sections 1-36; T35N R34E Sections 1-10, 15-22, 27-35; T36N R33E Sections 17, 20, 21, 25-29, 32-36; T36N R34E Sections 27-36. Appendix B **Error! Reference source not found.** shows the 47,956 acre project area situated on the Republic Ranger District of the Colville National Forest. Elevations in the project area range from approximately 1,740 feet to approximately 7,308 feet. Slopes in the area range from 0 to 75 percent, and are mostly steeper than 40 percent.

Forest Plan Management Areas

The Colville Land Management Plan (LMP) provides guidance and direction for management activities on all lands managed by the Colville National Forest. The LMP establishes goals, objectives, and standards and guidelines on both a forest-wide as well as on a management area specific basis. This report incorporates the LMP by reference and is tiered to the Land Management Plan's Final Environmental Impact Statement (USDA Forest Service 2019). This project would comply with forest wide management goals as well as forest wide standards and guidelines from the LMP.

Current Vegetation

Refer to silviculture report for discussion and details about the current vegetation within the project area.

Proposed Action

The proposed treatments are needed to reduce tree density, increase stand vigor, and decrease the potential for insects, disease, and large wildfires. Treatments would be designed to respond to insect and disease pressures created by wildfires, wind throw, and overstocked stands. Table 1 below summarizes acres by treatment type for the proposed treatments. The treatment definitions follow the table. Refer to Appendix B **Error! Reference source not found.** for a map of proposed treatments.

Table 1: Estimated Acres of Treatment

Commercial Thinning	3,846
Commercial Thinning with Openings	1,270
Pre-commercial Thin	2,520
Small Pine Thinning	519
Shelterwood Treatments	255
Total Silviculture Treatment Acres	8,410
No Silvicultural Treatment	39,546
Project Acres	47,956
Fuels Treatments	**Acres**
Shaded Fuel Break	2,270
Ladder Fuel Reduction	30
Machine Pile, Burn	7,256
Hand Pile Burn	444
Hand Pile, Burn / Machine Pile, Burn	463
Underburning (Includes Eagle Rock Maintenance and Landscape Natural Fuels)	8,666
Total Fuels Treatment Acres	19,129*
Roads	**Miles**
System Road Decommissioning	2.6
New Temporary Roads	3.65
Temp Road Use of Existing Templates	7.97
Restoration of Existing Non-System Templates	67
New road construction	0.25

Road Management

Approximately 1 mile of currently open roads will be closed to public vehicular access. The proposed action would decommission approximately 3 miles of NFS roads in the project area, all of which are currently closed. These roads, and their use, are generally linked to riparian, and/or hydrologic resource damage and have been deemed unnecessary for future activities.

Commercial harvest under the proposed action would require an estimated 12 miles of temporary road construction and use of non-system roads to provide access to proposed units. Activities would include reconstruction on existing roadbeds, new temporary road construction, and restoration of existing non-system roads. About 8 miles of existing non-system roads would be used during the project. Rutting would be minimized with addition of the rock surface and with the running surface maintained. Upon completion of vegetation and fuels treatments, these roads will be obliterated and made hydrologically stable. About 4 miles of new temporary road would be constructed where no roadbed exists, requiring new excavation and embankment, surfacing, and installation of drainage structures. Newly constructed temporary roads would be obliterated and made hydrologically stable at the completion of vegetation and fuels treatments. The project area includes over 67 miles of existing non-system road templates. These templates include old roads, jeep trails, skid trails, and may include features like. They were delineated using digital elevation models using ArcMap. They have not been field validated. In many cases these old templates may be overgrown and stable, where active restoration would not be a benefit. The non-system roads that are reasonably accessible and that have resource concerns would be restored through full obliteration or hydrologic stabilization. The remaining non-system roads would be allowed to continue to recover naturally.

Wildlife-Related Project Design Criteria

Criteria in the following tables would be incorporated into the design of the proposed action. We have successfully implemented these practices with other vegetation management projects completed on the Forest. These practices have proven to be effective in avoiding or minimizing potential negative effects of vegetation management projects to native wildlife species. For unit location refer to Appendix B **Error! Reference source not found.**.

Table 2: Project Design Elements for Terrestrial Wildlife

Design Elements for Specific Units	Units
Winter Range Seclusion- In designated winter range habitat, activities should be restricted December 1 to March 31st. When winter logging activities occur, project related activities should be done in the blocks recommended to reduce movement of ungulates during these resource limited months. Recommended blocks may be broken down further as appropriate for on the ground actions.	Recommended Unit Blocks: 561, 30, 552, 546, 547, 148, 554, 150, 555, 132, 136 193, 95 207, 158, 126, 171, 170, 169, 165, 96, 166, 97, 164, 174, 167, 138, 98, 538 159, 74, 160 161, 71 75, 540, 208, 73, 562, 563, 63, 361, 60, 61, 360, 566, 62, 533, 54, 227, 530, 55, 189, 56, 57, 199, 77, 477, 53, 565 549, 70, 44, 445, 69, 13, 535, 345, 544, 545, 2, 27, 64, 192, 58, 229, 429, 230 179, 36, 39, 545, 551, 537, 178 550, 90, 560
Hiding Cover – Within ungulate winter range, where the opportunity exists, retain clumps or patches of shrubs and trees to provide hiding cover (minimize sight distance) along open roads adjacent to regeneration harvest units. The intent is to limit disturbance to wildlife from motorized vehicles, decrease vulnerability to shooting, and discourage OHV travel off-roads. To the extent feasible, maintain the hiding cover value of these vegetative clumps and patches during post-harvest site preparation and fuels treatments. Hiding cover is defined as vegetation or topography that is capable of hiding 90% of an elk at a distance of 200 feet.	5, 47, 70, 94, 103, 138

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Goshawk Nesting Habitat- No timber harvest, prescribed burning, or other project activities will occur within active (reproduction attempted within the last five years) 30 acre nest stands. Within the mapped five alternate nest stands (total of 150 acres), ensure more than 50 percent canopy closure is retained post-harvest. Alternate nest stands occur in the vicinity of active nest stands based upon suitable habitat, they do not necessarily occur in the same unit as the active nest.	**Active nests occur in the following units and outside of the proposed project units:** Quartz Mtn. Territory: 42, 342, 3 McMann Creek Territory: 549, 445 13 Mile Sanpoil Territory: 552, 546, 561 Bear Mt. Territory: 138, 556, 174 Bearpot Territory: 24, 25 Nine Mile Falls Territory: 101, 550 Sanpoil 600 Rd. Territory: 1 Rabbit Rd. Territory: 21 **Alternate nest stands occur in the following units and outside of proposed units:** Quartz Mtn. Territory: 42, 49, 48, 3, 342, 41, 40, 2 McMann Creek Territory: 70, 549 13 Mile Sanpoil Territory: 546, 561

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	Bear Mt. Territory: 138 Bearpot Territory: 24, 25, 219 Nine Mile Falls Territory: 101, 550, 110, 108 Sanpoil 600 Rd. Territory: 1 Rabbit Rd. Territory: 7, 201, 531, 20
Goshawk Post-fledging Areas (420 acres total) - Timing restrictions on all project related activities (including layout) from March 1st through August 31st. If nest monitoring shows that the territory is inactive the timing restriction may be waived by the wildlife biologist.	**The PFA timing restriction occurs in the following units and outside of proposed units:** Quartz Mtn. Territory: 49, 48, 42, 41, 545, 342, 3, 338, 2, 40, 534, 179, 36, 39, McMann Creek Territory: 445, 44, 70, 345, 69, 549 13 Mile Sanpoil Territory: 561, 30, 552, 546 Bear Mt. Territory: 164, 137, 106, 103, 538, 98, 167, 174 Bearpot Territory: 24, 25, 219 Nine Mile Falls Territory: 101, 550, 223, 107, 102, 111, 110, 108 Sanpoil 600 Rd. Territory: 1, 197, 224, 121

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	Rabbit Rd. Territory: 7, 567, 543, 531, 201, 93, 215, 21, 20, 202, 542, 217, 541, 17
Lynx Analysis Units (LAUs) - Within LAUs retain a minimum of 20% in untreated patches and do not reduce tree stem densities to less than 500 trees per acre in early structure subalpine fir/lodgepole pine or spruce/subalpine fir vegetation types.	Units within the West Sherman LAU- 11, patches/portions of units 12, 9, 175, and 1 where vegetation type and structure is as described.
Lynx Habitat Components – Project activities shall not reduce horizontal cover (snowshoe hare habitat) in late-closed structure subalpine fir/lodgepole or spruce/subalpine fir vegetation types unless current conditions exceed HRV for late-closed structure.	Units within West Sherman LAU: 220, 1, 558

Wildlife Topics and Issues Addressed in this Analysis

Desired Condition of Wildlife Habitats

In the Sanpoil project area, there is presently an over-abundance of stands in middle structural stages and a deficit of stands in both the early and late structural stages, relative to historic conditions. Timber harvest would move the project area closer to the historic range of variability (HRV) for stand structural stages. Timber harvest would create forest openings and any palatable shrubs and green forage plants growing in these new openings would have improved access to sunlight, water and soil nutrients. They should respond by putting on abundant and nutritious new growth, enhancing foraging opportunities for big game and other animals over the short to mid-term. Existing late structural stage stands would not be harvested. Where trees in mid-structural stage stands would respond to stocking control, commercial thinning would occur. This harvest prescription would promote the growth of the largest, fullest crowned trees, accelerating the overall stand development towards late structure. As a result, additional habitat for old growth associated species could be recruited in the project area over the long-term.

Timber stands on the lynx range would be managed according to recommendations in the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013). High elevation subalpine fir/spruce stands with concentrations of downed logs would be reserved from harvest to provide potential den habitat for lynx. Timber harvest would create openings within stands in middle structural stages. Within about 15 years, these openings would fill in with young conifers and could be providing enough low cover and browse to be utilized by snowshoe hares; the primary prey of lynx.

Wildlife Issues

There are no wildlife issues that would result in unresolved conflicts or changes to the proposed action.

Wildlife Resource Indicators and Measures

The following table displays the resource indicators related to this project and the measures we will use to gauge project effects.

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Table 3: Resource indicators and measures for assessing project effects

Resource Element	Resource Indicator	Measure (Quantify if possible)
Lynx habitat components	prey habitat	Forest successional stages within LAUs (lynx analysis units) provide a mosaic of lynx habitat (including foraging, travel, and denning components) within landscape pattern that is consistent with the historical range of variability.
Lynx habitat components	den habitat	
Lynx habitat components	unsuitable habitat	Change no more than 15 percent of lynx habitat within any single LAU to an unsuitable condition in any 10 year period.
Big game seclusion	motorized access	Open route miles & densities, drivable route miles & densities
Grizzly bear seclusion	core habitat	Acres further than 500 meters from open and restricted-use roads
Goshawk Habitat	Nesting habitat	Acres of unmanaged habitat around nest stands within PFAs and maintenance/promotion of nesting habitat

Methodology

We reviewed wildlife sighting records from the project area and vicinity in the geographic information system (GIS) databases managed by the Washington Department of Fish and Wildlife (WDFW), the Washington Department of Natural Resources Natural Heritage Program, and the CNF. We reviewed documentation of past species specific wildlife surveys completed in the area. Over the course of four field seasons, walk-through exams were conducted to assess wildlife habitats in the proposed harvest units. During the northern goshawk nesting season, we surveyed for this species using broadcast, taped calls per protocol in Woodbridge and Hargis (2006). We conducted specific searches for goshawk nests in suitable habitat. We conducted surveys for sensitive invertebrates in suitable habitats. Lastly, we used formal stand exam data, LiDAR data, aerial photo interpretation, and existing GIS layers to map potential habitats for individual species.

Incomplete and Unavailable Information

Wildlife Population Estimates

Accurate estimates of wildlife populations relative to the project area are difficult if not unfeasible to obtain. It is unlikely that all activity centers such as dens or nests have been found. This is due to the limitations of detection methods and the level of effort and time that would be required for a complete census. Some species occur at very low densities and have vast home ranges (e.g. wolverine), making them very difficult to detect. A species' home range may only partially overlap the project area or may shift into or out of the project area over time. Additionally, the State of Washington manages wildlife populations and the Forest Service manages habitat for species. Lacking complete information on species distributions and abundance, when habitat occurs on which a species depends, we generally consider the habitat as potentially occupied.

Incidental wildlife observations and those recorded during species-specific surveys are records of presence at a given point in time. We may be able to surmise which local habitats are important to the

species based on where and how often the animals were detected. If wildlife activity centers (such as a raptor nest) are found during project planning or preparation, we would protect the sites as needed by adjusting the boundaries of treatment units, and/or imposing project timing restrictions in the area.

Although our knowledge of species presence and density is imperfect, we must still ensure that vegetation management activities in the project area do not directly, indirectly, or cumulatively impact the viability of wildlife species across the Forest. To accomplish this, we follow management guidance in recovery plans and use the best available science such as conservation assessments. These documents are compiled by taxon experts responsible for the conservation and/or recovery of the species. We must also ensure that the project incorporates Forest Plan standards and guidelines for wildlife, and current management recommendations in Youkey (2012) and Mellen-McLean et al. (2012) for maintaining species viability. These resources provide an assessment of "source" habitat levels at the regional and Forest-wide scales. They identify threats to the species, and conservation strategies.

Species listed as game animals in Washington State (e.g., elk, deer, forest grouse, furbearers) are monitored by WDFW through the collection of annual trend count and harvest data, and on-going research. WDFW uses these data to manage for healthy, productive populations of game species at sustainable harvest levels. This monitoring and adaptive management further ensures that these species will persist on the Forest over time.

Road Closure Effectiveness

Level 1 and temporary roads built with this project would be closed to motorized travel by the public at all times. Not all road closures are effective and some of these closed roads could be breached by motorized vehicles. This could lead to an overall decrease in seclusion habitat available to wildlife in the project area, and an increase in harvest levels, both legal and otherwise. It is difficult to accurately predict beforehand which, if any, road closures could be breached. This analysis assumes we would achieve a high degree of closure effectiveness in the project area based on the following;

- The project would require about 12 miles of temporary roads. Temporary roads are intended to be decommissioned immediately after use and no longer function as a road. The roadbed may be ripped or put back to slope in certain locations. The road entrance may be closed with piled logs, boulders, and other native materials and planted with native shrubs and trees. We have rarely documented breaches on roads which have been thus "put to bed" and none have had sustained motorized use.
- Closed roads that have been recently breached would have their closures re-worked to improve their effectiveness. This could involve moving a gate to a better location, re-installing earthen berms on the road entrance, piling slash in the road prism, etc.
- The project proposal would include monitoring road closures for five years. If we were to detect a breach during that time, we would take steps to re-work the closure. We would continue to periodically monitor and improve the closure as necessary.

Threatened and Endangered (T&E) Species

Regulatory Framework

Section 7 of the Endangered Species Act of 1973 (ESA) requires all federal agencies, in consultation with the U.S. Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS), to insure that their actions are not likely to jeopardize the continued existence of listed threatened, endangered or proposed species, or adversely modify their habitat. A biological evaluation/assessment (BE/BA) must be completed for all Forest Service planned, funded, executed or permitted programs and activities to determine their possible effects to species listed under the ESA (FSM 2672.4). Current management

direction/recommendations for threatened, endangered, and proposed species on the Colville National Forest can be found in the following documents:

- Colville National Forest Land Management Plan (USDA 2019),
- Endangered Species Act of 1973 (ESA),
- Forest Service Manual and Handbooks (FSM/H 2670/2609),
- Migratory Bird Treaty Act of 1918 (MBTA),
- Migratory Birds Executive Order (EO) 12962 of January 10, 2001
- National Environmental Policy Act of 1970 (NEPA),
- National Forest Management Act of 1974 (NFMA),
- Recovery Plans, Conservation Assessments, and other species specific documents,
- Regional Forester policy and management direction.

The Sanpoil Project area is entirely included within the boundaries of Ferry County, Washington. For Ferry County, the USDI Fish and Wildlife Service (FWS) presently lists no bird or mammal species as endangered, 1 bird (yellow-billed cuckoo, *Coccyzus americanus*) and 2 mammals (Canada lynx, *Lynx Canadensis* grizzly bear, *Ursus arctos*) as threatened, and 1 mammal (North American wolverine, *Gulo gulo luscus*) as proposed for listing under the Endangered Species Act (ESA) of 1973 (https://www.fws.gov/endangered/ and IPaC assessment, accessed 1/30/2018.
Abbreviations used in the table:
E=federally endangered T=federally threatened P=federally proposed
SS= Forest sensitive species

Table 4: Threatened, endangered, proposed, and candidate terrestrial wildlife species listed for the CNF (species in shaded blocks have habitat in the project area and will not be addressed in this report)

Species	Status	Habitat present?	Documented in area?	Habitat	Management Framework
Yellow-billed cuckoo (*Coccyzus americanus)*	T	No	No	Large cottonwood galleries and other dense riparian woodland habitats. Range for the species does not include the northeastern part of the state of Washington.	WDFW 2013 and Teachout 2015
Canada lynx (*Lynx canadensis*)	T	Yes	Yes	High elevation forests. Primary lynx habitat includes: lodgepole pine, subalpine fir, Engelmann spruce, and aspen cover types. Lynx foraging habitat includes dense young stands of lodgepole pine, mixed conifer/ hardwood stands with an understory shrub layer, or mature multi-level stands. Lynx denning habitat is characterized by large woody debris and ample overhead cover.	Ruediger et al. 2000 and Interagency Lynx Biology Team 2013, USDA 2019, Gaines et. al. 2017
Grizzly bear (*Ursus arctos*)	T	Yes	No	Spring foraging habitats include low to mid - elevation riparian areas, meadows, parklands, etc. Summer / fall foraging sites include mid - high elevation, berry producing shrubfields. Grizzlies often den in alpine or subalpine areas with deep soils.	USDI et al. 1986, USFWS 1993, USDA 2019, USDI 2001, USDA 2011
North American wolverine (*Gulo gulo luteus*)	P, SS	Yes	No	Den in higher elevation rock slides, caves, and crevices; often in glacial cirque basins. They forage in all higher elevation forested habitats	Gaines et. al. 2017
Woodland Caribou	E	No	No	Mature montane forests of western redcedar/western hemlock, and	USDI 1994, USDA 2019.

(*Rangifer tarandus caribou)*				subalpine fir/Engelmann spruce above 4,000 feet in elevation. Specifically the Selkirk Mountains located in Pend Oreille County	

Canada lynx, federally threatened

Existing Conditions

The population of lynx in northeast Washington declined dramatically from 1970 to the mid-1980s and the Kettle Range has not supported a population of reproducing lynx in the last 30 years. A brief camera trap survey occurred from 2016-2017 during that survey period three photos in and just outside of the Sanpoil project area captured lynx presence. It is thought that the three photos captured one individual lynx. An extensive camera trapping endeavor began summer 2018 to reassess the lynx population status throughout the Kettle Range as it has been several years since a thorough investigation has occurred, to date no lynx have been detected through this more extensive effort.

Lynx Analysis Units (LAUs) on the CNF were remapped in 2019, to reflect recent refinement of natural vegetation mapping across the forest, to align with guidance in the 2013 Lynx Conservation Assessment and Strategy and Forest Plan Guidelines to adjust LAU boundaries as appropriate (FW-GDL-WL-10, pg. 65). This remapping effort has been approved by the USFWS and representatives on the Western Lynx Biology Team. The Sanpoil project area contains the West Sherman Lynx Analysis Unit (LAU) and the Hall Creek LAU. Approximately 10,664 acres (66%) out of 16,175 acres of the West Sherman LAU occurs within the project area and approximately 3,565 acres (10%) out of 35,374 acres of the Hall Creek LAU occurs within the project area. The LAUs are located at the south end of a block of 14 LAUs that are distributed on either side of the crest of the Kettle Range.

Lynx Habitat Components

Existing Habitat Levels - We mapped potential lynx habitats in the LAUs present within the project area based on formal stand exams, walk through exams, LiDAR imagery of tree heights and canopy closure, and aerial photo interpretation. Table 7 displays the existing habitat conditions for lynx in the LAUs within the project area.

Table 5: Lynx habitat indicators and measures for the existing condition within the project area

Resource Indicator	Measure	Acres	% of LAU within the Project Area
West Sherman LAU within Project Area		**10,664**	**100%**
Primary prey habitat	Provide a mosaic of stand types including dense, young stands suitable for snowshoe hares.	2,280	21%
Marginal and/or alternate prey habitat	Provide a mosaic of stand types including mature, multi-storied stands suitable for tree squirrels as well as connectivity.	6,808	64%
Den habitat	Maintain or promote mature, subalpine fir / spruce stands with root wads / log jackpots over at least 10 percent of each LAU.	37	<1%

Unsuitable habitat	Ensure that no more than 15 percent of an LAU is unsuitable for lynx (includes recently created openings)	0	0
Non-lynx habitat	Meadows, rock, open water areas below 4,000 feet.	1,539	14%
Hall Creek LAU within project area		**3,565**	**100%**
Primary prey habitat	Provide a mosaic of stand types including dense, young stands suitable for snowshoe hares.	116	3%
Marginal and/or alternate prey habitat	Provide a mosaic of stand types including mature, multi-storied stands suitable for tree squirrels as well as connectivity.	2,526	71%
Den habitat	Maintain or promote mature, subalpine fir / spruce stands with root wads / log jackpots over at least 10 percent of each LAU.	404	11%
Unsuitable habitat	Ensure that no more than 15 percent of an LAU is unsuitable for lynx (includes recently created openings)	0	0
Non-lynx habitat	Meadows, rock, open water areas below 4,000 feet.	519	15%

Primary Foraging Habitat – Snowshoe hares are the primary prey of lynx. Hare populations are highest in moist coniferous forest stands that are very dense, young, and that have ample overhead cover and browse. In the winter, dense saplings or mature multi-layered stands maximize availability of food and cover for snowshoe hares and it is important that cover is present above varying snow depths throughout the winter. In northeast Washington, lodgepole pine and Douglas-fir are the most important browse species for snowshoe hare. In the Kettle Range, this habitat typically occurs in regenerating burns or in stands that were harvested approximately 15 to 20 years ago. We type spruce, subalpine-fir, lodgepole pine in early structure stages as primary foraging habitat.

Alternate Foraging Habitat - During times of hare scarcity, lynx focus more on alternate prey such as red squirrels, grouse, and infrequently, ungulates (Ruggiero et al. 1999). At the southern extent of lynx range (including the CNF) the main alternate prey appears to be red squirrels. Mature forests with good canopy closure, large amounts of coarse wood on the ground, and good cone production, tend to support larger populations of red squirrels. We type Douglas-fir stands with multi-stories, large trees present, and good overhead canopy, as alternate foraging habitat.

Denning Habitat - Lynx den sites are typically located in mature spruce/fir stands or mixed forests of spruce and birch. Forest structure at these sites seems to be more important than forest cover type. Areas having large woody debris (such as blow-down pockets) and ample overhead cover are preferred by lynx for denning. When mapping den habitat on the CNF, we look for stands in subalpine fir/spruce or Northern Rocky Mountain mixed conifer cover types, with multi-stories, good overhead canopy, and large down wood. There are no known active or historic lynx dens in the West Sherman or Hall Creek LAUs. For denning habitat to be functional, it must be in or adjacent to foraging habitat (Interagency Lynx Biology Team 2013).

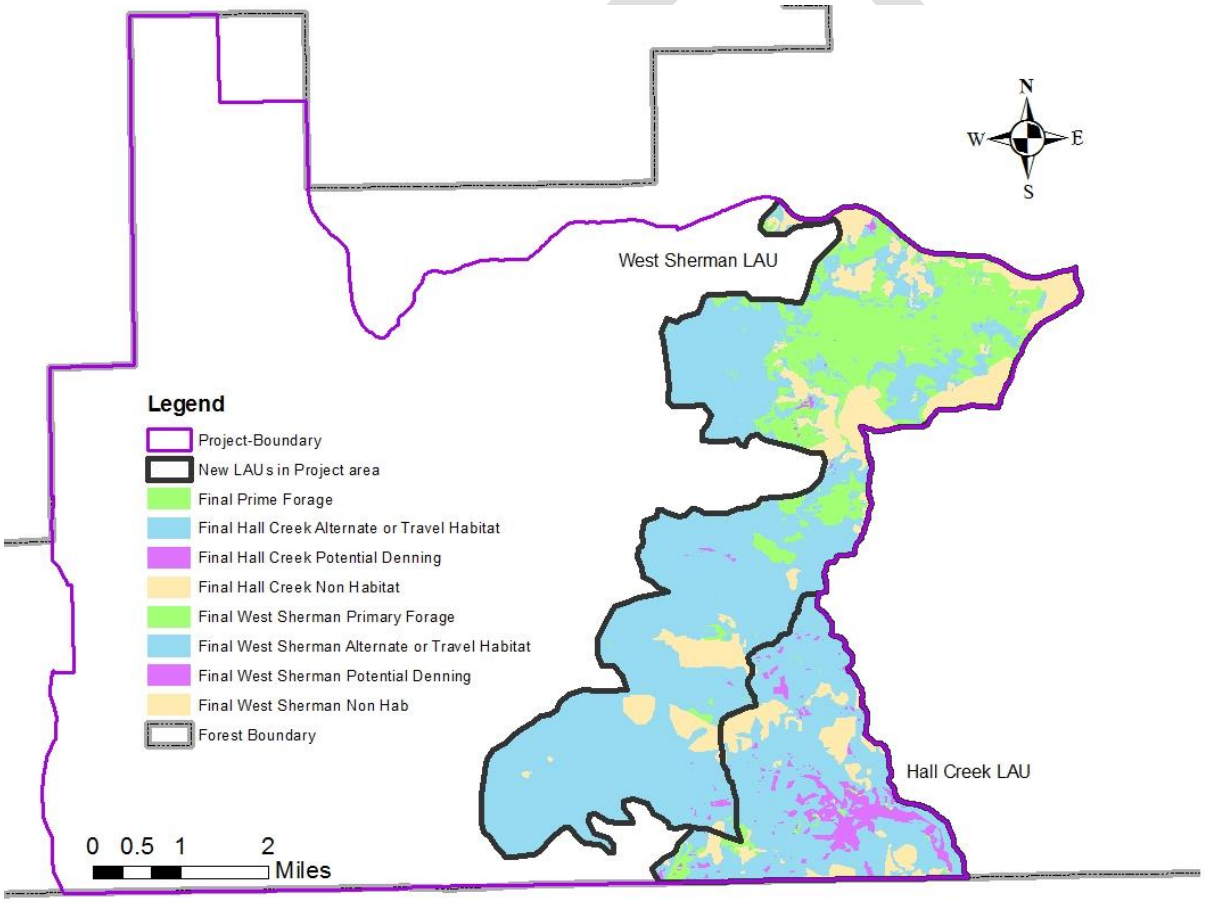
Unsuitable Habitat - Habitat that could but currently does not provide connectivity habitat or any form of habitat used by lynx is called unsuitable habitat. Unsuitable habitat includes recent regeneration harvest or other disturbance-created openings that have the potential to provide habitat for lynx, but presently do not

have enough vegetative cover to be used by the animals to an appreciable degree. These are stands in the stand initiation structural stage. After 5-10 years, shrubs and trees should have grown enough cover for lynx to travel through these sites. No more than 30 percent of an LAU should consist of habitat that is unsuitable for lynx. In addition, forest management should not change more than 15 percent of lynx habitat within a LAU to an unsuitable condition within a ten year period (Ruediger, et al, 2000).

The unsuitable habitat which occurs within the LAU is classified as unsuitable due being in the stand initiation structural stage. There have not been any timber harvests in the past decade that would have created the open conditions to cause the habitat to be currently unsuitable.

Non-lynx Habitat - Non-lynx habitats include; open water, rock, forest openings such as shrublands, meadows, and powerline corridors, dry forest stand types, and forest stands below 4,100 feet that are removed from spruce/fir vegetation types.

Figure 1: Distributions of lynx habitat conditions in the portions of the West Sherman and Hall Creek LAUs within Sanpoil Planning Area



Forest Roads and Trails - Lynx have been known to use roads as travel-ways where there is adequate cover on both sides of the road. Herbaceous plants and shrubs that grow along road edges can attract hares. It is possible that lynx hunting near roads could be more susceptible to predation or human-caused

mortality. However, "at this time, there is no compelling evidence to recommend management of road density to conserve lynx" (Ruediger et al. 2000). Neither the 2000 version nor the 2013 version of the LCAS provided a recommendation for target road densities on the lynx range.

Environmental Consequences

Direct and Indirect Effects –

Vegetation management actions would occur over approximately 1,896 acres of lynx habitat within the West Sherman LAU and approximately 528 acres of lynx habitat within the Hall Creek LAU. Table 6 displays the acres of harvest in the LAU by harvest prescription, not including proposed harvest in stands typed as non-lynx habitat.

Table 6: Proposed actions approximate acreage in the LAUs (excludes treatments in non-lynx stands)

West Sherman LAU Prescriptions	Potential Denning habitat	Marginal habitat (alternative prey habitat)	Primary foraging habitat	Total
Pre-commercial thin	0	319	193	
Commercial thin	0	696	75	
Shaded fuel break	0	116	0	
Small Pine Thinning	0	44	0	
Underburning	0	453	0	
Total	**0**	**1,628**	**268**	**1,896**
Hall Creek LAU Prescriptions	**Potential Denning habitat**	**Marginal habitat (alternative prey habitat)**	**Primary foraging habitat**	**Total**
Shaded fuel break	73	404	4	
Underburning	4	28	15	
Total	**77**	**432**	**19**	**528**

Den Habitat – Within the Hall Creek LAU approximately 77 acres of stands that currently provide potential denning habitat would be treated with fuels treatments. These proposed treatments will not reduce quality of potential denning habitat and could in the long term promote further growth of large trees enhancing canopy cover needed in denning habitat. There are no known lynx den sites in the LAUs. The normal operating season in timber sale contracts generally starts July 1 to avoid soft roads and wet soils. Contract activities in higher elevation areas are likely to be further delayed. Thus, the potential for the project to disturb an active lynx den should be insignificant or discountable.

Primary Prey Habitat – Approximately 268 acres of primary prey habitat would be treated within the West Sherman LAU and 19 acres within the Hall Creek LAU. Treatments within primary prey habitat shall maintain 500 trees per acre, meeting forest plan standards, units for which this applies to are listed within the design elements table. Even with this standard treatment, the proposed action would contribute to the temporary loss of primary prey habitat and increase unsuitable habitat; but the amount of unsuitable habitat created within each LAU is discountable and insignificant to the overall effects to lynx habitat. Within 15-20 years this treatment will create good quality forage habitat.

Alternate Prey Habitat - Treatment is proposed in approximately 1,628 acres within the West Sherman and 432 acres within the Hall Creek LAUs of marginal lynx habitat which is also considered alternative prey habitat or travel habitat. Habitat quality for tree squirrels could be reduced for up to 20 years in relation to the amount and heterogeneity (clumpiness) of the canopy retained in the harvested units. In the long term, most of the harvested areas will provide better habitat for snowshoe hares than if they remained on their current developmental pathways. Within about 15-20 years of harvest, good quality browse and overhead cover for snowshoe hares could develop in created openings where the young trees are sufficiently dense. As there is an abundance of this habitat type in both LAUs treatment will be

beneficial to lynx habitat through creation of a mosaic of stand types and will move the landscape towards HRV standards.

Unsuitable Habitat - Openings created through timber harvest would sometimes exceed 100 meters in width. Lynx would be reluctant to cross these larger openings due to their lack of concealing cover; particularly in the winter (Interagency Lynx Biology Team 2013). With this change, the amount of unsuitable habitat created by harvest, would remain below 30% of the LAUs maintaining forest plan standards.

Table 7: Comparison of lynx habitat measures between alternatives (Acreage and percentages apply to portion of LAUs within the project area)

Resource Indicator	No Action West Sherman LAU acres (% of LAU)	Proposed Action West Sherman LAU acres (% of LAU)	No Action Hall Creek LAU acres (% of LAU)	Proposed Action Hall Creek LAU acres (% of LAU)
Primary prey habitat	2,280 (21%) No immediate change; loss will occur to forest succession in 10+ years	2,012 (19%) Initial loss of 268 (3%) acres which will be potentially recruited in 5-15 years. Some of the treated alternate habitat could develop into primary habitat as well.	116 (3%) No immediate change; loss will occur to forest succession in 10+ years	97 (3%) Loss of 19 acres which will be potentially recruited in 5-15 years. Some of the treated alternate habitat could develop into primary habitat as well.
Alternate prey habitat	6,808 (64%)	6,808 (64%) reduced quality on 1,628 (15%) acres due to harvest for 5-10 years but is still considered alt. prey habitat and may develop into primary prey habitat or denning habitat in the next 20 years	2,526 (71%)	2,526 (71%). Reduced quality on 432 (12%) acres to due harvest for 5-10 years still considered alt. prey habitat and may develop into primary prey habitat or denning habitat in the next 20 years
Den habitat	37 (<1%)	37 acres (<1%) no change. There is potential for some of the treated alternate prey habitat to develop into denning habitat.	404 (11%)	404 (11%) Reduction of quality on 77 (2%) acres, still considered denning habitat. There is potential for some of the treated alternate prey habitat to develop into denning habitat.
Unsuitable habitat	No unsuitable habitat present at this time	Creation of about 268 (3%) acres due to treatment.	No unsuitable habitat present at this time	Creation of 19 (.5%) acres due to treatment.

***West Sherman total LAU acres in project area = 10,664 Hall Creek total LAU acres in project area = 3,565**
***Non-lynx habitat contributes to the remaining amount of acres not accounted for in this table**

Habitat Connectivity – Habitat connectivity would be reduced but not eliminated by the project. Once the project is complete, the bulk of the project area would remain un-managed and continue to provide dense cover for dispersing wildlife. Lynx would be reluctant to traverse the larger openings, particularly during winter, due to the lack of concealing cover on these sites. Where timber stands on the lynx range are commercially thinned, horizontal cover at ground level would be degraded, but not completely removed.

Cumulative Effects

Cumulative effects are evaluated within each individual LAU as directed by USDI 2001. Therefore, the cumulative effect area for this project is the West Sherman and Hall Creek LAUs. The effects from this project would be cumulative to those resulting from the White Mountain fire which occurred in 1988. The fire has created additional primary forage habitat for lynx within the West Sherman LAU. This habitat will continue to grow and create more primary prey habitat adding a beneficial cumulative effect to lynx habitat.

Effects Determination

Actions may cause the one recently documented individual to be displaced from the area during project activities but is not likely to have significant impacts to the individual. Regeneration harvest would increase the amount of unsuitable habitat (openings) for the next 5-15 years in the LAUs. Lynx would tend to avoid the larger openings, but enough forest cover would be retained on the landscape for animals to easily disperse through the area. In 15-20 years openings created during the project could grow dense enough to provide quality snowshoe hare habitat. The proposed action would be consistent with the best available science on lynx management. Based on these considerations, the proposed action may affect but is not likely to adversely affect lynx or lynx habitat.

Grizzly bear, federally threatened

Management Framework

The Sanpoil project lies outside of the recovery area and within lands classed as Management Situation 5 for grizzly bears (USDI et al. 1986). Grizzlies rarely occur in these areas although they contain some suitable and available habitats. Grizzly habitat needs are not a necessary consideration on these lands, but maintenance and improvement of habitat is an option (USDI et al. 1986).

Existing Conditions

There have been no confirmed observations of grizzly bears from in or near the Sanpoil project area since salmon were eliminated following construction of Grand Coulee Dam which was completed in the early 1940s, and before then sightings were rare (Bader 2000). The closest documented recent sightings are photographs from remote cameras in the Kettle Wedge (Washington Department of Fish and Wildlife 2013), which is greater than 25 miles away.

Grizzly Bear Habitat Components

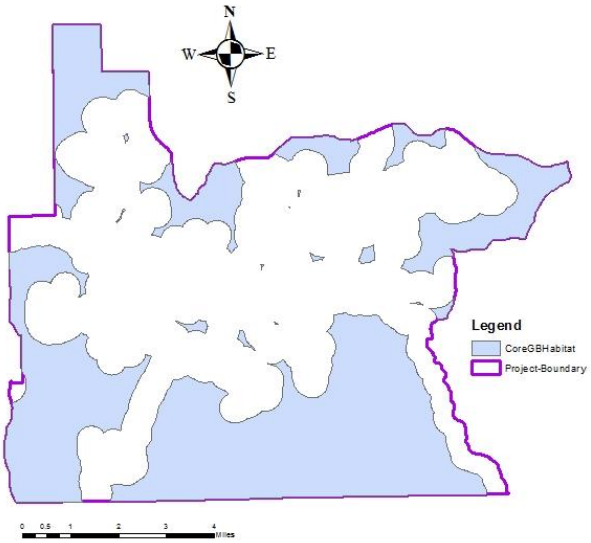
Hiding Cover - Hiding cover for grizzly bears is defined as vegetation capable of hiding 90 percent of a bear at a distance of 200 feet (USDA et al. 1990). This habitat component is most important along open roads. There is no established guideline for providing hiding cover for grizzlies outside of recovery areas. Virtually all forest stands in the area are presently providing hiding cover.

Den Sites - On the CNF, active grizzly bear dens have not been documented outside the Selkirk Mountains Grizzly Bear Recovery Area.

Seclusion - Core habitat for grizzly bears is defined as areas lying further than 500 meters from open and restricted (gated) roads and motorized trails (USDI 2001, USDA 2011). Within this 500 meter “zone of influence”, grizzly bears are most prone to being disturbed and displaced from suitable habitat by encounters with vehicle traffic or people on foot. The risk of a bear being shot by a poacher, or accidentally shot by a legal black bear hunter, is also higher near drivable roads. The higher the road density is in a given area, the fewer acres of core habitat and the greater the risk of human-caused bear mortality. Approximately 45% of the area consists of habitat farther than 500 meters from an open road (

Figure 2). There is no direction to manage for specific levels of core habitat or road densities for grizzly bears outside of designated recovery areas for the species.

Figure 2: Seclusion/core habitat for grizzly bears in the Sanpoil project area



Environmental Consequences

Direct and Indirect Effects -

Forage Resources - Timber harvest proposed with this alternative would reduce the overhead tree canopy in many stands that are typically densely stocked with immature trees. Where they exist in the areas proposed for harvest, forage plants utilized by bears could benefit from the increase in available sunlight, and the reduction in competition for water and soil nutrients. Grasses and other green forage plants could quickly become more palatable and productive. Berry crops could be enhanced over time. These potential effects would likely be best realized where timber harvest creates openings.

The proposed action would employ low-intensity burns to reduce forest fuel loads on about 8,666 acres. Prescribed fires would thin out dense areas of conifer regeneration and consume litter and down wood on the forest floor. The above-ground portion of forage plants eaten by bears could be burned. However, nutrients would be released into the soil from the ash of consumed vegetation and dead material and forage plants should quickly respond with profuse sprouting of nutritious and palatable shoots from their intact root systems. The quality and productivity of green forage plants should continue to improve until about 15 years following burning. It would take perhaps 3-7 years for burned, berry-producing shrubs to re-gain their pre-fire coverage (Coates and Haeussler 1986).

Hiding Cover - Within temporary road corridors, logging equipment corridors, and openings created by timber harvest, hiding cover would be degraded for approximately 5 years, less if considering conditions during summer when leaves are on the shrubs and small deciduous trees.

Post-harvest fuels treatments should have minor and mostly short-lived (1-3 years) impacts to hiding cover. Because prescribed fires are lit when conditions would not result in a stand-replacement fire, unburned patches of regeneration will remain. Even in areas that are well blackened, some degree of horizontal cover would be provided by the skeletons of shrubs and young trees, partially burned logs, and live and dead tree boles. Upland shrubs, grasses, and forbs would quickly re-sprout from their root systems and regain much of their above-ground biomass within a few growing seasons.

Den Habitat –During the critical period for bears when they first emerge from the den (March - May), timber sale operations on the CNF are usually closed in order to protect saturated soils and soft roadbeds. Thus, the potential for the project to disturb bears in the den or during the period following den emergence, should be insignificant or discountable.

Seclusion - The level of human disturbance in the project area would increase for the duration of the project. If a bear were to occur in the area, it would likely avoid areas of ongoing activities, particularly where heavy equipment was being operated. Nearly all the existing closed roads in the project area could be opened during harvest activities, though not all would be open at the same time. Additionally, approximately 4 miles of temporary road segments would be constructed to access timber stands for management. For the duration of the project, motorized travel by the public on all roads currently closed would be prohibited. While project activities are occurring on re-opened or temporary roads, the amount of core habitat could be reduced in the project area. Post project, all roads opened for the project would be reclosed or obliterated so the amount of core area will return to its pre-project level.

Post-project, about 15 miles of road, including temporary road would be closed. 3 miles of currently closed roads will be decommissioned, and approximately 1 mile of currently open road will be closed to public vehicular use. Post-project, the Forest Service would monitor closed roads in the area for five years and would take any steps necessary to address breaches and improve the effectiveness of road closures.

Cumulative Effects

In grizzly bear recovery areas, biologists evaluate and monitor habitat over individual bear management units (BMUs). Since the project area is not within a recovery zone, the cumulative effects area can be described as the CNF west of the Columbia River. Past, present, and reasonably foreseeable future projects considered for cumulative effects to grizzly bears include; other vegetation management projects, wildfires, and grazing. (Refer to Appendix A:
Table 13 and Table 14)

The proposed project will create a decrease in hiding cover for approximately 5 years, a decrease in seclusion habitat due to an increase in human disturbance, and a potential increase in forage habitat. These effects will be cumulative to those resulting from other similar vegetation management projects that are active or proposed. Wildfires which have recently occurred on the landscape will create an influx of forage habitat as growth of understory plants will be stimulated, creating a beneficial cumulative effect to forage. Conversely, grazing decreases the amount of forage available on the landscape. This action adds a negative cumulative effect to grizzly bear habitat.

Effects Determination

Due to lack of historical sightings and distance from source populations, the probability of a grizzly bear occurring in the project area is very low. The area is separated from the recovery area by three major rivers, therefore habitats in the project area are not needed for the survival and eventual recovery of the species. Timber harvest would create openings in the forest canopy that could enhance forage production for bears. On-going project activities could disturb and displace a bear from a foraging or resting site but will not have a significant impact to the population as a whole. The project would result in a temporary increase in drivable road miles and substantial decrease in core habitat. These effects would be moderate in duration (about 5 years). The post-project number and distribution of miles of open roads on NFS land would remain essentially unchanged. Based on these considerations, the alternatives as proposed may affect, but are not likely to adversely affect grizzly bears.

North American wolverine, proposed for ESA listing, CNF sensitive species

Existing Conditions

Due to their large home range size and habitat needs, this species is rare and uncommon throughout their range. Although they are rare in northeastern Washington, there have been both confirmed and unconfirmed reports of wolverine on or near the CNF. North American wolverines have not been documented in the project area. The most recent confirmed sighting on the CNF occurred in 2014 and was on the very eastern edge of the forest, which is greater than 130 miles away and across three major rivers.

Den Habitat - The project area does not contain suitable denning habitat for wolverines. Wolverine denning is strongly associated with persistent spring snow through the end of denning period in mid-May but the relationship between persistent snow and wolverine denning occurs when there is snow in more than half of the years that can be detected on a scale of 0.3 miles (Copeland et al. 2010). Snow depths as measured at the Sentinel Butte Snotel site (http://www.wcc.nrcs.usda.gov/nwcc/site?sitenum=1043) show there is not enough snow on the Crest in this area to support wolverine denning. Additionally, the project area does not contain avalanche paths, talus slopes, or boulder fields associated with den sites.

Foraging Habitat – Wolverines are opportunistic scavengers that consume a wide variety of plant and animal food, with carrion (especially big game animals) serving as the mainstay of the animal's winter diet. They can kill big game animals under certain conditions such as in deep snow. Hornocker and Hash (1981) have suggested that timber harvest could improve habitat for big game and small mammal populations, thereby providing more prey for wolverines. Big game habitats will be described in the section on gray wolves, later in this document. The project area provides habitat for ungulates and small mammals, prey of wolverines, as well as a diversity of vegetation that wolverine could eat. Many forested stands in the project area, particularly those on cooler, moister northerly aspects, support a shrub layer that includes berry-producing shrubs such as huckleberries.

Travel Corridors - Hornocker and Hash (1981) found little difference in the movements, habitat use, or behavior of wolverines that inhabited logged versus un-logged habitats in their Montana study site. These authors reported that wolverines occasionally crossed created openings, but tended to do so in straight lines and at a running gait; as opposed to more wandering and leisurely patterns in forested areas. In Idaho, wolverines commonly crossed natural openings and areas with little overhead tree canopy such as burned areas, meadows, and alpine areas (Copeland 1996).

Seclusion habitat - As with grizzly bears, human access on roads and trails may negatively affect wolverine. Sufficient cover exists in the project area to provide security for wolverines that are moving through the area. Approximately 45% of the Sanpoil project area consists of core area further than 500m from an open road.

Environmental Consequences

Direct and Indirect Effects –

Den Habitat – No denning habitat exists in the project area, therefore no effects to any potential den habitat will occur.

Foraging Habitat –Refer to grizzly bear and gray wolf effects on foraging as the effects described are the same. (pg. 20)

Travel Corridors - No project activities would occur in any travel corridors we mapped for pine marten which can serve the needs of both pine marten and wolverine. Although these corridors could be used by wolverines dispersing along streams and ridgelines in the project area, they are likely not necessary for the effective dispersal of these animals.

Seclusion –Refer to grizzly bear seclusion effects (pg. 20) as the effects described are the same.

Cumulative Effects

The area considered for cumulative effects analysis consists of the Kettle Range south of the Canadian border because wolverines have such large home ranges and occur at such low densities. There are cumulative effects which will occur to wolverine habitat due to the overlap of other FS vegetation restoration projects throughout the cumulative effects area. (Refer to Appendix B
Table 13 and Table 14) These cumulative effects will be the same as effects as described with the Sanpoil project direct and indirect effects. The resulting effects will include an additional decrease in hiding cover for approximately 5 years, a decrease in seclusion habitat due to an increase in human disturbance, and a potential increase in forage habitat. In consideration of these cumulative effects we are still meeting forest plan standards and guidelines for wolverine habitat.

Effects Determination

Based on the short to long-term project effects, the proposed action is not likely to jeopardize the continued existence of wolverines, lead in a trend towards federal listing or loss of viability.

Sensitive Species

Regulatory Framework

The Forest Service maintains a list of sensitive species for each national forest (USFS, 2015). Sensitive species are those whose population viability is a concern because of significant current or predicted downward trends in numbers of animals, significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution, or incomplete information about their distribution or abundance that would.

Species recently de-listed under the Endangered Species Act are classified as FS sensitive to ensure that forest management activities do not lead to re-listing. Management policy and direction for sensitive species are listed in the previous section on T&E species. Additional direction is provided by the Bald and Golden Eagle Protection Act.

The following tables display information relative to the July 2015 terrestrial wildlife species listed as sensitive on the Colville National Forest at the time the Sanpoil Project was initiated. Species in shaded blocks in the tables either have not been documented in the project area or potential habitat does not occur in the area. Note that sensitive fish and plant species are covered in separate reports.

Table 8: Sensitive species listed for the CNF as of July 2015 (species in shaded blocks have habitat in the project area and will be addressed in this report)

Sensitive birds	Habitat present	Documented in area	Habitat description	Management Framework
Great gray owl (*Strix nebulosa*)	Yes	No	Variety of coniferous forests that are characterized by being adjacent to openings, both natural and created Forage in open habitat including open forests, natural or created through timber harvest, meadows and wetlands. Nest in forest stands near wet meadows, pastures and other openings. Nest structures include large, broken-topped snags and abandoned raptor nests (Hayward and Verner 1994).	USDA 2019
Northern goshawk (*Accipiter gentilis)*	Yes	Yes	Stands with high canopy closure and larger trees for nesting though they also nest in burned stands.	USDA 2019.
Lewis'	Yes	No	Cottonwood riparian areas along rivers and some open, park-like	USDA 2019,

woodpecker *(Melanerpres lewis)*			ponderosa pine stands. They may also nest in burned-over stands of Douglas fir, mixed conifers, and riparian woodlands. They require large decayed snags for nesting habitat along with open canopy and brush or down woody material as ground cover.	Altman and Bresson 2017, Gaines et. al. 2017
White-headed woodpecker (*Picoides albolarvatus*)	Yes	No	Once thought to occupy mature and old-growth ponderosa pine forests (Mellen-McLean 2013), this species has recently been documented in a range of open pine forests, natural or managed (Lorenz et al. 2016). Require snags in advanced decay.	USDA 2019, Altman and Bresson 2017, Gaines et. al. 2017
American peregrine falcon (*Falco peregrinus*)	No	No	They hunt on the wing over open water, marshes, and other open ground (White et al. 2002). Nesting occurs on tall cliff faces or other rock features.	USDA 2019
Bald eagle (*Haliaeetus leucocephalus*)	No	No	In northeast Washington specifically, bald eagle nesting habitat is within 2,300 ft. of fish-bearing water bodies (unpublished data C. Loggers) and management should be focused on areas within 660 ft. of fish-bearing waters. Bald eagles roost in large open trees that are associated with aquatic foraging areas and in the winter eagles will use roost sites farther from foraging areas than during the nesting season (Buehler 2000). In Washington, winter roost sites tend to be in conifers and can be as far as 2 miles from major foraging areas (Stalmaster and Gessaman 1984, Buehler 2000).	USDA 2019 USDI 2007, Gaines et. al. 2017
Common loon (*Gavia imner*)	No	No	Loons are aquatic and require large lakes or rivers with abundant fish for foraging and adequate shoreline vegetation to conceal a nest.	USDA 2019
Harlequin duck (*Histrionicus histrionicus*)	No	No	Harlequin ducks breed on cold, fast-moving mountain streams with dense shrub/timber nearby and an absence of human disturbance. After arriving on the breeding ground, harlequin ducks stage along banks near gravel bars of larger rivers before ascending the watershed to breed on streams.	USDA 2019 Gaines et. al. 2017
Sandhill crane (*Grus canadensis*)	No	No	Sandhill cranes use a broad range of open wetland and grassland habitats including bogs, sedge meadows, open grassland, and agricultural lands throughout the annual cycle. They require isolated, large tracts of marshes or wet meadows that are more than ¼ mile from open roads (Littlefield and Ivey 2001).	USDA 2019 Gaines et. al. 2017
Sensitive mammals	**Habitat present**	**Documented in area**	**Habitat description**	**Management Framework**
Gray wolf (*Canis lupus*)	Yes	Yes	Wolves are closely tied to habitats that support abundant big game populations.	USDA 2019 Wiles et al 2011.
Little brown bat (*Myotis lucifugus*)	Yes	Yes	Habitat generalist that occupies conifer and hardwood forests, open shrub steppe, cliffs, and urban areas. Riparian areas and sites with open water are usually preferred. Roost sites used by this bat include buildings, mines and other man-made structures, caves, rock crevices, tree cavities, and underneath the loose bark of snags and stumps.	USDA 2019 Hayes and Wiles 2013
Townsend's big-eared bat (*Corynorhinus townsendii*)	Yes	Yes	Utilizes lowland mixed forests of conifers and hardwoods, montane conifer forests, ponderosa pine forests and woodlands, shrub-steppe, riparian habitats, and open fields. Day roosts include caves, rock crevices, and old growth trees with basal hollows, also available human-made structures such as mines, abandoned buildings, and bridges. In the spring and summer, females rear their pups in maternity colonies in mines, caves, or buildings that are generally above 50ºF. In Washington, maternity colonies are often located near a lake or river. During the winter months, they hibernate in caves and abandoned mines with moderate airflow and stable temperatures that typically range between 27 and 55ºF.	Washington's Bat Conservation Plan (Hayes and Wiles 2013)
Pygmy shrew (*Sorex hoyi*)	No	No	Found in upland, even-aged, second-growth conifer forests with dense ground vegetation. May be associated with disturbed, seral habitats. On CNF, pygmy shrews occupy forests east of the	Gervais 2015

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			Columbia River.	
Red-tailed chipmunk (*Tamias ruficaudus*)	No	No	Occupies mid and higher elevation openings and forest edges on the eastern part of the CNF elevations in the moist, Engelmann spruce and subalpine fir plant associations where stand understories are dense. Westernmost occurrence is Little Twin Lakes east of Colville.	Gervais 2015
Sensitive Invertebrates	**Habitat present**	**Documented in area**	**Habitat description**	**Management Framework (No specific forest plan direction)**
Meadow fritillary *(Boloria bellona)*	Yes	Yes	Common in the eastern US in hayfields and human-disturbed habitats. In the west they occur in meadows and openings in aspen or pine forests.	Miller and Voight 2011
Rosner's hairstreak (*Callophyrus nelsoni rosneri*)	Yes	No	Habitat for this species includes openings and edges in coniferous forest around western red cedar.	Miller and Voight 2011
Eastern tailed blue *(Cupido comyntas)*	Yes	No	This species has adapted well to human activity and thrives in disturbed environments. It uses a variety of lightly wooded, dry habitats and weedy areas. It is found in vacant lots, parks, canals and creeks and fallow fields.	Foltz 2010
Peck's skipper *(Polites peckius)*	Yes	No	In the Pacific Northwest, habitats include mountain meadows, marshy edges of potholes and roadsides. Wet, grassy meadows are preferred.	Foltz Jordan 2010
Tawny-edged skipper (*Polites themistocles)*	Yes	No	Habitats includes grasslands and forest openings at mid to low elevations.	Foltz Jordan 2010
Western bumble bee (*Bombus occidentalis*)	Yes	Yes	Bumble bees inhabit a wide variety of natural, agricultural, urban, and rural habitats. Has three basic habitat requirements: suitable underground nesting sites for the colonies, nectar and pollen from floral resources available throughout the duration of the colony period (spring, summer and fall), and suitable overwintering sites for the queens.	Jepsen and Foltz Jordan, 2013
Subarctic bluet *(Coenagrion interrogatum*	Yes	No	Populations of these species are localized and rare in the Pacific Northwest. In Washington, they are associated with high-elevation ponds, bogs, fens, and boreal wetlands.	No specific direction
Zigzag darner *(Aeshna sitchensis)*	Yes	No		
Subarctic darner *(Aeshna subarctica)*	Yes	No		
Delicate emerald *(Somatochlora franklini)*	Yes	No		
Whitehouse's emerald *(Somatochlora whitehousei)*	Yes	No		
Fir pinwheel (*Radiodiscus abietum*)	No	No	From Duncan (2008) and Burke (2013): most often found in moist and rocky mixed-coniferous forests dominated by Douglas-fir and sometimes western redcedar. They inhabit riparian forests, outside of the immediate floodplain, in or near talus of a variety of rock types or under fallen logs. They seem to prefer moist sites, low on slopes or near persistent water sources, but outside of floodplains. They have been found in northeastern Washington but only east of the Columbia River (Burke, pers. comm. 2017). Frest and Johannes	No specific direction

			(1995) list them as in "…extreme NE WA (Ferry Co.: T.Burke, pers. comm. 1994)", an error that Burke attempted to correct but was unsuccessful (Burke, pers. comm. 2017).	
Magnum mantleslug (*Magnipelta mycophaga*)	No	No	Found under logs and woody debris in the upper subalpine fir zone in the Selkirk Mountains (Burke 2013).	No specific direction
Thinlip tightcoil *(Pristilioma idahoense)*	No	No	Occurs in moist forest zones in the Pend Oreille River watershed in NE WA and throughout the Idaho Panhandle, and in the Blue Mountains (Burke 2013).	No specific direction

Great gray owl

Existing Conditions

Great gray owl (GGO) sightings are rare in northeast Washington. The nearest sighting is of a single bird about 18 miles north of the project boundary in 2011. We have surveyed for them in accessible areas along the Kettle Crest but have not found any. Average elevation of sightings is approximately 4,400 feet and they range from 2,700 to just over 6,000. No records exist from the Sanpoil project area, and we did not find evidence of them during surveys conducted for northern goshawks or during general field review of suitable habitats in the project area.

Nesting Habitat –

Potential nesting habitat is considered to be forest stands in late open and late closed structural stages which are primarily Douglas fir forests with patches of aspen, but also Douglas fir/lodgepole pine cover types and lodgepole/spruce cover types. Nest stands which are located in the vicinity of hunting habitats (200m) that include marshes, lakes, muskegs, wet meadows and pastures are considered to be existing nesting habitat. Existing nesting habitat, within 200m of openings (Franklin 1988), occurs at far lower amounts than potential nesting habitat (Figure 3) because it is defined by its proximity to openings.

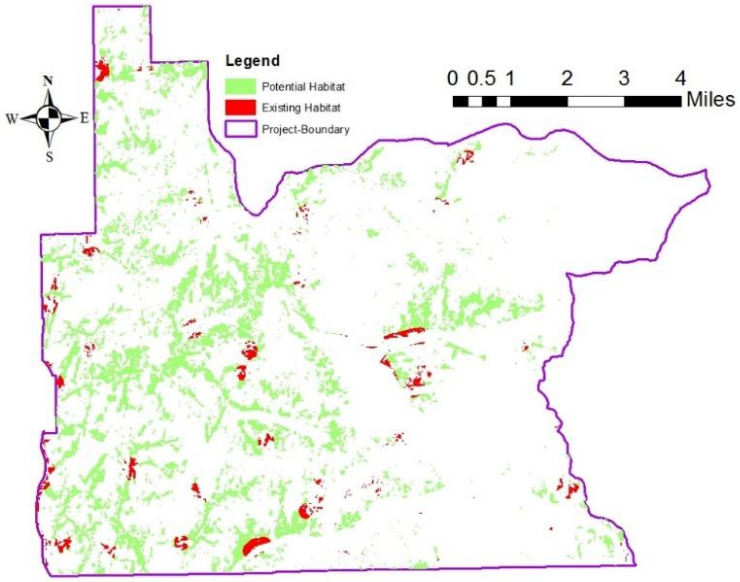
Foraging Habitat -

GGO forage for red-backed voles and other rodents in open, grassy habitats including bogs, natural meadows, and openings recently created by timber harvest (Haywood and Verner 1994). In northeast Oregon, this owl may prefer to forage in open forests that have a heavy grass under-story (Hayward and Verner 1994).

Table 9: Acres of existing and potential nesting habitat and existing foraging and for great gray owls in the Sanpoil planning area

Habitat component	Approximate acres	% of GGO habitat	Comments
Existing nesting habitat	578	7%	Provides appropriate habitat and adjacent to foraging habitat
Potential nesting habitat	5,664	72%	Provides appropriate habitat but not adjacent to foraging habitat
Foraging habitat	1,595	20%	Openings, created by disturbance or natural.

Figure 3: Great gray owl existing and potential nesting habitat in the Sanpoil Project Area



Environmental Consequences

Direct and Indirect Effects –

Nesting Habitat - Harvest is proposed on about 274 acres (47%) of existing nesting habitat. These harvest prescriptions would open stands and though decrease the number of trees in which great gray owls can nest, would not eliminate all trees. Opening stands would increase foraging habitat for these owls. A growing body of research has shown that thinning reduces the inter-tree competition for sunlight, water, and soil nutrients in the harvested stand (OR Dept. of Forestry 2008). Therefore, thinning can be used to accelerate the development of large diameter trees and snags (Bailey and Tappeiner 1998) that provide nest sites for large raptors.

Timber harvest, prescribed burning, and mechanical site preparation would reduce surface and ladder fuels. These activities would tend to reduce the risk of high-intensity, stand-replacing wildfires occurring in the area. Such hot fires could remove individual large trees or groves of trees that could provide nesting opportunities for great gray owls.

Foraging Habitat - The prescribed harvest would open stands, provide more foraging opportunities for GGO, and increase effective habitat by juxtaposing small stands of trees for nesting next to openings for foraging. Commercial thinning would reduce tree stocking levels across the project area, improving flight space and hunting effectiveness for large-bodied birds such as great gray owls. However, the reduction in canopy and crown bulk density would reduce concealing cover, potentially making these birds more vulnerable to predation by goshawks and other raptors, and to mobbing by corvids and passerine birds.

Cumulative Effects

Cumulative effects were analyzed at the forest wide scale due to the infrequency of great gray owl presence on the forest. Past, present, and reasonably foreseeable future projects considered for cumulative effects to GGO include other vegetation management projects. (Refer to Appendix A:
Table 13 and Table 14). Any actions which will create openings could provide foraging habitat for GGO for 10+ years following harvest. Thinning and selection harvests would cumulatively reduce the tree density in many forest stands, thus improving nesting habitat. The ability of large avian predators to fly through the harvested stand canopies would also be improved. These effects would be cumulative to those resulting from other, similar vegetation management projects that are active or proposed across the forest.

Effects Determination

The action would improve the amount of forage habitat, maintain sufficient nesting habitat, and reduce the risk of future intense wildfires in the project area primarily through timber harvest but also to a lesser extent in fuels reduction treatment areas. Vegetation management proposed with this alternative would be designed to maintain existing late structural stage stands (potential nesting habitat), and accelerate the development of additional late structural stage stands. Timber harvest and under-burning would create forest openings and edge habitat, and stimulate the growth of grasses and forbs in stand understories. As a result, forage resources for prey species could be improved on treated sites for a number of years. Meadows would be maintained in the project area. Therefore, the action proposed may affect individual great gray owls and their habitat, but are not likely to lead to a trend to federal listing or loss of viability of great gray owls.

Northern goshawk

Existing Conditions

Goshawk nesting habitat in eastern Washington and Oregon is generally composed of mature and older forests (McGrath et al. 2003). Nest stands are typically composed of a relatively high number of large trees, high canopy closure (50+ percent), multiple canopy layers, and a relatively high number of snags and down logs (Finn 1994, McGrath et al. 2003). Preferred stands have understories that are open enough to allow easy flight by these large-bodied birds. Gentler slopes (less than 40 percent) are normally selected for nesting.

The west zone of the CNF has embarked on a multi-year project to examine habitat use of Northern goshawks to determine the effects of forest management activities to them. West of the Columbia River, over a 20-year span, we have located more than 58 territories (20 active in 2017, 16 active in 2018 though not all nests were monitored, 27 active in 2019); captured and tagged 17 birds with GPS tags that allow some monitoring of the birds; and collected genetic material to examine landscape-level dispersal.

About 29,818 acres of potential nesting and foraging habitat exist in the watershed, about 1,645 have been lost due to harvest (figure 4). We surveyed all the highest quality habitat and a considerable amount of the moderate quality habitat using broadcast taped calls according to protocol established by Woodbridge and Hargis (2005). Within the Sanpoil project area there are eight known territories. In 2019 7 territories had active nests and one territory was occupied but reproduction did not occur. Several goshawks within the project area have been tagged which will allow assessment of effects of timber harvest on goshawks.

Figure 4: Existing and former goshawk habitat in Sanpoil project area

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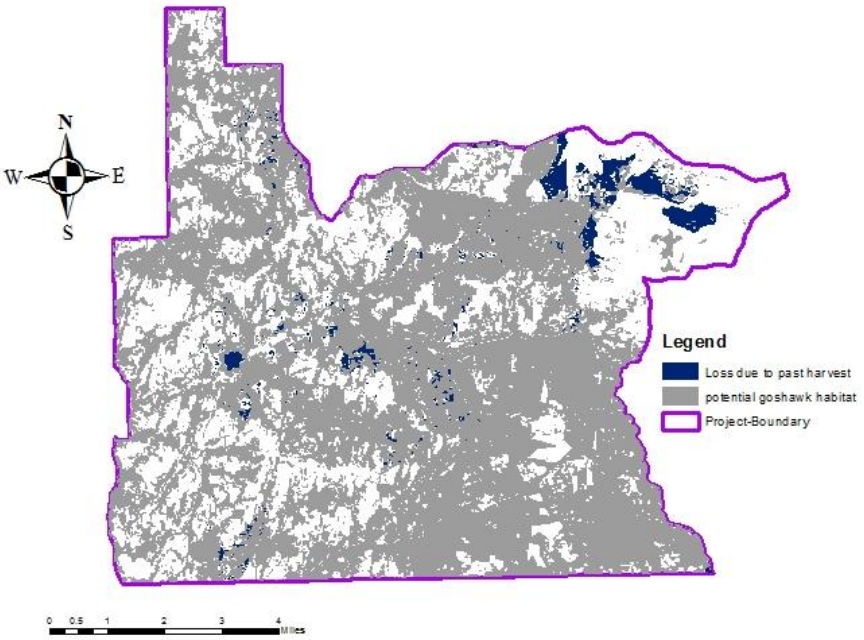


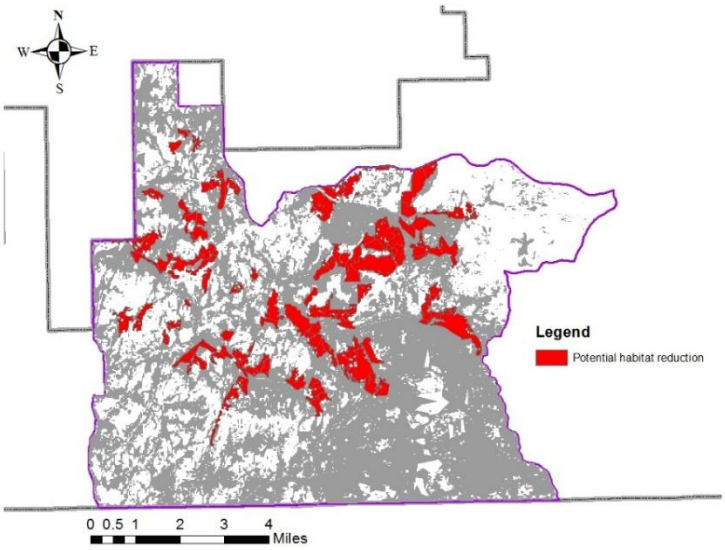
Environmental Consequences

Direct and indirect Effects –

Nesting Habitat – Units which will affect the 8 existing nest stands or the 30-acre buffers around the stands are listed in Table 4. The active nests will be monitored in the future and nesting and post-fledging area buffers adjusted if needed. In addition to the non-treatment active nest stands, alternate nest stands in which 50% canopy cover will be maintained have been designated to protect and promote future goshawk habitat. If goshawk pairs within the project area successfully reproduce, the PFA buffer will be in effect and no treatment will be permitted from March 1st to August 30th. If reproduction does not occur or is unsuccessful, the PFA buffer will not be in effect. Due to existing standard practices and design elements, most of the existing structures that could be utilized by goshawks for nesting or prey plucking should still be available post-harvest.

Foraging habitat – Of treatments proposed in the project, commercial timber harvest has the greatest potential to reduce existing nesting and foraging habitat. All goshawks tagged for the study mentioned earlier avoided moving through stands of open trees similar to those that will be created by the 293 acres of shelterwood harvest. Foraging goshawks probably would also avoid the commercially thinned stands and the free-selection stands with resulting canopy closure less than 50%. About 4,939 acres of commercial treatment could open stands to where they would be too open for goshawk use (Figure 5.) which would reduce potential goshawk habitat from 29,818 acres to 24,879 acres which is a 17% reduction.

Figure 5: Harvest units that would degrade conditions to where goshawk probably would not use harvested areas, Sanpoil project area



The ladder fuel reduction projects and prescribed fires would not negatively affect the use of an area by goshawk. Additionally, the prescribed burning and mechanical site preparation would all reduce surface fuels and fuel ladders, which would tend to reduce the risk of high-intensity, stand-replacing wildfires destroying large patches of nesting and foraging habitat in the area. The patchy conditions created by partial harvest might improve availability of food resources by increasing densities of prey that live in ecotone areas. Goshawks tagged for the project on the CNF have been frequently documented hunting these habitat edges but not frequently using the openings.

Cumulative Effects

The cumulative effects area for this species is the Colville National Forest. There are cumulative effects which will occur to goshawk habitat and individuals due to the overlap of other FS vegetation restoration projects throughout the cumulative effects area (Refer to
Table 13Table 14). These cumulative effects will be the same as direct and indirect effects described for the proposed project. The resulting cumulative effects will include reduction of foraging habitat and a potential increase in availability of food resources for the next 5-10 years. In addition, the potential abandonment of territories will be a potential cumulative effect due to other vegetation management projects. It is not clear how long a territory may be abandoned for after treatment within the nest stand proximity but through the limited amount of monitoring data which has been collected on the forest abandonment can occur for anywhere between one and four years. Any time that the territory has been abandoned reduces the breeding population and could affect the species viability.

Effects Determination

Harvest in the probable foraging area of the eight known territories could reduce habitat quality to where the birds might abandon the territory. Loss of these territories would not reduce the viability of the population. Also, since nest and PFA buffers will be enforced it is not expected for this loss to occur. Overall vegetation management activities will be designed to maintain existing late and old structural stage stands/patches and accelerate the development of additional stands. Based on this discussion, the alternatives as proposed may affect individual northern goshawks, but are not likely to lead to a trend to federal listing or loss of viability of the species.

Lewis' woodpecker

Existing Conditions

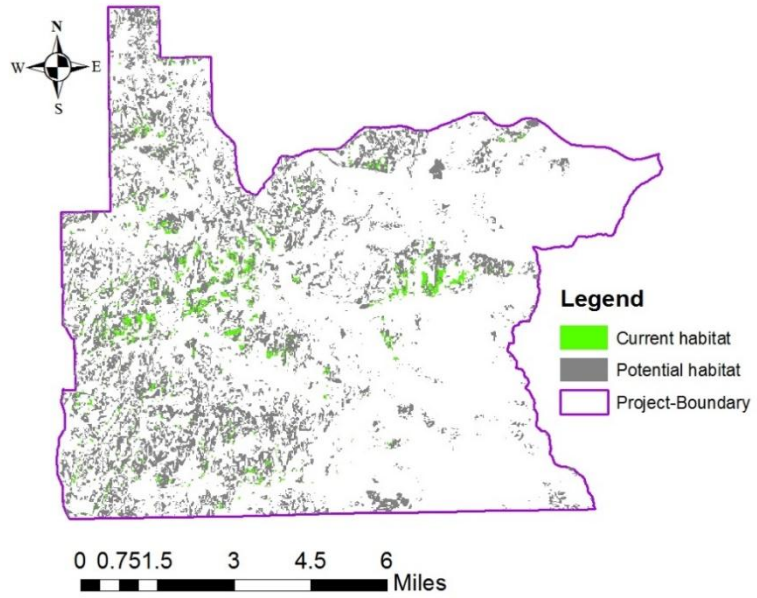
Compared to historic conditions, very few open stands of larger ponderosa pine remain in eastern Washington (Everett et al. 1994). Reasons for this in the project area include fire suppression, concomitant ingrowth of Douglas fir, some selective timber harvesting, felling of snags during harvest and other operations, and replanting with closely spaced seedlings. At lower elevations outside of NFS land, loss of snags associated with past harvest and development and loss of cottonwood riparian galleries have negatively affected available nesting habitat. Timber harvest has helped to maintain or enhance foraging habitat which is still present.

Lewis's woodpeckers have not been documented in the project area but there have been sightings within the CNF. The species is distributed locally within its range and its occurrence can be irregular (Vierling, et. al. 2013). Documented observations of the woodpecker on CNF have been mainly east of the Columbia River and along the Kettle River north of Curlew. Modeled habitat by the Northwest GAP Analysis project does not show any habitat for Lewis's woodpeckers in the Kettle Range north of Sherman Creek watershed approximately across the River from Kettle Falls.

Plant associations (Williams et al. 1995) and average stand characteristics were the basis for determining where there is potential habitat for Lewis's woodpeckers in the project area. Lewis's woodpeckers are associated with dry forest types so stands in the ponderosa pine and warm, dry Douglas-fir habitat types (Williams et al. 1995) were considered potentially suitable habitat. Currently suitable or existing habitat for the Lewis's woodpecker would be where the characteristics associated with the woodpeckers currently exist, specifically stands that have an open canopy, large trees, and abundant snags.

Approximately 7,783 acres of the project area is potential Lewis's woodpecker habitat (Figure 6). Potential habitat is described as habitat which not currently suitable and include areas that are too closed-canopied or don't have the large trees characteristic. About 830 acres are currently considered suitable habitat.

Figure 6: Current and potential Lewis' and white-headed woodpecker habitat in the Sanpoil project area



Environmental Consequences

Direct and indirect Effects –

For all treatments in existing and potential Lewis' woodpecker habitat, if snags can be maintained within the harvest units, the proposed activities will benefit Lewis' woodpeckers. About 376 acres of current Lewis' woodpecker habitat and another 2,899 acres of potential habitat will be affected by prescriptions.

The ladder fuel reduction units in both existing and potential habitat would not remove large trees but would open stands and improve habitat for Lewis' woodpeckers. Pre-commercial thinning would occur in units that only provide potential habitat because trees are too small to be used by Lewis' woodpeckers. This treatment would open stands, reduce competition among remaining trees, and result in faster growth of residual trees. These stands would provide Lewis' woodpecker habitat when the trees grow larger. Commercial harvest in existing habitat would not degrade habitat conditions because Lewis' woodpeckers occupy areas with very open canopies. Commercial harvest in potential Lewis' woodpecker habitat would improve conditions by opening the canopies. Prescribed fire would also improve conditions by improving habitat for prey as well as creating perching sites for Lewis' woodpeckers.

Cumulative Effects

The cumulative effects area for Lewis' woodpeckers consists of lower-elevation lands west of the Columbia River. Relevant past, present, and reasonably foreseeable future actions listed in Appendix A: Table 13 and Table 14 were considered specifically including; other vegetation management projects, wildfires, hazard tree removal, treatment on private lands, and firewood cutting. The beneficial effects for this proposed action will be cumulative to similar effects for other vegetation management projects that are active or proposed within the cumulative effects area. In addition, there will be additional beneficial effects from wildfires which have occurred throughout the area. Wildfires create additional snags which are essential habitat components. Hazard tree removal, treatment on private lands, and firewood cutting will add a negative cumulative effect to Lewis's woodpecker habitat as these actions will reduce the number of snags in the areas in which these actions will occur.

Effects Determination

The proposed project may impact individuals but is not likely to lead in a trend towards federal listing or loss of viability for Lewis' woodpeckers.

White-headed woodpecker

Existing Conditions

Fire exclusion and selective logging of large-diameter ponderosa pine in the early 20th century favored the development of forests with dense, small-diameter shade-tolerant species (Harrod et al. 2008, Merschel et al. 2014). As a result, old forests dominated by open, or patchy large-diameter ponderosa pine, which support white-headed woodpecker, are now a minor component of forested landscapes.

White-headed woodpeckers have not been documented in the project area but their range includes much of the region. They are uncommon throughout their range but can be locally abundant in optimal habitat. The woodpeckers are well-documented in ponderosa pine habitats in the Okanagan and Bonaparte Highlands, the southern Kettle Range, and area between the Columbia and Pend Oreille Rivers. In 2011, white-headed woodpecker surveys were conducted in the Deer Jasper project area, which is north of the Sanpoil project area, but failed to document any presence.

Plant associations (Williams et al. 1995) and average stand characteristics were the basis for determining where there is potential habitat for white-headed woodpeckers in the project area. White-headed woodpeckers have a strong association to ponderosa pine and large decayed snags (Williams et al. 1995). Currently suitable or existing habitat for white-headed woodpeckers was determined by excluding stands

within potential habitat that have canopy cover that is either too closed or too open to be considered suitable for white-headed woodpeckers or with trees that are too small. Refer to Figure 6 for a map of suitable and potential habitat.

Environmental Consequences
All effects to white-headed woodpecker are similar to those for Lewis' woodpecker: opening stands and retaining larger live trees and snags in dry, Douglas-fir/ponderosa pine stands would improve habitat for both species.

Cumulative Effects
Refer to Lewis' woodpecker as effects are the same.

Effects Determination
The proposed project may impact but is not likely to lead in a trend towards federal listing or loss of viability for White-headed woodpeckers.

Gray wolf
Existing Conditions
Presently there are 8-10 wolf pack territories partially or entirely within the boundaries of the CNF. The Strawberry and Nc'icn wolf packs are confirmed, successfully breeding wolf packs which occupied part of the project area. The WDFW website states "wolf pack territories vary in size from year to year, but usually average about 140-400 square miles" http://wdfw.wa.gov/conservation/gray_wolf/faq.html.

Ungulate prey base – Wolves could use essentially all habitats on the CNF that provide an adequate prey base. The Sanpoil project area contains both summer and winter habitat for big game, thus prey for wolves the entire year. Deer winter and summer ranges in the project area are deficit in forage habitat and exceed goals for cover habitat, which is typical of deer habitat on the Forest.

Approximately 41% of the project area (approximately 19,800 acres out of 48,000 acres) has been designated as big game winter range in the 2019 CNF Forest Plan. Approximately 8,700 acres of winter range are within proposed treatment units. Habitat component classifications were assigned that best described the stand based on field review and the following criteria;

- *Forage* - meadows, wetlands, shrubfields, forest stands in early or late open structural stages with available forage plants.
- *Hiding cover* - stands in middle structural stages.
- *Thermal cover* - stands in middle closed to late closed structural stages with at least 60 percent canopy cover and with overstory trees that are at least 40 feet tall.
- *Snow intercept thermal cover* - multi-storied stands with large trees and at least 60 percent canopy cover.

The following table shows current habitat conditions for ungulate habitat components in relation to HRV standards. Within the project area current vegetation in early structure or forage habitat for ungulates is within HRV standards for all vegetation types except subalpine fir/lodgepole pine where the current condition is below HRV. Hiding cover or stands in middle structural stages are in abundance, meaning above HRV standards. Thermal and snow intercept cover habitat is overall above HRV standards (mid-closed stands) but some habitat which can be classified as this habitat type is below HRV standards (late closed spruce/subalpine fir).

Table 10: Ungulate Habitat Components Related to HRV

Vegetation Type		Forage	Hiding Cover	Thermal and Snow Intercept Cover	Forage	Thermal and Snow Intercept Cover	% of Planning Area
Douglas-fir dry	Current	13%	22%	46%	2%	16%	74%
	HRV	6-16	2-8	4-13	38-78	1-32	
Spruce/Subalpine fir	Current	39%	12%	43%	1%	4%	3%
	HRV	14-46	0	13-41	0	29-57	
Subalpine Fir/Lodgepole pine	Current	18%	7%	59%	0%	16%	22%
	HRV	45-65	0	33-53	0	3	
Non-Forest							1%
Total		16%	19%	49%	2%	15%	

Seclusion Habitat- Recent information suggests that wolves are becoming more adapted to human activity (Weaver et al. 1996) but minimization of wolf-human conflicts are still important for wolves since the primary source of wolf mortality is due to human interactions (Mech 1995, Mladenoff et al. 1995). Wolves often avoid roads that are heavily traveled and easily accessible by humans so an important factor in determining habitat suitability is the distribution of open roads in an area (Thurber et al. 1994, Mladenoff et al. 1995). A wolf using an area with high road densities is more prone to being struck by a vehicle or shot. Additionally, wolves tend to den and maintain their rendezvous sites in areas not frequented by humans, though not always. Refer to the grizzly bear analysis for information on the amount of existing seclusion habitat (page 20). There is no management objective for open road density specific to wolves.

Environmental Consequences

Direct and Indirect Effects –

Ungulate prey base – Harvest and post-harvest activities would improve forage conditions for big game, thus wolves moving habitat conditions closer to desired conditions outlined by the forest plan. Refer to grizzly bear direct and indirect effects page 20 for detailed explanation on how the proposed action will improve forage conditions and therefore the ungulate prey base. In addition, treatments will be focused on reducing the amount of middle structure habitat thus reducing hiding cover which will also benefit wolves.

Seclusion Habitat- During the project, seclusion habitat will be reduced but post project, all roads opened for the project would be reclosed or obliterated so the amount of core area will return to its pre-project level. Refer to grizzly bear seclusion direct and indirect effects for detailed analysis.

Cumulative Effects

A characterization of cumulative effects to this species can reasonably be made at the Forest-wide scale. Refer to grizzly bear cumulative effects to forage and seclusion for analysis as effects are the same.

Effects Determination

The proposed action may impact individual gray wolves, but would not be likely to lead to a trend to federal listing or loss of viability of gray wolves.

Sensitive Bats

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Existing Conditions
Little brown and Townsend's big-eared bats are known to use caves, mines, man-made buildings, bridges and lava tubes as hibernacula or maternity sites. Within the project area there no known mines which could provide bat habitat. Many snags occur throughout the project area, and bats could use them as day roost sites.

Environmental Consequences
Direct and indirect Effects – Proposed Action
For Townsend's bats, the highest conservation priority is to reduce human disturbance and destruction of roost sites. Timber harvest would promote a structurally diverse landscape consisting of created openings, thinned stands, and unmanaged forest patches / stands. Within newly created openings, there would be a flush of herbaceous growth on the forest floor which could provide rich food sources for insect prey (Taylor 2006). Forest edge habitats would be created, potentially enhancing foraging opportunities for bats. Within thinned areas, flight space for bats would be increased, and herbaceous growth could be enhanced (Taylor 2006). A growing body of research has shown that thinning reduces the inter-tree competition for sunlight, water, and soil nutrients in the harvested stand (OR Dept. of Forestry 2008). Therefore, thinning can be used to accelerate the development of large diameter trees and snags (Bailey and Tappeiner 1998) that provide roost sites for forest bats. There is potential for unknown hibernacula, maternity, and other roosting sites to be lost due to project activities.

Cumulative Effects
A characterization of cumulative effects to this species can reasonably be made at the project area scale. Activities occurring within the cumulative effects area considered include: treatments on private inholdings within the project boundary, hazard tree removals, and firewood cutting. These activities will reduce the number of snags throughout the project area, potentially reducing the roosting sites for bats. These effects would be cumulative to those resulting from the proposed action.

Effects Determination
The proposed activities may impact individual bats but are not likely to result in a trend toward Federal listing or loss of viability for either little brown or Townsend's big-eared bats.

Sensitive invertebrates
Existing Conditions
The distribution and habitat requirements of the sensitive invertebrates listed for the CNF are poorly understood. Western bumblebees and meadow fritillary are the only sensitive invertebrates that have been documented within and in the near vicinity of the Sanpoil project area. Habitat exists for all sensitive invertebrates which could occur in the project area.

Environmental Consequences
Direct and indirect Effects –
Heavy equipment operation and prescribed burning associated with the project could directly kill individual sensitive invertebrates. Food plants could be damaged or removed. Off-setting these potential adverse effects, timber harvest would create forest openings which may result in more nectaring flowers which would benefit several species. Edge habitat would be created on the perimeters of these openings. Some of the sensitive butterflies might be able to exploit these habitats for perhaps 5-10 years, until conifer regeneration becomes well established. The herb and shrub layers within harvested units should become more robust; potentially enhancing the abundance and diversity of insect prey for sensitive dragonflies and damselflies. Streamside riparian habitats would not be affected due to treatment buffers.

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Harvest would be designed to promote hardwoods or shade-tolerant conifers within this area. Thus, the riparian vegetation and hydrologic integrity of these “hotspots” for invertebrates should be conserved.

Cumulative Effects

The cumulative effects area for sensitive invertebrate species is the Sanpoil project area. Activities considered for cumulative effects include treatment of private land, and grazing. Treatments on private lands would have similar effects to invertebrates as the proposed action along with the likelihood that down logs and wetland areas will have less protections potentially adding a negative effect to invertebrate habitat. Grazing will have an added negative cumulative effect to invertebrate habitat within the project area. Grazing has the potential to remove forage and host plants and alter the integrity of meadows and riparian habitats which are vital habitat areas for the sensitive invertebrates found on the CNF.

Effects Determination

The proposed activities may impact individual invertebrates but are not likely to result in a trend toward Federal listing or loss of viability.

Summary of Environmental Effects to TES Species

The proposed action would move the project area closer to its historic condition with regards to the tree species mix, stocking levels, stand structural stages, and fuel loading. The action would potentially reduce the extent and severity of wildfires. This action would increase forest edge habitat and the percentage of stands in early structural stages; improving conditions for big game species and many sensitive invertebrates. Snowshoe hare habitat could be recruited within created openings in 15-20 years, potentially benefitting lynx. Grizzly bears and other wildlife would be better able take advantage of existing shrub and herbaceous forage resources within the area. The following tables provide a brief summary of the effects determinations for TES species and the rationale for each determination.

Table 11: Summary of effects determinations for T&E species

T&E species	Determination	Rationale for determination
Canada lynx	May affect, not likely to adversely affect	No known lynx den site on the CNF. Potential den stands protected by avoidance. Activities near potential stands would occur outside of the denning period. Timber harvest could promote growth of snowshoe hare habitat in the project area within 5-10 years. Project would be consistent with management recommendations in the Canada Lynx Conservation Assessment and Strategy (Interagency Lynx Biology Team 2013).
Grizzly bear	May affect, not likely to adversely affect	Project is outside of the grizzly bear recovery area. Increase in disturbance and small reduction of core habitat during the project. Post-project, drivable road densities would be reduced and core habitat would be increased. Hiding cover will be degraded in the short term, hiding cover will be maintained along open roads when possible. Timber harvest and under-burning would likely improve local green forage production / palatability, and berry production over the short to mid-term.

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Wolverine	Not likely to jeopardize the continued existence of wolverines, lead in a trend towards federal listing or loss of viability, or result in the destruction or adverse modification of proposed critical habitat.	Structural stage distribution by moving it towards the more historic conditions, conditions in which wolverines evolved. For prey habitat, the Proposed Action would slightly improve conditions by improving forage.

Table 12: Summary of effects determinations for sensitive species

Sensitive species	Determination	Rationale for determination
Great gray owl	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Improve the amount of forage habitat, maintain sufficient nesting habitat, and reduce the risk of future intense wildfires in the project area primarily through timber harvest but also to a lesser extent in fuels reduction treatment areas. The development of additional late structural stage stands forage resources for prey species could be improved on treated sites for a number of years
Northern goshawk	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Move the area towards the more historic range of stand structure and size classes, conditions in which the goshawk evolved. Proposed harvest and fuels reduction treatments would reduce the risk of future, intense wildfires occurring in the project area. Harvest in the probable foraging area of three out of the seven territories could reduce habitat quality to where the birds might abandon the territory. As nest and PFA buffers will be enforced it is not expected for this loss to occur. Treatments may improve availability of food resources by increasing densities of prey.
Lewis woodpecker	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Could improve Lewis' woodpecker habitat by opening stands and retaining snags, but the amount of this habitat in the watershed, would not dramatically increase the amount of Lewis' woodpecker habitat or affect the Lewis' woodpecker population.
White-headed woodpecker	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Opening stands and retaining larger live trees and snags in dry, Douglas-fir/ponderosa pine stands would improve habitat
Gray wolf	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Improve the forage component of big game winter ranges for 10+ years. Project would move the project area towards a more historic fire regime where big game forage could be maintained.
Sensitive bats	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Project activities would either be far enough removed from known bat roost sites to have no effect on species or would be timed to avoid periods that the sites would be occupied. Activities near unknown locations could cause loss of individuals. Promote a structurally diverse landscape consisting of created openings, thinned stands, and unmanaged forest stands, moving landscape areas towards their historic conditions. Within newly created openings, there would be a flush of herbaceous growth on the forest floor which could provide rich food sources for insect prey.

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Sensitive species	Determination	Rationale for determination
All sensitive invertebrates	May impact individuals but is not likely to lead in a trend towards federal listing or loss of viability	Less mobile individuals could be killed by heavy equipment/fuel reduction operations. The action will open previously closed areas, which may favor host plants creating favorable nectaring conditions and brood-rearing habitat.

Compliance with the Forest Plan and Other Relevant Laws, Regulations, Policies, and Plans

The project alternatives as proposed would be consistent with Forest Plan (USDA 2019) standards and guidelines for TES and other wildlife. The project would be consistent with standards, guidelines, and recommendations in the grizzly bear recovery plan (USFWS 1993) and other guidance for grizzly bears (USDI et al. 1986, USDA 2011). The project would be consistent with management recommendations in the LCAS (Interagency Lynx Biology Team 2013). In addition, the project would adhere closely to management recommendations in existing conservation assessments and other guidance for sensitive wildlife species, as described in this report.

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Appendix A: Past, Present, or Reasonably Foreseeable Future Projects within the Sanpoil Project Area

Table 13: Past Actions that may contribute to Cumulative Effects

Past Actions	Timing	Description	Residual Effects
Aquatics			
Upgraded aquatic organism passage on the 2050-600 road where it crosses Ninemile creek.	2014	Install new bottomless arch to allow aquatic organisms to pass and provide passage for 100 year floods.	Would allow aquatic organisms to move upstream of the old culvert and utilize the upper reach.
Road Access			
Resurfacing six miles of road from 2350-000 to Obrien Creek	2017	Recondition and place aggregate along the 2053 road. Replace one 18" pipe and seed for turf reestablishment in disturbed areas.	Reduction in sediment input to Ninemile creek. In some cases previous fires have changed vegetation conditions by killing trees or burning up dead wood. In some cases, snags were created but their tenure on the landscape varies depending on fire intensity and weather. In most cases the fires are not continuing to have an effect that would influence the cumulative effects analysis. These fires have contributed to the existing condition and would be analyzed as part of the existing environment.
Wildfires			
White Mountain Fire	1988	5,588 acers burned in the project boundary for Sanpoil 16,395 acres in the Watershed Analysis Scale (in Hall Creek and Upper Sanpoil River watersheds)	Contributed to current tree size/structure and species composition. The White Mountain fire is in the northeast portion of the project area and more recovered over the past 30 years, than the Northstar fire which burned only three years ago and lies just to the west of the project area.
Northstar Fire	2015	43,083 acres in the Watershed Analysis Scale in the Middle Sanpoil River and Upper Sanpoil River watersheds	
Vegetation Management/Fuels Reduction Projects—Past Harvest			
Commercial Harvest	Note: listed treatments by decade are from the Forest Services' Activity Database (FACTS); additional treatments are known to have occurred, this is not mean to be an exhaustive list of every acre treated but rather an approximation of the types of treatments that led to the current conditions in the project area.		
	1950s	1,120 acres of commercial thinning, 3,290 acres of regeneration harvest 0 acres PCT	Thinning, regeneration harvest and other management has occurred throughout the
	1960s	875 acres commercial thinning, 50 acres precommercial thinning (PCT), 3,056 acres	

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Past Actions	Timing	Description	Residual Effects
		regeneration harvest	planning area. Past harvest has contributed to the current vegetative structure in the area and Reflected in the current condition assessment for forested vegetation and fuels.
	1970s	1,520 acres commercial thinning, 4,700 acres precommercial thinning (PCT), 1,730 acres regeneration harvest	
	1980s	50 acres commercial thinning, 2,020 acres precommercial thinning (PCT), 3,260 acres regeneration harvest	Thinning, regeneration harvest and other management has occurred throughout the planning area. Past harvest has contributed to the current vegetative structure in the area and Reflected in the current condition assessment for forested vegetation and fuels.
	1990s	1,960 acres commercial thinning, 1,790 acres precommercial thinning (PCT), 630 acres regeneration harvest	
	2000s	0 acres commercial thinning, 450 acres precommercial thinning (PCT), 0 acres regeneration harvest	
	2010s	400 acres commercial thinning, 0 acres precommercial thinning (PCT), 0 acres regeneration harvest	
CCT Harvest **in the three watersheds** that overlap the Sanpoil Project Area	1980s	Treatments of all types occurring between 1980 and 1989, rough estimate based on interpreted data **9,385 acres treatment**	Harvest has either been completed or is planned for the decade listed. Most treatments occur south of the Sanpoil project area and very few treatments fall into the Upper Sanpoil River Watershed.
	1990s	Treatments of all types occurring between 1990 and 1999, rough estimate based on interpreted data **21,680 acres treatment**	
	2000s	Treatments of all types occurring between 2000 and 2009, rough estimate based on interpreted data **16,733 acres treatment**	
	2010s	Treatments of all types occurring between 2010 and 2017, rough estimate based on interpreted data **991 acres treatment**	
Commercial Harvest on Private Land **in the three watersheds** that overlap the project area	July 2018 (estimated start of harvest) through December 2018	Active Forest Practices Applications in the three watersheds that overlap the project area (includes Upper Sanpoil, Middle Sanpoil, and Hall Creek Watersheds) Even-age harvest 132 acres Uneven-aged harvest 885 acres Salvage 152 acres	Harvest has been authorized by the DNR and may occur at any time during the application period. Cutting would be generally limited to smaller private holdings and could be either even aged or uneven aged harvest as noted.
	2019	Even-aged harvest 803 acres Uneven-aged harvest 87 acres	

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Past Actions	Timing	Description	Residual Effects
	2020	Even-aged harvest 623 acres Uneven-aged harvest 1,629 acres	
	2024	Even-aged harvest 64 acres Uneven-aged harvest 401 acres	
	2026	Even-aged harvest 401 acres	
	2027	Uneven-aged harvest 317 acres	
Commercial Harvest on Private Land **in the project area**	2018-2020	Even-aged harvest 427 acres	Harvest has been authorized by the DNR and may occur at any time during the application period. Cutting would be generally limited to smaller private holdings and could be either even aged or uneven aged harvest as noted.
Swan Lake 250 acre Overstory Removal	2016	Removal of fire-killed overstory trees in areas of high recreation use. Stands were previously popular for dispersed camping, hunting, and berry picking.	By removing unsafe overstory trees, and promoting a healthy green and growing understory, these areas would continue to see high levels of recreation use in the future. Stands would be converted to early seral stage, as newly established young trees begin to grow.

***Past activities listed here created current forest structure and associated wildlife habitat. These past activities can be considered in most cases as best analyzed by describing the current condition.**

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Table 14: Ongoing or reasonably foreseeable future actions that may contribute to cumulative effects.

Project Name/Activity	Timing	Description	Predicted or Ongoing Effects
Vegetation Management/Fuels Reduction Projects			
Roadside Hazard Tree Projects	2016, 2017, 2018	Removal of hazard trees within roughly 150 feet of either side of all roads within the fire perimeter	Removal of dead or dying trees along the roadside would reduce the number of snags immediately adjacent to the roadways.
Removal of Hazard Trees from Developed Recreation Sites Along Highway 20	Ongoing	Removal of hazard trees which pose a threat to recreation users. Assessment will follow developed site danger tree guidance.	Slight reduction over time of snags in developed recreation sites. Effects should continue the current trend as danger tree management has been ongoing for years.
Windstorm Understory Treatments	2017, 2018	Understory treatments including whip falling and PCT are to be completed in 2017. Treatments are likely to be completed by 2019.	Treatments in the understory are aimed at allowing good growth of remaining trees.
Sherman Pass Project	2018-2020	Treatments would include commercial harvest and fuels reduction. A portion of this project is in the watershed area but does not overlap with the Sanpoil project.	Removal of green and dead and dying trees across the project area. Follow up treatments would include prescribed burning and small pine thinning. Treatments could also result in changes to livestock management, habituation of livestock to the landscape, changes in natural barriers, and changes to the available forage base.
Prescribed Burning	Present/ongoing	The republic district has many acres slated for prescribed burning. In any given year the district conducts burns in the spring and fall seasons. As smoke emissions can be approved, conditions warrant, and staffing is available.	Prescribed burning would result in consumption of surface fuels and blackening of some residual trees would cause short term visual impacts. Smoke would be produced but effects would be very temporary lasting only a few days.
Treatment of Private Land north of McMann Creek	2017	The Northstar fire burned a portion of a large privately held parcel of timber land in 2015. The owner plans to begin salvage dead and dying trees.	Removal of snags along with temporary disturbance from logging equipment and temporary road construction needed to access timber.
Range			
Grazing	Present/ongoing	The Quartz allotment overlaps with the Sanpoil project area. Grazing is currently permitted for 328 cow/calf pairs.	Cows graze this pasture for a season of use between June and October 31. Allotment is managed under a three pasture deferred rotation grazing system.
Aquatic Resources			
Upgrade aquatic organism passage on the 2054 road where it crosses Ninemile	Installed sometime during	Install new bottomless arch to allow aquatic organisms to pass and provide	Would allow aquatic organisms to move upstream of the old culvert and utilize the upper reach.

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Project Name/Activity	Timing	Description	Predicted or Ongoing Effects
creek and on the 2054200 road where it crosses South Fork Ninemile creek.	the summer of 2020.	passage for 100 year floods.	
Invasive Plant Treatments			
Invasive Plant Treatment	Ongoing	Weed sites in and around the project area are slated for eradiation via herbicide spraying by Ferry County.	Treatments will result in a reduction in the extent of invasive plant sites and better prevention of establishment and spread.
Recreation & Transportation			
Sherman Pass BPA Powerline Management	Ongoing	Ongoing needs to maintain short segments of powerline access routes and reduce vegetation that may compete with powerline operations.	Effects would be outside the Sanpoil project area but would be inside the watershed analysis scale.
Maintenance of State Highway 20	Ongoing	Activities would include sanding, salting during the winter as well as hazard tree removal as needed along the route.	Effects would be outside the Sanpoil project area but would be inside the watershed analysis scale. Management has been ongoing for a very long time and effects are expected to continue to be well represented by the existing condition.
10 Mile Campground Restoration	2018-2020	Planned treatments would include maintaining the site west of the road and east of the road would see removal of infrastructure, removal of fill on the roads, removal of campsites and spur roads accessing sites. A small parking area would be left near the road, and access for fishing would be preserved. Plans also include removal of an outhouse. The area would be revegetated upon project completion.	Long term should result in reduced sediment to the stream, improved riparian vegetation and bank stability by limiting heavy visitor traffic close to the river.
Gibraltar Trail Connections	2019-2022	Some segments of trail approved under the project still need to be constructed mostly on existing travel ways to complete the full loop system. This includes a portion of the trail up to Quartz Mountain.	Potential sediment delivery to streams due to a few stream crossings in the area. Once the full loop trail is completed may see an increase in use.

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Project Name/Activity	Timing	Description	Predicted or Ongoing Effects
Pacific Northwest Trail Construction	2027	In two to three years the PNTA committee should have a management plan written for this congressionally designated trail. At that time work would begin to plan, analyze and designate trail routes through this area. Focusing on moving trail alignment off roads where necessary. This work of planning the new route could take 5 years. Finally there may be additional NEPA needed to authorize construction of the trail itself which could take a few years longer. Total time before ground breaking new trail is estimated to be 10 years.	Effects may include potential increase in recreation users including dispersed camping along the route even before trail routes are finalized and construction begins on the last segments.
Firewood Cutting	Present/ongoing	Cutting and removal of dead trees within 150 feet of open roads is allowed. This activity occurs in a few key areas such as McMann Creek throughout the project area.	Firewood cutting may result in a reduction in snags near roadways and may generate increased residual fuel loadings where small branches and limbs are left onsite.
Dispersed Recreation	Present/ongoing	There are 33 mapped dispersed recreation sites along FS roads where infrequent overnight use occurs.	Recreation may result in localized damage to vegetation and may contribute to the spread of invasive plants.

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